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HEXACHORDAL THEORY IN THE LATE THIRTEENTH CENTURY

VOLUME I

By

Mariamichela Russo

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ABSTRACT

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By

Mariamichela Russo

In the second half of the thirteenth century, the sight-singing practice based on a six-note unit, later known as hexachord, received a theoretical systematization in several music treatises. These treatises not only described the technical elements of solmization (gamut, hand, property, and mutation), but also developed a theoretical system in which the hexachord was regarded as a structural unit capable of interacting with other fundamental aspects of medieval music theory, such as modality, interval measurements, and *musica falsa*.

The primary focus of the present work is to provide a detailed analysis of the hexachordal theory as it appears in the treatises of the following theorists: Lambertus, Amerus, Helias Salomon, Jerome de Moravia, Johannes de Garlandia, the anonymous author of *Summa musice*, Walter Odington, Aegidius of Zamora, Johannes de Grocheio, and several anonymi from the same era. The study also includes the two fourteenth-century theorists Engelbert of Admont and Jacques de Liège, as they closely relate to the thirteenth-century stage of the hexachordal theory.

The comparative study of all these treatises reveals a multiform picture, more diversified than heretofore recognized, both in terms of solmization practice and of theoretical speculation. As regards the former, the study proves the existence of different systems of mutation, different applications of the so-called Guidonian hand, and

even alternative practices of solmization, such as the one suggested by Helias Salomon, based on five syllables rather than six. The study also gives evidence of a dispute, among thirteenth-century musicians, concerning the number of properties in solmization.

In dealing with the more speculative side of the hexachordal theory, the most interesting findings regard the relationship between hexachord and modes, especially evident in the works of Salomon and Jerome, and the relationship between hexachord and *musica falsa*. The latter receives very different treatments, as some theorists strive against the introduction of notes outside the gamut, while others try to justify such notes in terms of the hexachordal system, although starting from different premises and producing different outcomes (*falsa mutatio*, *synemmena*). Furthermore, the analysis of the definitions for the major hexachordal concepts shows the influence of Latin grammar and especially of Aristotelian philosophy. In particular, the application of the Aristotelian concept of "principle" to the hexachord seems to have been the focus of another debate among theorists.

The study also provides a careful examination of the terminology used by each theorist for the major concepts of the hexachordal theory. On the basis of such an examination, it seems appropriate to assume the existence, alongside the continental tradition, of a separate English tradition of hexachordal theory.

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

Bragard	*Jacobi Leodiensis. Speculum musicae.* Edited by Roger Bragard. Corpus Scriptorum de Musica 3. N.p.: American Institute of Musicology, 1955.
CS	Coussemaker, Edmond de, ed. *Scriptorum de musica medii aevi nova series a Gerbertina altera.* 4 volumes. Paris: Durand et Pedone -Lauriel, 1864-76
Cserba	*Hieronymus de Moravia O.P. Tractatus de Musica.* Edited by P. Dr. Simon M. Cserba. Regensburg: Verlag Friedrich Pustet, 1935.
GS	Gerbert, Martin, ed. *Scriptores Ecclesiastici de Musica Sacra Potissimum.* 3 volumes. Saint -Blaise: 1784. Reprint, Milan: Bollettino Bibliografico Musicale, 1931.
Gilles	Gilles, André. "De musica plana breve compendium: Un temoignage de l'enseignement de Lambertus." *Musica Disciplina* 43 (1989): 33-62.
Hammond	*Walteri Odington. Summa de speculatione musicae.* Edited by Frederick Hammond. Corpus Scriptorum de Musica 14. N.p.: American Institute of Musicology, 1970.
Page	*The* Summa Musice: *A Thirteenth -Century Manual for Singers.* Edited and translated by Christopher Page. Cambridge: Cambridge University Press, 1991.

Reaney-Gilles-Maillard	***Philippi de Vitriaco. Ars nova.*** **Edited by Gilbert Reaney, André Gilles, and Jean Maillard. Corpus Scriptorum de Musica 8. N.p.: American Institute of Musicology, 1964.**
Robert-Tissot	***Johannes Aegidius de Zamora. Ars musica.*** **Edited by Michel Robert-Tissot. Corpus Scriptorum de Musica 20. N.p.: American Institute of Musicology, 1974.**
Rohloff	**Rohloff, Ernst. *Der Musiktraktat des Johannes de Grocheo*. Media Latinitas Musica II. Leipzig: Kommissionverlag Gebrüder Reinecke, 1943.**
Ruini	***Ameri Practica artis musice*.** **Edited by Cesarino Ruini. Corpus Scriptorum de Musica 25. N.p.: American Institute of Musicology, 1977.**

PREFACE

The medieval hexachordal system may be defined as the organization of a fixed gamut into a number of recurrences of a six-note unit, the hexachord. Such a system evolved from the practice of solmization devised by Guido of Arezzo as a mnemonic aid for sight-singing and became the ground of musical education--the indispensable reference for both practical and speculative musicians--throughout the Middle Ages and the Renaissance.

The significance of the hexachordal system has been emphasized in recent scholarship. The works of Andrew Hughes and Gaston Allaire, both published in 1972, stressed the hexachordal implications of accidentals in late medieval and Renaissance repertories; twenty years later, Christian Berger devoted a significant part of his study on fourteenth-century French song to the central role of hexachordal theory in medieval music: only a complete understanding of the hexachordal system, he affirms, can allow modern musicians to correctly transcribe and analyze a repertory based on a *musikalische Anschauungsform* which is drastically different from the tonal system developed since the eighteenth century.[1] The aforementioned works,

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[1]The works are: A. Hughes, *Manuscript Accidentals: Ficta in Focus 1350-1450*, Musicological Studies and Documents 27 (N.p.: American Institute of Musicology, 1972); G. Allaire, *The Theory of Hexachords, Solmization and the Modal System: A Practical Application*, Musicological Studies and Documents 24 (N.p.: American Institute of Musicology, 1972); C. Berger, *Hexachord, Mensur und Textstruktur. Studien zum französischen Lied im 14. Jahrhundert*, Beihefte zum Archiv für Musik-wissenschaft 35 (Stuttgart: Steiner, 1992). Berger uses the

along with other fundamental studies primarily concerned with Guido of Arezzo's role in the development of the hexachordal system, have shed considerable light on the subject.[2] However, the emphasis of these contributions seems to lie either on the origins or on the practical applications of the hexachordal theory, regarded as a virtually uniform system.[3]

A careful examination of the theoretical sources related to hexachordal theory reveals a far more diversified picture. This is especially evident in the second half of the thirteenth century, when descriptions of the hexachordal system appeared in a host of treatises on *musica plana*, as another instance of that era's characteristic desire to give all aspects of knowledge a rational systematization. Far from simply describing a uniform practice, these treatises offer quite different interpretations of the hexachordal system and even propose distinct applications or refer to peculiar usages.

The present study aims at showing the state of the hexachordal theory at this particular stage of development by analyzing and

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expression "musikalische Anschauungsform," borrowed from Dahlhaus, to define the network of relationships among the tones of a gamut. It is indeed this network of relationships which differentiates the medieval system from the modern one, not the tonal material, which is defined as *Tonbestand*.

[2]A list of these valuable studies can be found in the bibliography. Some of these works will be discussed in the course of the first chapter in connection with particular issues related to the theoretical meaning of the hexachord and the historical development of the hexachordal theory.

[3]This shortcoming is especially evident in Allaire's treatment of solmization, where rules derived from late Renaissance treatises are applied unconditionally to the whole repertory. See A. Planchart, review of *The Theory of Hexachords, Solmization and the Modal System*, by G. Allaire, in *Journal of Music Theory* 18/1 (1974): 213-223.

comparing some thirteenth-century descriptions of the subject, either in works specifically on *musica plana*, or in treatises whose treatment of *musica plana*--usually placed at the beginning, as an introduction to the basics of music--is only part of a larger inquiry.

The study devotes a chapter to each major theorist, in chronological order, starting from Lambertus and including Amerus, Elias Salomon, Jerome of Moravia, Johannes of Garlandia, the anonymous author of *Summa musice*, Walter Odington, Egidius of Zamora, Johannes de Grocheio. A brief survey of some anonymous treatises of the thirteenth-century is provided in chapter nine, along with the analysis of two early fourteenth-century *summae*, Engelbert of Admont's and Jacques of Liège's, which for their contents and perspective still belong to the thirteenth-century stage of the hexachordal theory.

The analytical study regards the following aspects of hexachordal theory:

1-the relationship between letters and syllables, with particular attention to terminology;

2-the classification of hexachords through the use of the concepts of property (*proprietas*) and deduction;

3-the process of mutation;

4-the relationship between hexachords and modes or modal theory;

5-the implication of *falsa musica* in the hexachordal system;

6-the use of hexachordal syllables to measure intervals.

For some treatises, which only deal with part of the hexachordal system, it has not been possible to analyze all of the aforementioned aspects. For all treatises, I have tried to highlight any possible

reference to their cultural milieu, in particular any allusion to Aristotelian philosophy.

The reader will find a brief summary, at the end of each chapter, with the major findings about each theorist. A more detailed account of the results of this inquiry is found in the last chapter of the present study.

Chapter 1

A BRIEF SURVEY OF HEXACHORDAL THEORY AND ITS DISCUSSION IN MODERN SCHOLARSHIP

As a point of departure, the present chapter will offer an introductory review of the basic concepts related to the hexachordal theory of the thirteenth century, followed by a brief discussion of the major musicological studies on the subject.

1. The "Standard" Hexachordal System

While my work intends to focus primarily on the different ways thirteenth-century theorists dealt with the description of the hexachordal system, and on how the general thinking of the era affected them, the present section will examine what may be called the "standard" hexachordal theory, a series of basic concepts which form the ground for any of those theoretical descriptions. This "standard" hexachordal theory is obviously a useful abstraction for the purpose of comparing the individual descriptions; nevertheless, it is also historically justified by the fact that it represents the necessary basis of many a theoretical description through more than four centuries.[1] That such a persistence should also be regarded as evidence of a basically unchanged hexachordal theory and practice

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[1]The way the hexachordal system evolved through those centuries is beyond the scope of the present study. Useful information about such a development may be gathered from several studies listed in the bibliography, especially those regarding *musica ficta* and *coniuncta*.

throughout the late Middle Ages and the Renaissance may be argued on the basis of the observation that the "standard" theory is in any case the necessary premise, the common background, from which any musical discussion must start, even when such a discussion intends to promote completely new theories or practices.[2]

In turning now to the examination of the standard hexachordal theory, I should like to premise that the subject will be treated, as much as possible, as a theoretical crystallization, independent of historical connections. For the purpose of clarity certain terms are preferred here, while the matter of actual thirteenth-century terminology will be surveyed in a separate section and then specifically treated in connection with each theorist.

The theoretical gamut underlying the hexachordal theory is a succession of twenty-one or twenty-two pitches, according to whether the high *e"* is included or not.[3] On a first level, these pitches are defined by alphabetical letters, from *A* to *G*, repeated to show octave equivalence. In fact, the gamut covers two and a half octaves, employing capital letters for the lowest octave, small letters for the middle octave, and double small letters for the highest octave. As the only exception, the very lowest pitch is designated by the Greek letter

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[2]This is the case with Pareja's *Musica Practica*, where he offers a thorough description of the hexachordal system with the intent to propose an octochordal system based on the syllables *psal-li-ter-per-vo-ces-is-tas*. See C. Terni, *Música práctica de Bartolomé Ramos de Pareja* (Madrid: Joyas Bibliográficas, 1983).

[3]From now on, the medieval letter notation will be used, as is customary in most modern scholarship on the subject. In modern letter notation the medieval gamut extended from G (Γ) to d" or e" (dd or ee). See *Harvard Concise Dictionary of Music*, comp. D. Randel (Cambridge, Mass.: Belknap Press, 1978), s.v. "pitch names."

Γ. The first eight notes, from Γ to *G*, are usually defined as low (*graves*), the notes of the middle octave, from *a* to *g*, as high (*acutae*), while the highest notes, from *aa* to *dd* or *ee*, are called very high (*superacutae*).[4] Furthermore, in the *acuta* and *superacuta* regions, the gamut allows two pitches for the letter *b* (that is, *b* and *bb*), corresponding to *b* natural and *b* flat. The *b* flat is specifically forbidden for the lowest octave. Two different letter shapes and names are used to differentiate the two types of *b*: *b*, the *b* flat, is called *b rotundum* (round *b*), in reference to the shape, and *b molle*, in reference to the sound produced; ♮, the natural *b*, is called *b quadrum* or *quadratum*, as to the shape, and *b durum*, as regards the sound.[5] The notes of the gamut are arranged diatonically in the following order of

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[4]This division is found in Guido's *Micrologus*. See *Guidonis Aretini Micrologus*, ed. Joseph Smits van Waesberghe, Corpus Scriptorum de Musica 4 (N.p.: American Institute of Musicology, 1955) and *Hucbald, Guido and John on Music: Three Medieval Treatises*, ed. C. Palisca, trans. W. Babb (New Haven: Yale University Press, 1978), p. 59.

As will be discussed in reference to the single theorists, tetrachordal divisions of the gamut were also used along with the one based on the octave.

[5]The terms *durum* and *molle* and their implications will be discussed again in the section 3.4 of the present chapter. I also would like to specify that in Latin both the neuter and the feminine genders are used for letters or notes, so that the forms *dura*, *mollis*, *rotunda* and *quadrata* can be found along with *durum*, *molle*, *rotundum*, *quadratum*. Jacques of Liège notes that the neuter gender is used with respect to the element, the feminine with respect to the letter ("non est vis si tacta litterarum nomina nunc in neutro, nunc in femineo ponantur genere; sic enim illis utuntur actores ut per respectum ad nomen elementi neutra sint, ad nomen litterae feminina." Bragard, p. 185). For the purpose of uniformity, I will always use the neuter when speaking in Latin terms.

tones and semitones:

Γ A B C D E F G a b c d e f g aa bb cc dd (ee)

T T S T T S T T S T T T S T T S T T T

(a) ♮ (c) (aa) ♮♮ (cc)

T S T S

The presence of the two *b*'s, *b* natural and *b* flat, does not alter the diatonic structure of the gamut, since they are always used as mutually exclusive, never as two semitones in a row, which would be the characteristic progression of the chromatic genus.[6]

The notes in the gamut, however, are defined also by monosyllabic, singable names. Inside the gamut, along with the octave, there operates another principle, based on a six-note pattern: the hexachord. This is a six-note series characterized by a central interval of a semitone flanked by two whole tones on both sides. The six notes are defined, in ascending order, by the monosyllabic names ut re mi fa sol la, names which correspond to the initial syllables of the first six half-verses of the hymn "Ut queant laxis."[7] The primary

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[6]The Greek diatonic genus included both b natural and b flat, in the Greater and the Lesser Perfect Systems respectively. The alternative use of one or the other does not give rise to the succession of two semitones which would disrupt the diatonic genus. On the diatonicism of the two b's in medieval theory see C. Dahlhaus, "Die Termini Dur und Mol," *Archiv für Musikwissenschaft* 12 (1955): 280-296.

[7]Other syllables were also used to indicate the six steps, especially in the early stage of the theory. The most famous alternative set is *tri pro de nos te ad*, whose syllables seem also to point to the modal finals. See J. Smits van Waesberghe, *De musico-paedagogico et theoretico Guidone Aretino eiusque vita et moribus* (Florence: Olschki, 1953), pp. 101ff. This subject will be treated in greater detail in the following section.

purpose for the use of these syllables is solmization, i.e., the technique of sight singing based on the utterance of melodic intervals by means of syllables.[8] In fact, the principal melodic intervals, which Guido calls *consonantiae*, can be expressed through the six syllables of the hexachord at any pitch level of the gamut.[9]

The hexachordal unit is indeed found in seven different locations of the gamut, i.e., starting on Γ, *C*, *F*, *G*, *c*, *f*, *g*, according to the following diagram:

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[8]As Andrew Hughes defines it, solmization is "the use of syllables in association with pitches as a mnemonic device for indicating melodic intervals." A. Hughes, "Solmization I: European Medieval and Renaissance Systems," *The New Grove Dictionary of Music and Musicians*, ed. S. Sadie (London: Macmillan, 1980) 17: 458-462. Martin Ruhnke distinguishes between a narrower meaning, as the medieval technique based on the Guidonian hexachord, and a broader meaning, as any method to sing with syllables which stand for melodic intervals. M. Ruhnke, "Solmisation," *Die Musik in Geschichte und Gegenwart*, ed. F. Blume (Kassel: Bärenreiter Verlag, 1949-1967) 12: 843-852.

[9]*Consonantiae* in this particular sense are the melodic intervals of tone, semitone, ditone (major third), semiditone (minor third), diatessaron (perfect fourth), and diapente (perfect fifth). See *Hucbald, Guido, and John on Music*, p. 61.

(*ee*)								la
dd							la	sol
cc							sol	fa
bb natural								mi
bb flat								fa
aa						la	mi	re
g						sol	re	ut
f						fa	ut	
e					la	mi		
d				la	sol	re		
c				sol	fa	ut		
b natural					mi			
b flat					fa			
a			la	mi	re			
G			sol	re	ut			
F			fa	ut				
E		la	mi					
D		sol	re					
C		fa	ut					
B		mi						
A		re						
Γ		ut						

In this diagram, pitches are now defined by both one letter and one or more syllables. As a mnemonic aid, the diagram is often found represented as a hand, in which each note (combination of letter and syllable/s) is written on a joint or finger tip.[10] Because of this

common representation, the gamut is also called "hand" (*manus* or *palma*).

The seven rows of six syllables which are found in the hand are the deductions.[11] Even though the deductions may be called hexachords as well, it is not useless to keep a distinction between the two terms, with hexachord to mean the unit in the abstract and deduction to mean any of its particular locations in the gamut.[12] The seven deductions are then classified into three different categories, called properties (*proprietates*), according to the location of the semitone mi-fa: when the semitone falls between the pitches *b* natural and *c*, the hexachord is called *durum*, i.e., hard; when the semitone occurs between *a* and *b* flat, the hexachord is called *molle*, that is, soft; finally, when the semitone occurs between *e* and *f*, the hexachord is called natural or proper (*natura*, *naturalis* or *proprius cantus*).[13] Thus, what really

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[10]For a more ample discussion of the hand and the different placements of notes on it see section 4 in the present chapter. The primary study devoted to this subject remains J. Smits van Waesberghe, *Musikerziehung: Lehre und Theorie der Musik in Mittelalter*, Musikgeschichte in Bildern III/3 (Leipzig: VEB Deutscher Verlag für Musik, 1969).

[11]The Latin term *deductio* actually belongs to a later stage of the hexachordal theory. However, it is commonly used in modern scholarship both in the original version and in its English translation. For the definition of *deductio* as given by a later authority like Tinctoris, see *Johannes Tinctoris Opera Theoretica*, ed. A. Seay (N.p.: American Institute of Musicology, 1975), p. 45, and A. Seay, "The Expositio Manus of Johannes Tinctoris," *Journal of Music Theory* 9 (1965): 212-214.

[12]The importance of such a distinction will be proven especially in connection with the influence of scholasticism on thirteenth-century terminology. See chapter four, pp. 142f, in the present study.

[13]The *durum* hexachord is sometimes called *duralis* and the soft one *mollaris*, in agreement with the other, *naturalis*.

determines the property of the hexachord is the presence (or absence, in the case of the natural hexachord) of either *b* natural or *b* flat.

Since relatively few chants stay in the range of a single deduction, it is usually necessary to move to other ones. This transition from one deduction to the next one, either in ascending or descending motion, is accomplished through the process of mutation, which consists in switching syllables on a pitch common to both deductions. Thus, for instance, if a song starts in the first deduction, with the ut on Γ, and then moves up beyond the upper limit of the hexachord, in this case *E*la, then it is necessary to mutate to the next deduction, which starts on *C*. The way to accomplish that is to switch syllables on one of the three pitches which are common to both deductions, that is, *C* fa ut, *D* sol re, or *E* la mi. Obviously, when only one of these pitches is present, that will be the place of mutation. If there are several possibilities, the general rule is to mutate at the last possible moment.

2. A closer look at the elements of the system: Some questions of terminology[14]

Most descriptions of the hexachordal system start with the definition of the two basic elements for the identification of notes in the gamut: letters and syllables. These may be seen, as proposed by

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[14]Although the subject of terminology will be treated more specifically in connection with each of the thirteenth-century theorists examined in this study, a brief survey of the principal terms that will be encountered seems appropriate at this stage of the discussion.

Wegman, as two sub-systems, in which the former define the number and the order of the available steps, while the latter determine the intervals surrounding each step; to use Lange's analogy, letters may be regarded as symbols for the eye and syllables as symbols for the ear.[15] However, the most comprehensive treatment of the function of letters and syllables, as well as of the most commonly used terms *littera*, *vox*, *clavis*, and *nota*, is found in Christian Berger's study on fourteenth-century music, to which I will refer in the course of this section.[16] There, letters are thus described:

> The "septem alphabeti litterae" mark, since the *Dialogus de musica*, the steps of the tonal system which were representable in a rational way and could therefore be concretely shown on the monochord by means of a proportional measurement.[17]

According to Berger, letters are the *Rohmaterial*, the precondition for notating chant, which in turn is the prerequisite to reproduce, i.e., perform, its vast repertory. In fact, the structuring of the tonal system, with the differentiation of the seven notes in the octave by means of seven different letters and the affirmation of octave replication by means of similar letters, was a fundamental step towards the development of music writing.[18] However, with the use of

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[15]See R. C. Wegman, "Musica ficta," *Companion to Medieval and Renaissance Music*, eds. T. Knighton and D. Fallows (New York: Schirmer Books, 1992), p. 265, and G. Lange, "Zur Geschichte der Solmisation," *Sammelbände der Internationalen Musikgesellschaft* I (1899-1900), p. 535.

[16]Especially to the section entitled *Zur Terminologie der Musiklehre*. Berger, *Hexachord*, pp. 92-100.

[17]"Die 'septem alphabeti litterae' bezeichnen seit dem *Dialogus de musica* die Stufen des Tonsystems, die auf rationale Weise darstellbar waren, die also konkret am Monochord mit Hilfe einer proportionalen Messung dargestellt werden Konnten." Ibid., p. 96.

[18]Ibid., pp. 96-97.

specific graphic symbols (*notae*) to represent sounds, and with the development of staff notation, the reference to this underlying tonal system expressed by letters was not an absolute necessity for the singer, who could read and perform chant without knowing much of the theoretical structure. On the other hand, the symbolic notation by itself, without having in mind the system expressed by letters, was not self-sufficient, since it still left the singers to wonder about the positions of tones and semitones. The correct delivery of intervals, without the slightest hesitation between tones and semitones, became indeed the fundamental issue for singing, an issue which was successfully addressed by Guido of Arezzo in the eleventh century. To be sure, the already available set of letters could have been used again as a constant reference for the *notae*; instead, Guido devised new names, the solmization syllables, to be superimposed on the *notae* and used as a valid aid in singing. Why? The reasons for such an outcome may be several. First of all, as Berger suspects, singers must not have been familiar with the literal arrangement of tones, so letters would have been just as foreign and abstract as almost any other set of artificial names; on the contrary, the syllables proposed by Guido were extrapolated from a familiar hymn and could always be related to the musical context of that hymn. Furthermore, solmization syllables had the great advantage of indicating the semitone always in the same way, as mi-fa, without worrying about its pitch location. Also the arrangement of the solmization syllables into a unit of six notes, the hexachord, seemed well suited to a repertory which rarely presented

intervals larger than a fourth or a fifth and virtually never used the octave.[19] Last, but not least, solmization syllables were singable names for sounds, much easier to deliver than letters. Whatever the reasons for creating these syllables, they became the standard way for reading music and learning intervals.

The terms commonly used in thirteenth-century treatises for letters and syllables are, respectively, *litterae* and *voces*. Both terms came from grammar, and in their musical usage shared some of the same semantic range of their grammatical counterparts. *Vox*, as the general term for any sound produced by the vocal organ, was applicable to both musical sounds and language sounds. As a consequence, grammatical statements about *vox* were used in musical treatises as well. For instance, the distinction, made by Priscian, between *vox literata* and *vox illiterata*, i.e., between sounds that can or cannot be written down in letters, was echoed or paraphrased in several music treatises, including the thirteenth-century *Scientia artis musice* by Elias Salomon.[20] Furthermore, as early as the *Musica Enchiriadis*, language letters and musical sounds were correlated as the elemental,

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[19]The remark that in Gregorian chant intervals larger than a fourth are rare is found in Berger, *Hexachord*, p. 97. R. Hoppin, in his article, has emphasized the role of the fifth degree in the melodic and tonal organization of Gregorian chant. R. Hoppin, "Tonal Organization in Music Before the Renaissance," *Paul Pisk, Essays in His Honor*, ed. John Glowacki (Austin: College of Fine Arts, University of Texas, 1966), p. 29. The importance of the fifth degree could also explain the passage from tetrachordal to hexachordal structure in medieval tonal system. Crocker has stressed that the octave is too large a unit in chant to be of any practical use. See R. Crocker, "Hermann's Major Sixth," *Journal of the American Musicological Society* 25 (1972): 29.

[20]For a full discussion of Salomon's definition, and its reference to grammar, see below, chapter four, pp. 128-129.

not further divisible parts of, respectively, grammar and music.[21] As Berger notes, the rise of the *Grammatica speculativa* in the twelfth century, with its shift of emphasis from the form to the meaning of words, affected music theory too, especially in terms of the new definition of *vox*, now classified as *alia significativa* and *alia non significativa*. However, Berger seems to confine the influence of the new *Sprachlogik* on music theory to the quotation, by some music theorists, of the Aristotelian definition of *vox* as a sound endowed with meaning.[22] It is reasonable to posit, though, that even as a musical term the word *vox* underwent a similar change in meaning, and from its generic connotation of a sound came to be applied to a sound with a specific meaning, that is, a sound with a musical function. Thus, the term *vox* can be found in several thirteenth-century treatises as a synonym for solmization syllable. Although some theorists explicitly state the distinction between *voces* (sounds) and *vocabula vocum* (solmization syllables), such a distinction tends to disappear in the actual treatment of the hexachordal theory.[23]

Another term which is often found in connection with pitch denomination is *clavis*. The term originated in musical practice, and was used with different connotations.[24] In the hexachordal theory, the

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[21]See Berger, *Hexachord*, pp. 94ff. Again, Elias Salomon resumes the analogy between music and language and compares letters, from the combination of which arise syllables, words, and ultimately speech, to musical letters/solmization syllables, which combined produce hexacords, modes, and ultimately songs. See GS III, p. 20.

[22]As an example, Berger quotes Jacques of Liège. Berger, *Hexachord*, pp. 95-6.

[23]For example, see Engelbert's emphasis on the subject, disproved by his own ambivalent usage of the term *vox*. See below, chapter ten, pp. 311, 322.

term seems, at first, to be a mere synonym of *littera*. However, as Berger has noted, *clavis* more often refers to a letter associated with a particular tonal level, while *littera* seems rather to express an abstract, mathematically measured pitch. In his analysis Berger also relates *clavis* to *nota* and states that both terms point to an actual sounding tone, measurable on the monochord. Nevertheless while *clavis* still refers to a *littera* at a particular tonal level, *nota* is more specific for the actual pitch: thus, he continues, the two *voces b* mi/*b* fa are the same *clavis*, but not the same *nota*.[25]

As these distinctions may begin to suggest, the meaning of the term *clavis* is far from being unequivocal. For instance, Jerome of Moravia's assertion that *b* mi and *b* fa are the same *littera* yet two different *claves* seems to give the term *clavis* the meaning Berger attributes to *nota*, i.e., that of a specific pitch distinct from its *littera*.[26] Consequently, the Moravian theorist uses the term *clavis* mostly to define the combination of letter and syllable/s that denotes a certain pitch, such as Γ ut, *A* re, and so forth. Thus, already in the thirteenth century the meaning of the term *clavis* as a letter-syllable combination is attested, against Henderson's belief that the first instance of such an usage appears in Jacques's *Speculum*.[27]

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[24]Berger, *Hexachord*, pp. 98-99, and *Handwörterbuch der musikalischen Terminologie*, ed. H. H. Eggebrecht (Wiesbaden: Steiner, 1972-), s.v. "Clavis," by F. Reckow.

[25]Berger, *Hexachord*, p. 100.

[26]Cserba, pp. 48ff.

[27]Henderson, in his chapter on terminology, defines *clavis* as a special tonal location, first corresponding to a simple letter, and later, from the fourteenth century, to a composite letter-syllable term. R. Henderson, "Solmization Syllables in Musical Theory: 1100 to 1600" (Ph.D. diss., Columbia University, 1969), p. 51.

Another theorist, Elias Salomon, uses the term *clavis* still in a different, and quite unique meaning, to signify hexachord.[28] Salomon also uses the peculiar term *punctus* to indicate a solmization syllable, while other theorists prefer *nota*. However, such specific usages will be better analyzed in the course of the present work, in the chapters corresponding to each theorist.

While the term hexachord is a much later acquisition, the concept of a six-note row finds different terminologies in thirteenth-century theory. All theorists classify the hexachord into the three types of natural, hard and soft, and most of them use the term *proprietas* to express the rationale of such a classification. Not all theorists, though, make a clear terminological distinction between the three types of hexachord and the seven resulting series in the gamut, in other words, between *proprietas* and what will be later called *deductio*. The term *deductio* does appear in the treatise, attributed to Garlandia, *Introductio musice*, yet apparently with the meaning of letter-syllable combination. Some theorists propose a specific terminology for the concept of *deductio*: thus Amerus speaks of seven *cunae* (cribs), that is, seven positions in the gamut in which the hexachord can be "embedded."[29] Other theorists, on the contrary, prefer to use a single term with different connotations: Elias Salomon, for instance, applies

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[28]See the discussion in chapter four of the present study.

[29]The existence, in Amerus's treatise, of a specific term for the six-note row contradicts Henderson's statement that until the mid-fourteenth century there was no term to denote the series of six notes as something distinguished from *proprietas*. See Henderson, "Solmization Syllables," p. 70.

the term *clavis* to both the general idea of hexachord and to its seven positions in the gamut. As to the three *proprietates*, a certain uniformity can be found for the soft and hard types (*durum* or *duralis*, *molle*), even though occasionally the terms for the two shapes of the letter *b*, *quadratum* and *rotundum*, are applied to the *proprietates* as well. For the third property, two terms are used: *natura* and *proprius cantus*, each employed on the basis of different etymological arguments.

Complete agreement among all the theorists examined can be found for the term mutation. A few of them assign one or more qualifications to the term and give slightly different definitions, yet the concept and the terminology are quite homogeneous. The term might have come from Aristotelian philosophy, where it refers to a change in a substance which nevertheless maintains its essence.[30] This definition appropriately applies, in the hexachordal theory, to the process of switching hexachords on a given note: the mutating note maintains its "essence," in other words there is no variation in pitch, yet its function, its position in the hexachord, changes; consequently, the mutated note, even though identical in terms of pitch, is really changed on the level of tonal relationships.

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[30]The Latin term *mutatio* is the translation for the Greek *metabolè*. Aristotle devotes the third book of *Physics* to the discussion of *motus* and *mutatio*. See *The Works of Aristotle*, ed. W. D. Ross, Vol. II *Physica*, trans. R. P. Hardie and R. K. Gaye (Oxford: Clarendon Press, 1970), III 200b. See also M. deWulf, *Philosophy and Civilization in the Middle Ages* (New York: Dover, 1953). F. Turrell sees a historical continuity between the Greek *metabolé* and the medieval *mutatio*, up to the modern concept of modulation. F. Turrell, "Modulation: An Outline of Its Prehistory from Aristoxenus to Glarean" (Ph.D. diss., University of Southern California, 1956).

3. The hexachordal theory in modern scholarship

3.1. The relationship between hexachord and tonal qualities

Since the time that Handschin, in his study on the *Toncharakter*, denied any connection between hexachordal syllables and tonal qualities, not many scholars have investigated the possibility of such a connection.[31] The subject is relevant here both because it explores the nature of the hexachord--either as a mere practical tool, or as also a theoretical instrument fundamental for the understanding of the tonal system--and because it involves the relationship between Guido's first conception and the later development of the hexachordal theory.

For the sake of clarity, we may define a tonal quality as the character or property that a given note receives from its relationships with the surrounding notes.[32] It is different from pitch, in that pitch characterizes a note in terms of mathematically measured distances. Now, either pitches or qualities can be used to build a tonal system. For instance, the first treatise that distinguishes between pitch and quality, the *Musica enchiriadis*, recognizes only four qualities, expressed by four different symbols, and arranges them into tetrachords to build a system with replication at the fifth, rather

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[31] J. Handschin, *Der Toncharakter: Eine Einführung in die Tonpsychologie* (Zurig: Atlantis Verlag, 1948).

[32] "When it is brought up for its [a tone's] description which intervals lie above or below it, that may be understood as a paraphrase of the tonal quality." ("Wenn zu seiner Charakterisierung angeführt wird, welche Intervalle über und unter ihm liegen, darf dies wohl als eine Umschreibung der Tonqualitat aufgefasst werden," Handschin, *Toncharakter*, p. 316.) We should keep in mind, however, that Handschin also derived the concept of tonal quality from the circle of fifths.

than at the octave. The resulting scale--which Handschin regards as an ideal rather than a usable scale on account of its lack of octave replication--is the well known succession:

G A Bflat C / D E F G / a b c d / e f♯ g a / b c♯.[33]

As we turn our consideration back to the hexachord, that is, to a theoretical instrument which developed through several centuries, the question of its relationship with tonal qualities may need to be approached from a diachronic point of view. Indeed, we might find different results at different stages of development of the hexachordal theory, especially as we compare Guido's words with later theorizations. The German musicologists Handschin and Oesch, indeed, believe that Guido's six-note row was substantially different from the later hexachord and should not be regarded, by any means, as a series of six tonal qualities. In all of Guido's writings, the two musicologists maintain, he recognized either four or seven qualities, namely the four finals *D*, *E*, *F*, *G*, and the seven *discrimina vocum* of the octave; consequently, to admit six tonal qualities, corresponding to the six degrees of the hexachord, would be in contradiction with Guido's emphasis on the octave.[34] What is then for Handschin and Oesch the six-note unit described by Guido? There are two major references, in Guido's writings, to this six-note unit. The first one is the

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[33]Handschin devotes a large discussion to the question of tonal quality in *Musica enchiriadis* in his *Toncharakter*, pp. 316ff. Crocker too refers to *Musica enchiriadis* in his tracing of the development of the medieval tonal system. See Crocker, "Hermann's Major Sixth," pp. 25ff.

[34]Handschin, *Toncharakter*, p. 325, and H. Oesch, "Hexachord I: Das guidonische Hexachord," *Die Musik in Geschichte und Gegenwart* 6: 349-352.

famous passage in the *Epistola*, where Guido introduces his new method for reading music; the second one is found in chapters seven and eight of *Micrologus*, which deal with the doctrine of affinity. It is especially on this latter reference that Handschin bases his interpretation of Guido's hexachord. In the seventh chapter of *Micrologus* Guido introduces four *modi vocum* which for Handschin correspond to four qualities:

> The first mode of notes arises when from a note one descends by a tone and [118] ascends by a tone, a semitone, and two tones, as from A and D. The second mode arises when from a note one descends by two tones and ascends by a semitone and two tones, as from B and E. The third is that in which one descends by a semitone and two tones but ascends by two tones, as from C and F. The fourth goes down by a tone but rises by two tones and a semitone, like G.[35]

In the previous passage, the first three modes of notes unfold inside a major sixth, starting on *G* for the notes *A*, *B*, *C*, and on *C* for the corresponding notes *D*, *E*, *F*. The fourth mode, on the contrary, outlines only a fifth, from *F* to *C*. According to Handschin, the sixth of the first three modes of notes (*modi vocum*), which is usually identified with the later hexachord, is simply the range in which the affinity between notes with the same tonal quality may be shown and is substantially different from the hexachord of the later theory.[36]

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[35]*Hucbald, Guido, and John on Music*, p. 63.

[36]For instance, the affinity between A and D, notes of the same *modus vocum* or quality, extends only within the limits of six notes, since if we go further there is no longer correspondence between the two notes:

E F G A B C D E *F G A*
S T T T S T T *S T T*

A *B* C D E F G A *B C D*
T *S* T T S T T T *S T*

The italics shows the non-correspondence of notes beyond the range of the sixth.

Guido's words only point to the recognition of a symmetry inside the system, namely the correspondence between the two segments G-E and C-A, in which the similarity, or affinity, extends between notes which lie a fifth apart at most. However, to use Handschin's words, "it is different, though, to establish a double row of similarities of six notes, or better, to acknowledge that the similarity at the fourth and at the fifth extends at most in this series of tones, from taking these six tones as a series of different tonal qualities."[37] For Handschin, the latter is a step that later theorists took. Starting as soon as the eleventh century, they extrapolated the sixth of the first three modes of notes as a unit in itself, and transposed it at different levels in the gamut. Consequently, besides the sixths on *G* and *C*, another sixth or hexachord was built on *F* by switching from *b* natural to *b* flat. This first transposition of one of the two original sixths, namely the sixth *C*-*A*, gave way, gradually, to the introduction of new transpositions by means of new accidentals, resulting eventually in the dissolution of the whole hexachordal system. Thus, Handschin's interpretation can be summarized in the following points:

1-Guido did not intend the sixth as a structural unit to be moved in the gamut, but simply acknowledged the similarity between the sixths on *G* and on *C*;

2-the two sixths, however, are two different entities, and not the same series transposed, since the one on *G* has a semitone above, while the one on *C* has a semitone below;

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[37]"Aber es ist etwas Verschiedenes, eine Aehnlichkeitdoppelreihe von sechs Tönen aufzustellen, das heisst zu konstatieren, dass die Quarten- und Quintenähnlichkeit maximal durch eine solche Tonfolge durchläuft, oder aber diese 6-Ton-Reihe als die der voneinander verschiedenen Qualitäten zu nehmen." Handschin, *Toncharacter*, p. 335.

3-consequently, the idea of transposition is in contradiction with Guido's view, because it presupposes that the two sixths are not different, but rather transpositions of the same unit, a series of tonal qualities which are maintained unaltered at different locations;
4-the introduction of the concept of transposition brought about first the hexachord on *F*, which is against Guido's basic diatonicism, and later the use of other hexachords and accidentals which eventually broke down the whole system.

Handschin's view seems to be substantially shared, yet also revised by another German musicologist, Walther Wiora. In his article on the origins of medieval solmization, he reaffirms, like Handschin, that the tonal qualities in the medieval system were seven, not six, and adds that the hexachordal solmization fails to reinforce the number seven which is extremely significant in several cultures since it was believed to govern all the harmonious movements.[38] However, after stating what solmization syllables are not, Wiora does find a particular function of their own, thus mitigating Handschin's negative judgement:

1-syllables do not represent tonal qualities, which are seven and are expressed by letters;

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[38]Wiora recalls the recurrence of the number seven in "dynamic" (related to motion) contexts: the seven musical tones, the seven Greek vowels, the seven planets, the seven days of the week, the seven days of Creation, etc. Since medieval cosmology was founded on the correspondence between the seven planets and the seven sounds, it seems an even bigger contradiction to have a solmization with only six tonal qualities. See W. Wiora, "Zum Problem des Ursprungs der mittelalterlichen Solmisation," *Die Musikforschung* 9 (1956): 265-6.

2-they do not express the tones' ranks inside a mode;

3-they not only do not show the octave correspondence, but even seem to obscure it;

4-yet, they show the *proprietas*, that is, the correspondence between tones which occupy the same position inside different hexachords.

This function is not so important theoretically, but extremely useful pedagogically, since the hexachord has the advantage, for singers, to accomodate melodies better and especially to indicate the semitone always with the same syllables.

Richard Crocker was the first musicologist to forcefully contest Handschin's view and propose a different interpretation. The American musicologist disagrees especially with the theoretical rather than historical approach followed by Handschin:

> The objections raised by Handschin are real enough and occurred to medieval theorists in due course. The difference is whether one raises them in terms of theory (as Handschin does) and in consequence proceeds to judge the results *sub specie aeternitatis*, or only in terms of history. The judgement in the latter case is very different and does not affect the importance and usefulness of the hexachord in its own time--it remained the central concept for both chant and polyphony up through the 16th century.[39]

Crocker's reaction is directed primarily against Handschin's quite negative judgement of the medieval hexachordal theory, stigmatized as a "joining of sketchiness and obscurity."[40] And to argue against such an indictment, Crocker tries to show that the later hexachordal theory not only is not in contradiction with Guido's view, but is the logical derivation of a historical process which involves

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[39]Crocker, "Hermann's Major Sixth," p. 37.

[40]"Verbindung von Schematismus mit Unklarheit," Handschin, *Toncharakter*, p. 328.

Guido as well as other major theorists. In referring to *Musica enchiriadis*, Hucbald, the anonymous *Dialogus*, Guido, and Hermann, Crocker finds a common path in spite of the individual divergencies; this path is the gradual building of a system which derives primarily from singing practice, and only secondarily relates to the Greek scale:

> The point is, I think, that the Frankish musician started with the singing of the chant and worked his way toward theoretical constructions such as the scale, rather than the other way around. He was singer, teacher, theorist, in that order. *Cantus*, not *musica disciplina*, was his starting point . . . . In terms of that experience there was a clear need for a scalar module of manageable size, such as a fourth or a fifth.[41]

According to Crocker, the module that accommodated better the singers' needs was the tetrachord of the finals, *d e f g*, that is, a fourth with the semitone in the middle. This tetrachord is found first in Hucbald's *De harmonica institutione*, where it is applied to the Greek Greater Perfect System, and even to the *synemmenon* tetrachord of the Lesser Perfect System.[42] The tetrachord of the finals, however, did not derive from Greek theory, which used as structural element a fourth with the semitone at the end, but rather developed out of a historical process which started with the effort to classify the myriads of chants singers had to memorize and culminated in the building of a tonal system:

> The primary step was the classification itself. This was carried out on the basis of the final, the last note of

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[41]Crocker, "Hermann's Major Sixth," p. 29.

[42]Crocker was the first to recognize the importance of the tetrachord of the finals in Hucbald's construction (Ibid., pp. 26ff.) He also pointed out that Hucbald used the tetrachord of the finals to reinterpret the *synemmenon* tetrachord by spelling it *G a b* flat *c* instead of the customary *d c b* flat *a*.

> a piece. Chants were grouped according to the pattern of intervals surrounding the last note . . . . At some point the finals were projected onto a diatonic system. A diatonic system, in its simplest sense, is one in which there are at least two tones between any two semitones. If octave duplication is desired, further conditions must be met, traditionally by adding a third whole tone onto every other pair of whole tones: . . . S T T S T T T S . . . . Chant melodies, however, require considerably more flexibility than is provided by such a system. Thus in the Greater Perfect System--the diatonic system used by Hucbald--the *synemmenon* tetrachord (d, c, bflat, a) of the Lesser Perfect System had constantly to be invoked to provide the pitches actually called for by the melodies.[43]

As Crocker emphasizes, this process of projecting the finals upon a common scale does not bring about only one result, but leads to several possible locations:

> It is a misunderstanding to think of such alternate locations as "transpositions": it could not have been the case that the *protus* was first placed at one principal position and subsequently moved to another subsidiary one. The early theorist would first have been aware of the several alternate positions; his problem was, precisely, *which* of these was to be considered the principal one?[44]

Crocker continues his analysis to show that the sixth described by Guido in the *Micrologus* is nothing but an expansion of the tetrachord of the finals; and that this sixth is to be identified with a similar sixth described by Hermann, who uses it, even more consistently than Guido, to show the correspondences among the different locations of the finals.[45] This sixth, especially in

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[43]Ibid., pp. 30-31.

[44]Ibid., p. 32.

[45]Hermann's theory contemplates the correspondence between *A, D, a, d* for the first mode, *B, E, b, e* for the second, *C, F, c, f* for the third, and *D, G, d, g* for the fourth, always referring to the major sixth to show the similar patterns around the corresponding finals. Guido recognizes this affinity between different locations only for the first three modes. The mode on G not only has no affinity with *D*, but is also assigned a pattern inside a fifth, rather than a sixth (Ibid., pp. 19-22).

Hermann's formulation, should be seen as the direct predecessor of the hexachord:

> Guido, starting from the monochord scale of the *Dialogus*, laid increasing stress on a seven-tone, octave oriented, strictly diatonic scale, with octave duplication; at the same time he persistently explored the affinities, that is, the relationships among the finals at their various alternate locations, and eventually expressed these affinities in terms of the major sixth that encloses the tetrachord of the finals. Hermann, starting from the emphasis laid by his teacher Berno of Reichenau on the species of fourths and fifths, first relied on them to mediate the anomalies between the recurring tetrachord of the finals and the scale of the *Dialogus*, then eventually came to the same major sixth. And in Hermann's discussion, this major sixth so strongly resembles the hexachord that it seems the two should be identified without hesitation.[46]

At this point, Crocker proceeds to confute Handschin's view through the following statements:

1-the hexachord *is* a row of tonal qualities because it embodies the four tonal qualities of the tetrachord of the finals;

2-the relationships among the finals have a "greater sense of tonal reality," in medieval theory, than the diatonic system. Therefore,

3-the possibility to move the hexachord on *F* and even on other steps, which involve chromatic tones, is not a counter-diatonic factor, but rather "the reaffirmation of the relationships among the finals."[47]

As to the first statement, what Crocker says is not totally in disagreement with Handschin's view. As we have seen, Handschin recognized in Guido's theory the four tonal qualities of the modal finals; what he could not justify as a row of tonal qualities was the

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[46]Ibid., p. 14.

[47]Ibid., p. 37.

whole hexachord, on account of the two added tones, one above and one below the tetrachord of the finals, which do not maintain the same quality at different locations. As a matter of fact, Crocker's assertion fails to clearly show what is the quality of the outer notes of the hexachord, unless we supplement his thesis with the assumption that these outer notes only have the function of boundaries for the tetrachord of the finals. This latter interpretation is supported by Joseph Smits van Waesberghe, who defines the hexachord as a unit containing the four finals plus their lower and upper neighbors, which are used in chant melodies to confirm the modal finals.[48] However, if the interpretation of the hexachord as an expansion of the finals' tetrachord seems to be coherent with Hermann's sixth, the matter is not so consistent in Guido's writings. The diagram found in the eighth chapter of *Micrologus*, where the trichord *c d e* assumes a central position, leads Crocker to the hypothesis that maybe Guido really acknowledged only three qualities or three modal finals: one with two tones above, represented by *c* and corresponding to the traditional *f* and *g* finals; one with a tone and a semitone above, corresponding to the customary *d* final, and one with a semitone and a tone above, corresponding to the traditional *e*.[49] But if we carry this hypothesis to its consequences and reinterpret the hexachord on the basis of this trichord, the first note *c* assumes the quality of a final, no longer of a boundary-note; moreover, instead of being an extension of the tetrachord, the hexachord is better understood as a double trichord of

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[48]Smits van Waesberghe, *Guidone Aretino*, p. 97.

[49]*Hucbald, Guido, and John on Music*, p. 65.

finals, always requiring a semitone after the last note, which in the case of the hexachord on *C* leads to the constant use of *B* flat. Such an outcome, however, seems to go too far beyond Guido's words and also runs against the strict diatonicism attributed to Guido by both Crocker and Handschin.[50]

In any case, Crocker's main argument to prove the hexachord's value as a theoretical instrument relies on its relationship with the tetrachord of the finals, which is the focus of the next section in the present study.

3.2. The relationship between hexachord and other scalar modules

In his article "La quarte et la structure hexacordale" Christian Berger emphasizes the central role of the fourth in building the hexachordal system:

> The joining of the concept of *affinitas* with the system of fourths as the most important "scalar module of manageable size," . . . has been the decisive step which has made possible the triumph of solmization during the following centuries.[51]

The reference to the fourth seems to be made primarily, at least as far as the article is concerned, in order to justify the expansion

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[50]Handschin, *Toncharakter*, p. 324, and Crocker, "Hermann's Major Sixth," p. 34.

[51]"L'union du concept d'*affinitas* avec le système des quartes comme le plus important 'scalar module of manageable size', . . . cette union a été donc le pas decisif qui a rendu possible le cortège de triomphe de la solmisation pendant les siècles suivants." C. Berger, "La quarte et la structure hexacordale," in *L'enseignement de la musique au Moyen-Age et à la Renaissance* Colloque organisé par la Fondation Royaumont en coproduction avec l'A.R.I.M.M. (Association pour la Recherche et l'Interprétation des Musiques Médiévales) et le C.N.R.S. (Centre National de la Recherche Scientifique) (Royaumont: Editions Royaumont, 1987), p. 21. The quotation is from Crocker, "Hermann's Major Sixth," p. 29.

of the hexachord by means of the addition of another semitone at the end, a procedure which became known, some time later, as the *fa-supra-la* rule. Such an expansion, indeed, can arise because the fourth is regarded as a structural part of the system:

> Through the combination of two hexachords, through the *fa-supra-la*, the system is expanded to seven degrees, which are composed by two fourths: the "fundamental fourth" *ut-fa* and the "mutated fourth" *fa-fa*.[52]

The distinction between the fundamental and the mutated fourths, as qualitatively different in spite of their similar arrangement of tones and semitone, becomes extremely significant in the hard realm of *musica ficta*.[53] According to Berger, who follows Allaire's assumption, the fundamental fourth came to be indicated in musical scores by the ♯ or ♮ sign, and the mutated one by the *b* sign; consequently, the interpretation of these signs by modern editors must take into account the hexachordal context and especially the tetrachord construction.

In order to demonstrate his thesis, Berger traces the role of the fourth in medieval music theory. Like Crocker, he starts his historical reconstruction with Hucbald's arrangement of the Greek Greater Perfect System into tetrachords which have the structure of the tetrachord of the finals, namely tone-semitone-tone. Later on, after

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[52]Berger is here using, by his own admission, Allaire's concept and terminology. Ibid., p. 17. See also G. Allaire, "Les énigmes de l'Antefana et du double hoquet de Machaut: une tentative de solution," *Revue de Musicologie* 66 (1980): 27-57.

[53]A great deal of studies have been devoted to the exploration of the topic of *musica ficta*, that is, the interpretation of the written down as well as the implied accidentals. However, the many questions posed by the subject are still far from receiving a definitive answer. See the bibliography, in the present study, for a selected list of the major works on the subject.

stating that Guido separated the system of sounds (gamut) from the system of modes, Berger analyzes the theorist's interpretation of the former.[54] First, Berger says, Guido identified in the gamut two identical segments of six notes, *G-E* and *C-A*, which he explained through the concept of *affinitas*; later on, he reduced the concept of affinity to an even more elemental structure, the succession of two whole tones, which he described in the already mentioned diagram of three notes in the eighth chapter of *Micrologus*. In other words, even though Berger does not use Handschin's terminology, we might say that Guido first recognized six "qualities" recurring in the gamut, and then he reduced these qualities to three, or better four, since a semitone is understood after the two whole tones. It is possible, therefore, that Guido reinterpreted the previous sixth (hexachord) as a double trichord always followed by a semitone, namely as a given tetrachord followed by another potential fourth; on this ground, the *fa-supra-la* procedure would find here its first appearance in embryo.[55] However,

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[54]"Thus we have two systems: the first one of the gamut, defined by the *affinitas* and without quality, and the second one of the modes, which can also explain the expressive power of music, as Guido describes it in the fourteenth chapter of *Micrologus*." ("Ainsi nous avons deux systèmes: le premier de la gamme, défini par l'*affinitas* et sans qualité, et le deuxième des modes qui peut même expliquer la force expressive de la musique, comme Guy le décrit au quatorzième chapitre du *Micrologus*." Berger, "La quarte," p. 20.) I suspect that with the previous statement Berger is following Handschin's view that Guido's recognition of two similar stretches in the gamut is not applied to the modal context, that is, is not done in order to create substitute finals.

[55]The famous rule "una nota super la semper est canendum fa," which extends the hexachord by one semitone, without engaging in a mutation, appeared in the above stated formulation only in the sixteenth century. However, several scholars, such as Berger and Allaire, believe that it was in force long before, maybe right from the beginning of the hexachordal theory. See B. Carvell, "Notes on 'una nota super la,'" *Music from the Middle Ages through the twentieth Century: Essays in honor of Gwynn S. McPeek*, eds. C. Comberiati and M.

Berger hastens to inform us that in Guido's theory there is no explicit connection between the concept of *affinitas* and the solmization method. This important step was taken by later theorists, first of all by Johannes of Afflighem, who also seems to point to the division of the hexachord into two trichords: *c-d-e/f-g-a*, *g-a-b/c-d-e*.[56] With Johannes, therefore, the hexachord is explicitly related to the fourth, since the two whole tones of the trichord always imply a semitone afterwards. This fundamental role of the fourth seems to have come to Johannes more directly from another previous theorist, Hermann, who therefore appears to have laid the foundations of the hexachordal theory even more than Guido. Hermann consistently applied the concept of affinity throughout the gamut, even between *G* and *D*, which Guido denied. Consequently, he regarded the whole gamut as a succession of affine tetrachords, and, by relating this affinity to the doctrine of interval species, came to the unusual result of producing four species of fourths, one for each of the notes inside any of the tetrachords constituting the gamut: first species from *A* to *D*, second from *B* to *E*, third from *C* to *F*, and fourth from *D* to *G*. The fourth species is exactly the same as the first in terms of the constituting intervals, yet, Berger notes, has a different quality. This qualitative difference between the first and fourth species of fourth seems to be

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Steel (New York, Gordon and Breach Science Publishers, 1988): 94-111.

[56]Berger notes that Johannes slightly modified Guido's diagram to emphasize the correspondence among the trichords. He also sees in this diagram a reference to the rule of mutation according to which the first three syllables are used to mutate in ascending, while the other three are used to mutate in descending. Berger, "La quarte," pp. 22-23.

the precedent to admit, in the later hexachordal theory, the qualitative difference between the fundamental and the mutated fourths, ut-fa and fa-fa. Berger finds further evidence of the importance of these two fourths in a theorist of the later hexachordal system, Jerome of Moravia. In fact, not only does Jerome interpret the gamut as a succession of tetrachords, but also, in a passage dealing with the relationships between modal ranges and hexachords, he seems to point more specifically to the *fa-supra-la* rule, that is, to the mutated fourth:

> At the third mode we find a very remarkable indication. That [mode] extends from D to high f, for which the same two hexachords C-a and g-e are sufficient. The *f acutum* cannot be added but through the *fa-supra-la* formulated much later.[57]

As stated above, in Berger's article, as in Crocker's, the relationship with the tetrachord emerges again as a focal point for the interpretation of the hexachord. However, if Crocker identifies the tetrachord of the finals as the structural element for the definition of the hexachord, Berger seems to oscillate between the tetrachord of the finals, with the semitone in the middle, and the tetrachord ut-fa, with the semitone at the end. Therefore, in Berger's analysis it is not clear whether the hexachord is an expansion of the tetrachord of the finals, with a tone above and one below, as Berger states regarding Hermann, or rather a prolongation of the tetrachord ut-fa, so that tetrachords of this kind can be interlocked to form new configurations

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[57]"Au troisième mode nous trouvons une indication très remarquable. Celui-ci s'étend du *re* jusqu'au *fa* supérieur, auquel ne suffisent que les mêmes deux hexacordes *do-la* et *sol-mi*. La *fa acutum* ne peut être joint que par la règle du *fa supra la* formulée beaucoup plus tard." Ibid., p. 26. See also chapter five in the present study.

of seven notes. Yet, it is not of little significance to interpret the hexachord on the basis of one or the other tetrachord. In the first case, the hexachord maintains a close relationship with the modal system, and the different positions of the hexachord in the gamut are as many recognitions of possible locations for the finals. In other words, it is like establishing a set of relationships around the finals and then projecting this set at different levels onto the whole gamut. In the second case, on the contrary, the relationship with the modal finals is lost; moreover, to assert that the two fourths ut-fa and fa-fa, both made of tone-tone-semitone, are of different quality, because one is the fundamental fourth of the hexachord, and the other is the one arising from the *fa-supra-la* procedure, seems to contradict the essence of the hexachordal theory, that is, the recognition of the same tonal qualities at different locations. In this respect, the theoretical evidence provided by Berger cannot be accepted as conclusive. Berger mentions Hermann and his four species of fourths to support his idea of fourths of the same species with different functions; however, he does not specify that the main purpose for Hermann's classification is to establish the affinity, denied by Guido, between *D* and *G* as well, so that there is complete agreement among all the *tetrachords of the finals* into which Hermann subdivides the gamut.[58] More evidence Berger finds in Johannes of Afflighem because of a diagram in his treatise where the trichord *C-D-E* is related to the trichords *G-A-B* and *F-G-A*.[59] In his interpretation, the diagram is a

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[58]Crocker is very clear about this point and quotes Hermann's criticism of other people (very likely, Guido) who don't recognize this correspondence among all the four finals.

[59]Berger, "La quarte," pp. 21-23, and *Hucbald, Guido, and John on*

clear manifestation of the relationship between the hexachord and the species of fourths; but even if such a relationship did appear in the diagram, it would not justify the expansion of the hexachord by just one note by means of interlocked fourths. The last evidence provided by Berger, and which seems to be the most stringent, is the above mentioned passage in Jerome where he seems to imply the *fa-supra-la* procedure. First of all, since Berger emphasizes Jerome's tetrachordal orientation, it is necessary to be aware that the theorist provides several divisions of the gamut, not only the one quoted by Berger and based on the tetrachord ut-fa; on the other hand, it is true that Jerome seems to have a particular penchant for the tetrachord, but this could derive from his desire to reconcile the medieval system with the most authoritative Greek one. As to the supposed *fa-supra-la* reference, it is not clear why Jerome did not use that same rule to explain the range of the second mode. In fact, he says that the range of the second mode, in its normal position, is from *A* to *b* flat and that this range needs to be covered by three, instead of the usual two, hexachords, that is, the first hard hexachord, the first natural hexachord, and the first soft hexachord. The *fa-supra-la* would apply even more in this case because the *b* flat is taken "per accidens."[60] Could it be that in his analysis of the third mode Jerome is referring to two properties, the hard and the natural, without worrying too much about the number of deductions actually involved?

Music, p. 114.

[60]Cserba, p. 169.

Another musicologist, Ina Lohr, provides a different interpretation of the hexachord which seems to relate it more to the fifth, rather than to the fourth.[61] Lohr starts with the assumption that every sound has the tendency to seek a rest by going down by a fifth. This tendency would generate an endless series of downward leaps of the fifth, if we did not put a limit and establish one note as conclusive. This occurs by means of the leading tone, that is, by means of an even stronger tendency which forces the lower note of a semitone to seek rest in the upper note. However, in the case of medieval monophonic music, Lohr continues, the conclusive tone is not reached via the semitone below, but rather through the neighboring notes, which are more often at the distance of a tone from the *finalis*.[62] Another fundamental difference between the tonal and the modal systems is that in the former the basic structure is the octave, which is a juxtaposition of two tetrachords, each with a semitone and, consequently, with a goal tone afterwards; in the latter, instead, the basic structure is the symmetrical hexachord with only one semitone in the middle. This hexachord can be interpreted, according to the tendency shown above, as the result of a downward motion, from la to re, followed by the neighboring motion re-ut. At this point, each note of the hexachord is given its own specific function:

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[61]I. Lohr, *Solmisation und Kirchentonarten* (Zurich: Musik Hug Verlage, 1948).

[62]Both the first and the fourth modal pairs have a tone above and below the final; the second has a tone below and a semitone above, while the third modal pair has a semitone below and a tone above. However, in his analysis of each mode, Lohr tries to show that the neighboring notes which lie a semitone apart from the final are often replaced by the next note, that is, a third.

ut: the low neighbor (*Wechselton*);

re: the rest tone (*Ruheton*);

mi: the upper neighbor (*Wechselton*);

fa: the upper neighbor which often replaces mi because of being more stable;

sol: the passing tone between the neighbor fa and the motion tone la;

la: the motion tone, which tends to fall by a fifth (*Rufton*).

Lohr also mentions another interpretation of the hexachord as a leap sol-ut, with the neighboring note of the motion-note sol, that is, la. However, this interpretation works less satisfactorily because the note designated by the syllable ut cannot function very well as a final for the lack of a lower neighbor.

Having established the aforementioned basic relationships among notes, Lohr proceeds with the analysis of these relationships in the context of each mode. As stated above, the notes' functions are expressed by means of hexachordal syllables; however, since all modal ranges go beyond the compass of a single hexachord, two or three hexachords are used to represent the functions of all notes. Let us take, for example, the first mode. The final *D* has a main relationship (*Ruheton* to *Rufton*) with the note *a*, represented by the syllables re-la; it also has a relationship with the neighboring notes *C*, *E*, and the *E*-substitute *F*, represented by the syllables re-ut, re-mi, re-fa. Now, the note *a* too has neighboring relationships, specifically with the notes *G* and *b*, the latter often being replaced by *c* for its

instability; yet, the system also admits a *b* flat as a neighboring tone of *a*, so that three hexachords are necessary to represent all these relationships: ut-re for *G-a*, re-mi for *a-b*, re-fa for *a-c*, mi-fa for *a-b* flat.[63] The note *F* also functions as a middle point in the fundamental motion from *D* to *a* (and vice versa), and consequently acquires a special status which is reinforced by its lower neighbor *E*, a particularly unstable note because of the semitone.

Even though one might argue with Lohr's postulate of an absolute tendency, for every note, to fall down by a fifth, I think his contribution is very important for the understanding of the hexachordal system. The following points deserve to be stressed:

1-First of all, there is the distinction between the octave-oriented system, seen as a juxtaposition of two tetrachords with two potential leading tones, and the hexachordal system, with its symmetrical arrangement around the only semitone. This suggests that while in the octave-oriented system the forward motion of the semitone is emphasized and becomes the most resolutive relationship between notes, in the hexachordal system this forward motion of the semitone is somehow mitigated: the lower note of a semitone is still strongly attracted by the upper note, but this attraction is not the most important relationship among the notes. On the contrary, other relationships, expressed by the hexachordal syllables, seem to better define a modal context. This also accounts for the avoidance of the unstable notes *e* and *b*, by either replacing them with the upper notes *f* and *c*, or using

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[63]The network of relationships among the notes of each mode is shown by Lohr in diagrams which also provide the hexachordal syllables representing such relationships.

the alternative *b* flat.

2-Another important point is the recognition of a fundamental connection between the fifth and the hexachord. As some musicologists have noted, the fifth must have acquired a new, primary role in the melodic context of chant to require the replacement of the familiar module of the tetrachord with the foreign hexachord.[64]

3-The importance of the neighboring notes is also another factor in the rise of the hexachord. As Smits van Waesberghe stresses too, the hexachordal module provides each mode with its upper and lower neighbors: *C*-D-*E*, *D*-E-*F*, *E*-F-*G*, *F*-G-*A*.[65] These neighbors define the modal final like the leading tone defines the tonic in the modern tonal system. Therefore, the relationship of the upper/lower neighbors with the final has to be regarded as a preferential modal relationship properly embodied in the hexachord.

3.3. Hexachord and musica ficta

The understanding of the medieval hexachordal system has become especially important for modern scholarship when dealing with the challenging problem of *musica ficta*. As Margaret Bent specifies, *musica ficta* is:

> The term used loosely to describe accidentals added to sources of early music, by either the performer or the modern editor. More correctly it is used for notes that lie outside the predominantly diatonic theoretical gamut of medieval plainchant, whether written into the source or not.[66]

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[64]Cf. Hoppin, "Tonal Organization," p. 29.

[65]See reference in footnote 48.

[66]M. Bent, "Musica Ficta I (i-iv)," *The New Grove* 12: 802-806.

It is especially in the latter meaning that *musica ficta* will be discussed in the present section. In dealing with pitches lying outside the gamut one encounters in medieval music theory two other terms: *musica falsa*, a predominantly thirteenth-century term, and *coniuncta*, which seems to have come into use at the end of the fourteenth century. While *musica falsa* is usually recognized as a synonym for *musica ficta*, scholars disagree on the exact meaning of *coniuncta*, described as either another term for *musica ficta* or a new term for transposition. To define pitches lying inside the standard gamut, medieval theorists employ the term *musica recta* or *vera*, as opposed to *musica ficta* or *falsa*; while the former comprises all the notes of the "hand," according to the three hexachord properties, therefore including also *b* flat and *bb* flat, but not the lower *B* flat, the latter indicates any pitch outside the hexachordal system, that is, both accidentals other than *b* and *bb* flat and notes lying beyond the upper or lower boundaries of the system.[67]

According to this theoretical background, the common operation of adding a flat to *b*, in order to correct the tritone *f-b*, should not be labeled as *musica ficta* because *b* flat is part of the *recta* gamut; furthermore, *musica ficta* should not be equated with accidentals, since it may refer to diatonic notes as well, specifically the ones lying outside the gamut, such as *F* below Γ or *f"*. For some musicologists, this distinction between *recta* and *ficta* should be extended to transpositions as well. Following a suggestion made by Dahlhaus, Bent

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[67]Ibid. See also K. Berger, *Musica Ficta. Theories of Accidental Inflections in Vocal Polyphony from Marchetto da Padova to Gioseffo Zarlino* (Cambridge: Cambridge University Press, 1987).

and Hughes assert that the standard gamut, that is, the whole system of seven hexachords, could be and was transposed one or two fourths up, starting the gamut on *C* or on *F*, and still maintained its *recta* character. These transpositions are shown by "key" signatures, that is, by flats placed by the clef.[68] In the first transposition, with the gamut starting on *C*, the *b* flat, put at the clef sign, replaces the *b* natural, which now belongs to the realm of *musica ficta*, while the notes *e* flat and *ee* flat become available as *recta* notes corresponding

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[68]Obviously the expression "key signature," taken from tonal music, is inadequate for the flats placed by the clef in medieval and Renaissance music. However, it is commonly used and understood as a handy terminology which does not involve any tonal interpretation.

As to Hughes's interpretation, other scholars have supported the idea that key signatures indicate transpositions of the whole gamut. Cf. H. M. Brown, "A Ballade for Mathieu de Foix: Style and Structure in Composition by Trebor," *Musica Disciplina* 41 (1987): 75-108; J. Hirshberg, "Hexachordal and Modal Structures in Machaut's Polyphonic Chansons," *Studies in Musicology in Honor of Otto E. Albrecht*, ed. J. W. Hill (Cassel: Bärenreiter, 1980), pp. 19-42; G. Allaire, *The Theory of Hexachords*; O. Ellsworth, *The Berkeley Manuscript. University of California Music Library, MS. 744 (olim Phillipps 4450)*, Greek and Latin Music Theory 2 (Lincoln and London: University of Nebraska Press, 1984); N. Routley, "A Practical Guide to Musica Ficta," *Early Music* 13 (1985): 59-71. Karol Berger too regards "key" signatures as transpositions; however, as we will see briefly, he refuses the idea that these transpositions were still regarded as *musica recta* (K. Berger, *Musica Ficta*, pp. 59ff.). Allaire does not make any reference to *musica recta*, yet insists on calling the semitones arising from such transpositions "diatonic" rather than "chromatic," as suggested by Apel, and I think that this stipulation, which he justifies in terms of Greek terminology, could also speak in favor of regarding transpositions of the whole system as still *recta* (G. Allaire, *The Theory of Hexachords*, p. 19). See also W. Apel, *Gregorian Chant* (Bloomington: Indiana University Press, 1958), p. 164.

For other interpretations of "key" signatures, see the articles exchange between Lowinsky and Hoppin: E. Lowinsky, "The Function of Conflicting Signatures in Early Polyphonic Music," *Musical Quarterly* 31 (1945): 227-260; R. Hoppin, "Partial Signatures and Musica Ficta in Some Early 15th Century Sources," *Journal of the American Musicological Society* 6 (1953): 197-215; E. Lowinsky, "Conflicting Views on Conflicting Signatures," *Journal of the American Musicological Society* 7 (1954): 181-204; R. Hoppin, "Conflicting Signatures Reviewed," *Journal of the American Musicological Society* 9 (1956): 97-117.

to *b* and *bb* flat of the untransposed system; in the second transposition, with the gamut starting on *F*, both *b* and *e* flat replace their natural counterparts as *recta* notes, and therefore two flats are placed by the clef, while *A* and *a* flat correspond to *b* and *bb* flat of the untransposed system.[69] While many scholars agree that transposition is the most reasonable explanation for the "key" signatures in medieval music, Karol Berger has challenged the assumption that these transpositions of the *recta* system generate *recta* notes. He asserts that the evidence provided by Hughes and Bent, mainly based on a passage by Ugolino of Orvieto where the fifteenth-century theorist discusses two transpositions of the gamut or hand, is a clear misunderstanding:

> Ugolino's discussion, however, proves an exactly opposite point. The theorist simply shows all the hexachords contained in each "double hand" (*duplex manus*). The first "double hand" consists of hexachords with uts in the places of F below Γ, Γ, B, C, D, E, F, G, b, c, d, e, f and g. The second "hand" consists of hexachords starting in the places of C below Γ, D below Γ, F below Γ, Γ, B, C, D, F, G, b, c, d, f and g. One may most plausibly interpret the first of these "double hands" as combining the regular system of seven hexachords with the same system transposed a whole tone down (that is, with hexachords beginning on F below Γ, Bb, Eb, F, b, eb, f) and adding hexachords on D and d. The other "double hand" may be seen to combine the regular system of seven hexachords with the same system transposed a perfect fifth down (that is, with hexachords beginning on C below Γ, F below Γ, Bb, C, F, b and c) and add hexachords on D, d and D below Γ. <u>The theorist's words make it perfectly clear that he would consider a transposed hand to represent musica ficta, not vera, since he talks of his "double hands" as combining steps of musica recta and ficta.</u>[70]

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[69]A. Hughes, *Manuscript Accidentals*, p. 47.

[70]Berger, *Musica Ficta*, p. 64 (underlining mine). Berger also mentions that the hypothesis elaborated by Bent and Hughes was first presented by Carl Dahlhaus (Ibid., p. 209).

Berger also quotes the late fourteenth-century Berkeley treatise, where the hexachords of the transposed system are called *coniunctae*, which for most scholars is just another name for *musica ficta*.[71] However, another scholar, Jehoash Hirshberg, disagrees with this widely accepted interpretation of *coniuncta*, and asserts that the term was indeed used to define transpositions of the hexachord system, therefore different from *musica ficta*, and rather equivalent to *musica recta*, however transposed.[72]

If we follow Bent, Hughes, and Hirshberg on the assumption that not only "key" signatures refer to transpositions of the system, but also that the consequent flat notes arising from such transpositions are still *musica recta*, then the common rule to prefer *recta* over *ficta* notes when correcting an interval comes to be extended, in a transposition, to several non-diatonic notes besides the *b* and *bb* flat.[73] Another consequence is that, since transpositions are always shown by flats, sharps are always indications of *musica ficta*, while

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[71]A. Seay, "The 15th-c. Coniuncta: A Preliminary Study," *Aspects of Medieval and Renaissance Music: A Birthday Offering to Gustave Reese*, ed. J. LaRue (New York: Norton, 1966), pp. 723-37; A. Seay, "The Beginnings of the Coniuncta and Lorenzo Masini's L'Antefana," *L'Ars Nova italiana del Trecento. Secondo convegno internazionale 17-22 luglio 1969*, ed. F. A. Gallo (Certaldo: Edizioni centro di studi sull'Ars nova italiana del Trecento), pp. 51-65; O. Ellsworth, "The Origin of the Coniuncta: A Reappraisal," *Journal of Music Theory* 17 (1973): 86-109.

[72]Hirshberg, "Hexachordal and Modal Structure," pp. 21f.

[73]For instance, in a system transposed two fourths up, in the presence of the tritone *E* flat-*A*, the flattening of *A* is to be preferred over the natural *E*. I used the adjective non-diatonic to avoid misunderstandings arising from the terms chromatic as well as accidentals, and I meant to indicate those notes corresponding to the "black keys," which nevertheless could be still defined as diatonic in a transposition.

flats may be either *recta* or *ficta*, a question which cannot always be ascertained.

Aside from the question of transposition, whether one regards it as a matter of *musica ficta* or *musica recta*, hexachords seem to play a primary role in explaining the accidentals which are placed not by the clef, but rather inside the melodic lines. The most comprehensive treatment of such a relationship is Hughes's work on manuscript accidentals which, by analyzing all the occurrences of accidentals in the Old Hall manuscript, comes to the following conclusions:
1-The meaning of accidentals in medieval music is to show where a semitone occurs, not to inflect a particular pitch. The two forms of accidentals, ♯ and b, come from the double possibility for the note *b* to be either a mi (♮), in the hard hexachord, or a fa (*b*), in the soft one. Therefore, accidentals maintain the basic meaning of indicating, according to their shape, either mi or fa, that is, either one of the two solmization syllables involved in a semitone.[74]
2-As a consequence of the previous statement, the new semitone shown by the accidental also points to a new hexachord, in which that semitone can take its place; furthermore, that new hexachord points to a new context of hexachords, to a new gamut, in other words, to a transposition, in either sharpward or flatward direction:

> The proposition is not as extreme as it appears at first glance. We are quite accustomed, in eighteenth

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[74]The meaning of accidentals as either mi or fa is indicated as the "universal rule" for the interpretation of accidentals, which Hughes reports in Prosdocimus's version: "whenever b is placed we ought to call that sound fa, and whenever ♮ is placed we ought to call that sound mi, regardless of whether the note would or would not normally have those syllables." (Hughes, *Manuscript Accidentals*, pp. 44-45).

> century theory, to the idea that a single accidental can change the whole system from one tonality to another, on a permanent or temporary basis.[75]

3-However, since sharp signatures are unknown in medieval music, sharpward transpositions are always transitory, or *ficta*, while flatward transpositions can be either *recta*, when flats are constantly applied as key-signatures, or *ficta*, when pointing to transitory transpositions in the course of a piece:

> The theorists do not refer to key-signatures, or to transposed systems . . . . But they indicate quite clearly that musica recta is the norm for a piece of music. A consistently applied key-signature can "deliver" a recta series of notes only in a transposed gamut.[76]

4-Even though accidentals have the single function of showing a semitone, they may bring about several different effects: inflecting the pitch the accidental refers to, leaving the pitch unchanged if already a mi or a fa, inflecting the adjacent note, cancelling a previous accidental, or showing a transposition of the system.[77] Of those, the first effect is by far the most common.

5-A particular case is represented by preplaced accidentals, which seem to function as indicators of ambiguous points of mutation or system transposition.[78]

Hughes's analysis, as well as the other scholars's works mentioned so far, is mainly concerned with fourteenth- and fifteenth-

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[75]Ibid., p. 47 (some of the possible transpositions are shown in Hughes' table IV, on p. 49).

[76]Ibid., p. 47, and also pp. 52ff., on the question of partial signatures.

[77]Ibid., pp. 44 and 51.

[78]Ibid., pp. 63ff.

century music, even though they seem to imply that their conclusions should apply to thirteenth-century music too, when the hexachord system was well established. Yet, one of the most attentive scholars of thirteenth-century music, Hans Tischler, disagrees on the importance of the hexachord role in interpreting accidentals. In his analysis of the thirteenth-century motet, Tischler comes to the conclusion that there is no connection whatsoever between the presence of accidentals in practical sources and the hexachordal system.[79] The main reason for his dismissal of the hexachord in explaining manuscript accidentals seems to be the lack of consistency in the behavior of the note *b*, which is neither always flattened when returning to *a*, nor always natural when moving to *c*.[80] However, maybe the assumed rule that a *b* revolving around *a* should always be flattened is not as stringent, in the thirteenth century or even in general, as the later *fa-supra-la* expression would seem to indicate. On this matter, Karol Berger notes that the *fa-supra-la* rule is just one of the ways in which the prohibition of the tritone was expressed; later on, it became a separate rule, according to which *a-b-a* was sung la-fa-la regardless of whether there was *F* or not.

The *fa-supra-la* rule is a fundamental premise in Allaire's work on the hexachordal theory. He starts from the assumption that the original gamut, starting on Γ, was made up of only *G*-hexachords and *C*-hexachords, and that it was later transposed a fourth up, with the

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[79]H. Tischler, "'Musica Ficta' in the Thirteenth Century," *Music and Letters* 54 (1973): 45-46. See also H. Tischler, "Musica Ficta in the Parisian Organa," *Journal of Music Theory* 17/2 (1973): 310-319.

[80]Tischler, "'Musica Ficta' in the Thirteenth Century," p. 45.

addition of *b* flat, thus combining *C*- and *F*-hexachords.[81] Since the first combination of hexachords, in the original untransposed gamut, had a fa above la, Allaire assumes that this phenomenon was preserved in the other combinations too, giving origin to the *fa-supra-la* rule:

Γ A B C D E F G a
ut re mi fa sol *la*
ut re mi *fa* sol la

C D E F G a bflat c d
ut re mi fa sol *la*
[ut re mi] *fa* [sol la]

and:

F G a bf c d eflat f g
ut re mi fa sol *la*
[ut re mi] *fa* [sol la][82]

The main implication of such an approach is the flattening of the

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[81]Allaire, *The Theory of Hexachords*, p. 18.

[82]Ibid., p. 26. Allaire uses his own terminology defining hexachord-orders as the combination of two adjacent hexachords, and distinguishes between a conjunct hexachord-order, composed by two conjunct tetrachords, like Γ-*C* and *C*-*F*, and a disjunct hexachord-order, consisting of two disjunct tetrachords, like *C*-*F* and *G*-*c*. I have used the neutral term "combination," since there is no theoretical evidence that hexachords were thought of in the terms Allaire proposes.

note coming after any la, unless this note is already at a distance of a semitone.[83]

In dealing more specifically with the question of accidentals, Allaire states:

> Theoretically all the flats and sharps of the cycle of fifths were known, but due to the non-tempered scale of the Middle Ages and the Renaissance, music using more than three flats or sharps was not practical . . . . Also, the number of flats and sharps employed varied slightly from period to period; for instance, Anonymous XI (15th c.) gives A-flat, E-flat, B-flat, F-sharp, and C-sharp while Thalesio in the early seventeenth century gives E-flat, B-flat, F-sharp, C-sharp, and G-sharp.[84]

He postulates a simplified type of solmization, used by singers, in which only the three basic hexachords were used, while any other hexachord involving accidentals was transposed and read as one of the basic ones. This simplified solmization would explain the lack of accidentals in musical sources:

> It was not necessary to write the flats and sharps occurring in common modal transpositions, and those which while modulating fell within the framework of the hexachord. Cadential, modal, and tetrachordal analysis was sufficient to indicate to the musicians, to the singers or at least to their choirmaster, the hexachord-orders involved and the hexachordal transpositions to be effected in order to perform the music properly.[85]

However, it is not very clear from Allaire's work how this simplified solmization, and the relative accidentals, can be reconstructed. Finally, in dealing with the problem of the inconsistency of accidentals in different versions of the same piece, Allaire states:

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[83]Ibid., p. 46.

[84]Ibid., pp. 33-34.

[85]Ibid., p. 42.

> If generally the flat sign (b) indicated the fa of a hexachord, and the sharp (♯) or the B-durum (♮) signs signified the mi of a hexachord, sometimes the flat sign (b) indicated a hexachord of the molle group while the sharp (♯) or the B-durum (♮) signs signified a hexachord of the durum group, without necessarily compelling the lowering or the raising of the notes affected by the signs . . . . Secondly, in some kind of simplified solmization, because some notes belong to more than one hexachord--C can be ut in naturale, fa in durum, and sol in molle--the flat and sharp or B-durum signs were used as a convenient device to indicate changes of hexachord or hexachord-orders in the direction of hexachords of the molle or durum families, without necessarily altering the pitch of the notes affected by such signs. Thirdly, we maintain that some other flat and sharp signs, true accidental signs, may have indicated chromatic alterations; this presents a problem which musicology must solve.[86]

If I understand correctly Allaire's somehow obscure terminology, accidentals may indicate:

1-that we are in a particular hexachord of the molle or durum group;[87]

2-that we must change into a particular hexachord of the molle or durum groups;

3-that we are in the presence of a chromatic alteration.

If Allaire's study offers some treatment of the first two possibilities, although without providing a satisfactory and understandable method, the third possibility is not discussed at all, leaving the reader wondering about the way chromatic inflections would be applied in the hexachord system.

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[86]Ibid., p. 43.

[87]The molle and durum groups or families are the two "areas of oscillation" that Allaire sees on both sides of any given hexachord. They do not necessarily have to be identified with hexachords containing either flats or sharps. For instance, if in the case of the *C* hexachord, the molle family comprises the *F* hexachord and the *B*-flat hexachord, in the case of the *G* hexachord, the molle group includes the *C* hexachord, without any flat, and the *F*-hexachord. Ibid., pp. 26-7.

4. A brief survey of the development of hexachordal theory from the origins to the thirteenth century

4.1. The question of the origins

The present section is concerned with Guido's role in the genesis of the hexachordal system. Consequently, the more general issue about the possible derivation of medieval solmization from other similar systems will not be treated here, and the reader is referred to the specific works on the subject.[88]

It is now unanimously accepted that the hymn text cannot be attributed to Guido, as was believed earlier, since it is documented two centuries before Guido's time; on the other hand, some scholars have even proposed that the syllables at the beginning of each half-verse of the hymn, Guido's solmization syllables, were actually pre-existing. Two musicologists in particular have been intrigued by such a hypothesis, Wiora and Chailley, who, nevertheless, come to opposite conclusions. For Chailley, the hymn text is an esoteric cryptogram

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[88]The distinction between a more general and a more specific question as to the origins of medieval solmization has been provided by W. Wiora ("Zum Problem des Ursprungs"). The general question, that is, whether hexachordal solmization was a medieval creation or a derivation from preexisting systems, is discussed in particular by Schünemann, who believes that Guido was acquainted with the oriental and Greek systems of solmization, and by Lange. The latter mentions the principal hypotheses on the origins of hexachordal solmization and concludes that none of them is supported by enough evidence. Wiora, who is primarily concerned with the specific question of the origin of the hymn, is in favor of a direct derivation of the hexachordal solmization from the Greek one, on the basis of the similar way both systems treat the semitone; such a belief is confuted by Smits van Waesberghe, on the basis of the documentary evidence that Greek sources on solmization are extremely rare and no codex of these sources can be found in Italy from Guido's time. See Smits van Waesberghe, *Guidone Aretino*, p. 96. See also G. Lange, "Zur Geschichte der Solmisation," pp. 535-622.

where the syllables ut, re, sol, and io (from Johannes) form the word *resolutio*, which he regards as a fundamental concept in the Christian world. The remaining syllables have symbolic implications too, since sol contains the Latin vowel corresponding to the Greek omega, while fa and la form, with some adjustment, the beginning letter of the Greek alphabet, alpha, thus forming with sol one of the definitions for Christ, the "alpha and omega;" finally mi is a particular syllable too in that it contains the biggest and the smallest numbers in the Latin numeration, *M*, a thousand, and *i*, one.[89] The fact that the text had a symbolic significance is the reason, for Chailley, that determined Guido's choice of that particular hymn to expose his solmization system; however, Guido's role should not be confined to the choosing of significant syllables for solmizing, but should also include the composition of that peculiar melody.[90] Wiora's hypothesis that the syllables pre-date the hymn is based primarily on the observation that those six syllables contain all the Latin vowels, with the necessary repetition of one of them, as well as some particularly fitting consonants like *r*, *s*, and *f*. Wiora argues that the syllables were created for singing, as also a comparison with other systems of solmization can easily show.[91] Therefore, the hymn "Ut queant laxis"

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[89]J. Chailley, "Ut queant laxis et les origins de la gamme," *Acta Musicologica* 56 (1984): 48-69. See also J. Chailley, J. Viret, "Le symbolisme de la gamme," *La Revue Musicale* 408-409 (1988).

[90]Chailley finds evidence for this supposition in Guido's own words "deinde subposui," which he translates "hence I composed." The French musicologist also proves, on the basis of paleographic examinations, that what Coussemaker believed to be an earlier instance of the "Ut queant melody" has to be assigned to the eleventh century. Ibid., pp. 53-57.

[91]Wiora, "Zum Problem des Ursprungs," p. 270. Similar observations were made by the anonymous author of *Summa musice*. See

is to be considered an acrostic formed with singable syllables, that is, syllables of a pre-existing solmization not created by Guido. Furthermore, since the hymn has seven half-verses, the last syllable sa must have been a solmization syllable too, otherwise the acrostic would not have been complete. Wiora finds further evidence for this other syllable in the fact that the syllable si, which was added some centuries later to Guido's system, sounds very close to this supposed syllable sa, and was likely derived from the last verse of the hymn, however not from the beginning syllable, but rather from the initials of the two words "Sancte Johannes" (si). Wiora proposes also another interpretation for these pre-existing syllables relating them to the names of the seven planets of medieval cosmology: if that is the case, again we have to suppose a seventh syllable, probably corresponding to the planet Saturn (sa).[92] Wiora's conclusions not only greatly reduce Guido's role in the creation of medieval solmization, but also seem to re-define this role essentially as the passage from a solmization system based on seven syllables to one based on six.

On the opposite side, Möberg and Smits van Waesberghe mention the possibility that the hymn was composed on pre-existing syllables, but only to reject it: Möberg finds other hymns, not used for musical purposes, which have the same characteristic of presenting the five Latin vowels at the beginning of their verses; Smits van Waesberghe

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chapter six, pp. 209ff, in the present study.

[92]Wiora quotes Handschin in this correspondence between names of notes and names of planets. Wiora, "Zum problem des Ursprungs," p. 272.

stresses the fact that the syllable ut is rather unsingable to have been chosen as a solmization syllable and refuses the possibility of pre-existing syllables on the basis of Guido's emphasis on the novelty of his method.[93]

Lange and Smits van Waesberghe also mention the existence of other hymn texts used for the same purpose of solmization.[94] Of these, Lange believes that the one based on the syllable set tri-pro-de-te-nos-ad was used by Guido in alternation with the "Ut queant laxis" text; according to Lange, his interpretation would account for Guido's words "imprimis et in ultimis," which would refer to two hymns, one to be used at the beginning of the lesson, and the other at the end.[95] This alternative set seems to have been an improvement in comparison with the other one, because the syllables point to the four modal finals: *pro* for *protus* on *D*, *de* for *deuterus* on *E*, *tri* for *tritus*, transposed on *C*, *te* for *tetrardus* on *G*. The set *tri-pro-de* seems to have survived well after Guido's time, since it is likely to be the one mentioned by Johannes of Afflighem, the author of *Summa musice*, and Jacques de Liège after him, which was different from the widely accepted ut re mi fa sol la, and used exclusively by Italians. However, the set ut re mi fa sol la prevailed in spite of the fact that the alternative set could also show the modal relationships.

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[93]C. Möberg, "Die Musik in Guido von Arezzos Solmisationhymne," *Archiv für Musikwissenschaft* 16 (1959), pp. 194ff. Smits van Waesberghe, *Guidone Aretino*, p. 102.

[94]Lange, "Zur Geschichte der Solmisation," pp. 563ff. See Smits van Waesberghe, *Guidone Aretino*, pp. 101ff., and Henderson, "Solmization Syllables," pp. 20-36, for a complete account of the sources.

[95]Lange, "Zur Geschichte der Solmisation," pp. 542-43.

As for the melody used by Guido, several musicologists agree on the idea that Guido might have composed, or rearranged, the melody.[96] In particular Möberg investigates such a possibility, and concludes that the melody found in Guido's *Epistula* is a re-elaboration, for pedagogical purposes, of another melody.[97] The main objection that has been raised against the attribution of the melody to Guido is Guido's own statement referring to the melody as a "well-known symphony," likely a pre-existing one; however, many scholars believe that the adjective *notissima* should be interpreted in the sense that the singer has to sing the melody again and again until it becomes "well known" to him.[98] In any case, the "Ut queant" melody does not seem to be documented before Guido's time, since Coussemaker's dating of another instance of that melody has been disproven by modern scholars.[99]

Whether Guido composed the melody for the hymn or not, it seems more relevant to the present study to try to determine Guido's contribution to the shaping of the hexachordal system. Several scholars see a basic continuity between the six-note row that appears in Guido's writings and the later hexachord, while also pointing out significant differences. In particular, Lange and Smits van Waesberghe discuss the relationship between Guido's method for sight-singing and

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[96]Smits van Waesberghe, *Guidone Aretino*, p. 99; Chailley, "Les origines de la gamme," pp. 57ff.; Möberg, "Die Musik in Guido," pp. 196ff.; Lange, "Zur Geschichte der Solmisation," p. 556.

[97]Möberg, "Die Musik in Guido," pp. 203ff.

[98]Lange, "Zur Geschichte," p. 556, and Chailley, "Ut queant laxis," p. 58.

[99]Chailley, "Ut queant laxis," pp. 53-57. See above n. 91.

the later practice of solmization, perceiving the latter as a misreading of Guido's intent to form the musical ear:

> Therefore it is possible to affirm that we owe the essence of solmization to Guido, but we would do him wrong if we expressed the matter in such a way as if he had taught his pupils the "art of solmization." For Guido *musical instruction is music itself and through music itself*. In Guido (as we said in the first chapter of this section) there is no trace of the dull and non-musical teaching method which, before and after him, up to the twentieth century, was used to learn to read written music and to memorize intervals.[100]

For Lange too, the later solmization took the syllables out of their musical context to make them new denominations of tones.[101] Lange also maintains that the hexachord in Guido's theorization is not a self-standing unit yet, like the Greek tetrachord, but is somehow present in the background; in other words, we might infer that for Lange Guido did not regard the segment of six notes as a structural element of the gamut, like the octave, but recognized the practical significance of the similarity between six-note segments in the gamut as a felicitous characteristic to be exploited especially in singing.[102] Consequently, Lange suspects that the hymn melody was sung on different hexachords, and that it was notated on the *C* level not to be confined to that particular hexachord but rather in order to have it end on the modal final *D*. Lange's position might seem close to

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[100]"Igitur affirmari quidem licet essentiam solmisationis Guidoni deberi, sed iniuria ei infertur, si rem ita proponamus, quasi pueros 'artem solmisandi' docuisset. Apud Guidonem *institutio musicalis fit ipsa musica et per ipsam musicam*. Apud eum (ut in capite I huius partis exposuimus) nullum vestigium adest methodi didacticae aridae atque non-musicalis, qualis ante et post eum, usque in saeculo XX adhibebatur in discendo legere musicam descriptam atque in addiscendis intervallis." Smits van Waesberghe, *Guidone Aretino*, p. 95.

[101]Lange, "Zur Geschichte der Solmisation," p. 560.

[102]Ibid., pp. 556-7.

Handschin's view, also on account of the former's observation that the addition of a new hexachord on *F* was the starting point for transposing the hexachord on other pitches, and, consequently, for introducing other accidentals. However, Lange does not share Handschin's negative judgement of the hexachord and on the contrary emphasizes the power of singable syllables over pitches drawn from the monochord to show tonal relationships.

We already saw Smits van Waesberghe's position regarding the relationship between Guido's singing method and the later practice of solmization. However, even more relevant to the present study is his discussion of the theoretical implications of the method exposed in the *Epistula*, that is, the tracing of the roots, in Guido's theory, of the more complex hexachordal system which is found completely established in the thirteenth century. First of all, Smits van Waesberghe sees a substantial connection between the singing method exposed in the *Epistula* and the theory of affinity in *Micrologus*: the sixth which shows the affinity between notes a fifth apart is the same sixth used to show the new method of sight-singing. The connection with the theory of affinity makes the sixth found in the *Epistula* a real structural unit with a theoretical, not only practical, value.[103] The

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[103]The hexachord as a unit and not just a series of names for six notes is discussed in the section "Composuitne Guido hexachordum tamquam unitatem?" ("Did Guido devise the hexachord as a unit?") in the second chapter of Smits van Waesberghe, *Guidone Aretino*, pp. 97ff. As seen above, several scholars held a different position about this matter: Handschin sees the passage in the *Micrologus* as the mere recognition of a double row of similarities, not as the establishment of a new unit in the gamut; Christian Berger states that Guido did not make the connection between the theory of affinitas and the sight-singing method which is at the basis of the hexachordal system. See above sections 3.1 and 3.2.

beginning of this six-note row on *C*, rather than on the gamut first *A*, is another proof that Guido had the theory of affinity in mind while exposing his new singing method, a view shared by Karol Berger.[104] In fact, had Guido been interested only in showing tonal relationships, he would have started on *A*. Another proof that the six-note row in the *Epistula* is a self-standing theoretical unit is the fact that this segment of the scale contains all the modal finals and their lower and upper neighbors. As already noted, these neighboring notes are fundamental, along with the final, in defining a mode, therefore Guido's hexachord turns out to be a compact unit to show modal relationships as well.[105]

Regarding the lack of a seventh syllable, Smits van Waesberghe also notes that the note *B* is hardly ever used in Gregorian chant as the beginning note of either ascending or descending movements, and therefore would not be very useful for showing tonal relationships.[106] Lange emphasizes the peculiarity of this note *B* which changes pitch in relation to the surrounding notes, and therefore cannot have a stable character expressed by one syllable.[107] With this last remark, Lange seems to imply that each syllable of the hexachord has a single, peculiar character, therefore the hexachord might be seen as a series of "tonal qualities."

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[104]Berger, *Musica ficta*, p. 8.

[105]For the importance of the neighboring notes in modality see the preceding section 3.3, where the modal relationships expressed by syllables are quoted from Lohr.

[106]Smits van Waesberghe, *Guidone Aretino*, p. 92.

[107]Lange, "Zur Geschichte," p. 562.

4.2. From Guido to the Thirteenth Century[108]

We already saw the relationship between Guido's method and the later solmization, as discussed by some scholars; I also pointed out the connection, emphasized especially by Smits van Waesberghe, between the sixth Guido used in the eighth chapter of *Micrologus* to show the doctrine of affinity and the six syllables of the *Epistula*. However, if the transposition of the six syllables on other steps beside *C*, as we find in the later hexachordal theory, has its roots in the theory of affinity, it is not clear whether Guido actually used mutation.

Musical sources from 1050 to 1150 seem to confine mutation to the hexachords on *G* and *C*.[109] In the ms. Munich, Bayerische Staatsbibliothek, Clm. 9921, fol. 58r, reproduced by Smits van Waesberghe, and dated from the second half of the eleventh century, there is an interesting diagram which shows the mutations between the hexachord on Γ and the one on *C*. On the left side, the four letters Γ-*b*-*d*-*f* are aligned vertically, like clefs, while horizontally syllables and mutations are shown (see picture on next page).

The anonymous treatise *Liber Argumentorum*, from the twelfth century, or even earlier, provides one of the first references to

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[108]In this last section I intend to offer a brief overview of some eleventh- and twelfth-century documents related to the development of the hexachordal theory. A complete study and comparison of all theoretical and practical sources of the two centuries, in order to investigate the evolution of the hexachordal theory from Guido to the thirteenth-century theorizations would require a research of its own, which would go beyond the scope of the present study.

[109]Smits van Waesberghe, *Musikerziehung*, p. 116.

mutation in a theoretical treatise.[110] In the sixth chapter, "Item de musica et de arsi et thesi," the hexachordal syllables ut re mi fa sol la are given in ascending and descending motion, starting from the letter Γ.[111] However, in chapter forty, "Argumentum ad inveniendum ignotum cantum per computum," the set Tri pro de nos te ad is used throughout the gamut, from Γ to *dd*, showing the following mutations between hard and natural hexachords:

-on *C* nos-Tri (=fa-ut), from hard to natural property

-on *D* te-pro (=sol-re), " " " " "

-on *E* ad-de (=la-mi), " " " " "

-on *G* te-Tri (=sol-ut), from natural to hard property

-on *a* ad-pro (=la-re), " " " " " .[112]

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[110]*Expositiones in Micrologum Guidonis Aretini*, ed. J. Smits van Waesberghe (Amsterdam: North-Holland Publishing Company, 1957). Smits van Waesberghe dates both the *Liber Argumentorum* and the *Liber specierum* between 1050-1100, and ascribes them to an Italian origin because of their use of the Tri-pro-de set of syllables and the presence of Italian notation. Ibid., p. 9.

[111]Ibid., p. 19.

[112]Ibid., p. 30.

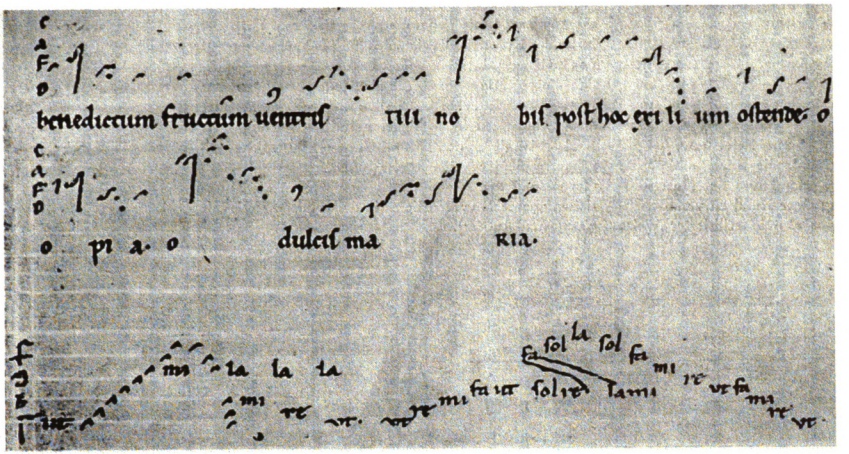


Figure 1 - A very early example illustrating mutation
(München, Bayerische Staatsbibliothek, Clm. 9921, fol. 58r)

Two explanations seem possible: either the example above represents an early stage in the development of hexachordal theory--a stage in which the soft property was not used yet,--or it gives evidence of a different practice of solmization, possibly Italian for the use of the Tri-pro-de set, which observes the strict diatonicism suggested by Guido's writings. Were the latter hypothesis true, the remarks about Italians using different syllables, found in John of Afflighem, the author of *Summa musice*, and Jacques of Liège, could also indicate the use of a different hexachordal system.

In the treatise *De Musica* by John of Afflighem the system of three hexachord is established. At the beginning of his treatment, John affirms that six syllables (*syllabae*) are used, although they differ among people:

> The English, French, and Germans use these: ut, re, mi, fa, sol, and la. But the Italians have others, and those who wish to learn them may arrange to do so with these people.[113]

We cannot know what the other set of syllables mentioned by John was; yet, since the Tri-pro-de set is quite common in early sources, it could well be the one used by Italians.

Aside from this reference to syllables, John makes quite clear, in the chapter devoted to the letters of the gamut, that he has in mind the system of three types of hexachords, of three properties, including the hexachord on *F*, even though he does not state that explicitly. Indeed, in referring to the letter *b*, John says that the two forms of *b*, that is, the square *b* and the round *b*, differ "both in appearance and in the syllables written above them."[114] The reference clearly

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[113]*Hucbald, Guido, and John on Music*, p. 104.

points to the syllables mi and fa of the *G*- and *F*-hexachords. John also uses syllables to define intervals: ut-ut for the unison, mi-fa for the semitone, ut-re for the tone, re-fa for the semiditone or minor third, ut-mi for the ditone or major third, ut-fa for the diatessaron or fourth, ut-sol for the diapente or fifth, mi-ut for the semitone plus diapente or minor sixth, ut-la for the tone plus diapente or major sixth.[115] It is interesting that intervals are almost always started on ut, rather than on the first final, *D*, which corresponds to re. The hexachord seems to have gained already the role of a significant unit, of a measuring module. Furthermore, for those intervals that go beyond the limits of one hexachord John resorts to the next hexachord, thus applying, implicitly, mutation.[116]

The treatise *De legitimis ordinibus pentachordorum et tetrachordorum* by Theinred of Dover, supposedly from the twelfth century, shows hexachord transpositions even on *F* below Γ, *B* flat, and *D*, reaching as foreign pitches as *e* flat and *f* sharp.[117] However,

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[114]Ibid., p. 108.

[115]Ibid., p. 112.

[116]C. Berger regards a diagram in John's treatise, similar to the one in Guido's *Micrologus*, as the first representation of the distinction, inside the hexachord, between the lower syllables ut-re-mi, which start fundamental fourths, and the upper syllables fa-sol-la, which begin mutated fourths (Berger, "La quarte," pp. 22-3). However, the diagram simply shows the octave subdivision into the consonances of fourth and fifth, without any evident hexachordal implication.

[117]See G. Reaney, "Transpositions and 'Key' Signatures in Late Medieval Music," *Musica Disciplina* 23 (1979): 27-42. See also A. Hughes, "Theinred of Dover," *The New Grove* 18: 731-32. However, in his article, Hughes mistakenly attributes to Theinred another treatise in the same manuscript, the *Breviarium regulare musice*, whose author is a certain Willelmus. See G. Reaney, "The *Breviarium regulare musice* of Ms. Oxford Bodley 842," *Musica Disciplina* 11 (1957): 31-37.

Gilbert Reaney believes that the treatise, which survives only in a fifteenth-century copy, should probably be dated later than the twelfth century, so that it cannot be taken as evidence of the recognition of such far hexachord transpositions already in the twelfth century.[118]

Another important source for the study of the relationship between Guido's ideas and the later hexachordal theory is the so called "Guidonian" hand. Already at the beginning of the twelfth century, the medieval writer Siegebert of Gembloux attributes to Guido the invention of the hand.[119] According to Smits van Waesberghe, had Guido used the hand it would have been only for singers to memorize the letters of the monochord, not to memorize intervals.[120] The use of the hand as a mnemonic device in education was quite old and widespread; there are a few examples of the hand used as a didactic means to teach music theory before Guido, while many "Guidonian" hands are documented from the twelfth century onward.[121] As is well known, the standard Guidonian hand is a representation of the left hand, with each note of the gamut inscribed in a joint, starting from the tip of the thumb and proceeding

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[118]G. Reaney, "De legitimis ordinibus," pp. 29-30.

[119]Siegebert Gemblacensis, *Liber de scriptoribus ecclesiasticis* and *Chronica*, in *Patrologiae cursus completus: Series latina*, ed. J. P. Migne (Paris, 1844-64) 160: 204 and 579, quoted by Smits van Waesberghe, *Guidone Aretino*, p. 96. Smits van Waesberghe indicates the passage taken from the *Liber* (c. 579) as A, and the one taken from the *Chronica* (c. 204) as B, but in quoting them he actually reverses the letters, attributing the words in the *Chronica* to the *Liber* and vice versa.

[120]Ibid., pp. 120-1.

[121]Smits van Waesberghe, *Musikerziehung*, pp. 122ff., and *Guidone Aretino*, pp. 114ff. Smits van Waesberghe first refers to some examples of pre-Guidonian hands used to show the tetrachordal division of the gamut and the modal finals and ranges, and then analyzes some of the numerous Guidonian hands.

like a spiral to the last joint of the middle finger. Indeed, the gamut in Guido's theory comprised ninenteen notes, corresponding to the ninenteen joints on the hand; with the addition of *ee*, in the thirteenth century, the highest note of the gamut was still placed on the last joint of the middle finger, but on the back, as Karol Berger has pointed out.[122]

Some of the earlier examples of the Guidonian hand show only the letters of the gamut, without syllables, either encompassing the whole gamut from Γ to *dd* or confined to the double octave Γ-*g* or Γ-*aa*; they also make no distinction between the two types of *b*.[123] Later examples not only have the syllables, partly or all the way through, but also show the distinction between square and round *b*.[124] Aside from the indication of letters and syllables, which provide the singer with a complete reminder of the gamut and its succession of tones and semitones, pictures of the hand can also supply further information, like the position on the staff, the indication of the modal finals or that of the modal tenors.[125] A particular case is the hand in the ms

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[122]K. Berger, "The Hand and the Art of Memory," *Musica Disciplina* 35 (1981): 94. The idea that notes corresponded to the phalanxes, and that the last note was placed, exceptionally, on the tip of the middle finger, but still on the front of the hand, should be rejected.

[123]See the pictures in Montecassino 318, Bibl. Vat. Reg. lat. 577, and Vienna Ö.n. 55. All of them, as described and reproduced by Smits van Waesberghe, have no syllables and only one type of *b* (Smits van Waesberghe, *Musikerziehung*, pp. 126ff.).

[124]See Rome, Bibl. Vat. Reg. lat. 1578 (syllables from Γ ut to *a* la mi re); Munich, Clm 14965 b (syllables all the way to *dd*); Vienna, O.N. 51 (syllables all the way, Γ with both syllables ut and re); Rochester 149667 (syllables all the way and specification of sy=synemmenon on the syllables belonging to the F hexachord). Smits van Waesberghe, *Musikerziehung*, pp. 126ff.

[125]In Smits van Waesberghe's list, the ms. Monaco Clm 14965 (12th century) has the indication of the modal tenors, as well as the

Paris, Cod. lat. 7203, which shows the picture of a right hand, where the letters of the gamut, but not the syllables, go from Γ to *ee*, and also provides the corresponding Greek names for the first two octaves.[126] That quite soon after Guido the hand had become a very powerful and indispensable theoretical and practical tool, is testified by John of Afflighem's words:

> So let him who strives for knowledge of music learn to sing a few songs with these syllables until he knows fully and clearly their ascents and descents and their many varieties of intervals. Also, let him diligently accustom himself to measuring off his melody on the joints of the hand, so that presently he can use his hand instead of the monochord whenever he likes, and by it *test, correct, or compose* a song.[127]

The three operations mentioned by John, to judge, to correct, and to compose, are restated two more times in the second chapter of his treatise, right after the quotation above, as the ground for distinguishing between a musician and a singer:

> For whoever devotes unremitting labor to it [i.e. music], and persevers without pausing or wearying, can gain from it this reward, that *he will know how to judge the quality of song--whether it is refined or commonplace, true or false--and how to correct the faulty and compose the new.* The knowledge of music, then, is no mean achievement, since *it makes him who knows it a judge of music already created, an emender of faulty music, and an inventor of new.*[128]

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redundant specification of tones and semitones through the initials T and S; the Vienna Ö.n. 51 (12th century) specifies both the modal finals and the position of notes either on a line or inside a space; the Bibl. Vat. Cod. lat. 3101 (13th century) again indicates the position of notes on line or space (*riga* or *spacio*). Ibid., pp. 128-131.

[126]Ibid., p. 133.

[127]*Hucbald, Guido, and John on Music*, p. 104 (italics mine).

[128]Ibid., pp.104-105 (italics mine).

Thus, with John the Guidonian hand has become such an important theoretical and practical instrument that whoever is able to use it can rise to the degree of *musicus*.

Chapter 2

THE TRACTATUS DE MUSICA BY LAMBERTUS AND THE RELATED *DE MUSICA PLANA* TREATISE

1. Introduction

There are four sources for the *Tractatus de musica* by Lambertus, published by Coussemaker as the work of Pseudo Aristotle: the manuscripts Paris BN lat.11266 and BN lat.6755/2, on which Coussemaker based his edition; Siena Bibl. Com. L.V. 30, and Erfurt Wiss. Bibl. 8* 94.[1] Sources related to the treatise are Paris BN lat 15128, which contains the "Lambertean" *De musica plana*; Rome Vat. Reg. lat. 1146, which lacks the section on plainchant, and a spurious work by Venerable Bede, edited by Migne.[2]

The treatise edited by Coussemaker appears complete only in the late fifteenth-century source Siena BC L.V. 30, f. 14r-32r. The Paris BN lat 11266, f. 1r-35r, is the oldest copy, but lacks the introductory part, while BN lat. 6755/2, f. 71r-78r, omits the tonary and the section on mensurable music. Also in Erfurt WB 8* 94, f. 87r-97r, the initial part is missing.

Very little is known about Lambertus. His name may suggest a Belgian origin, even though there has not been traced, so far, a birth

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[1]CS I, pp. 251-281. For a description of the manuscript sources see S. Pinegar, "Textual and Conceptual Relationships Among Theoretical Writings on Measurable Music of the Thirteenth and early Fourteenth Centuries" (Ph.D. diss., Columbia University, 1991), pp. 126ff.

place or date.[3] The only information we have comes from two theorists, the Anonymous St. Emmeram and Grocheio, who attributed to him the theory of the nine rhythmic modes. Jacques de Liège mentions him three times in his treatise by the name Aristotle, rather than Lambertus. Reaney's explanation for this oddity is that the name came from the work *Secreta secretorum*, once attributed to Aristotle, which precedes Lambertus's treatise in the source Paris BN 6755/2.[4] Sandra Pinegar, in her dissertation, has questioned such an explanation, on the basis that there is no evidence that both works, the *Secreta secretorum* and the *Tractatus de musica*, were bound together at Jacques's times. She proposes another possible interpretation, according to which the pseudonym *Aristotilis* might be related to the condemnation of Aristotle in Paris in 1270, and the censure of Lambertus's theory as Aristotelian.[5] Pinegar also proposes the identification with a certain Lambertus d'Auxerre who was the dominican commentator of Aristotle.[6]

As regards the attribution of the *Tractatus de musica*, Pinegar supposes that the treatise, which she prefers to call *Ars musice*, is not an original work by Lambertus, but rather a compendium of several sources, one of which is by Lambertus.[7] She argues that the whole

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[2]Migne, *Patrologia latina*, Vol.109, pp.919-38.

[3]G. Reaney, "Lambertus," *Die Musik in Geschichte und Gegenwart* 8: 130-132.

[4]Ibid. The same explanation is found in R. Baltzer, "Lambertus," *The New Grove* 10: 400-401.

[5]Pinegar, "Textual and Conceptual Relationships," pp. 122-124.

[6]Ibid., p. 122.

[7]Ibid., p. 133. She adduces the following reasons for her opinion: first of all, Anonymous St. Emmeram says that Lambertus's treatise is divided into chapters, but none of the surviving sources

treatise cannot be ascribed to one theorist, on the basis of the following observations:

1-the introductory material is mostly a quotation from Boethius and Gundissalinus, and is found independently in other sources;[8]

2-the section on plainchant seems to be a *compilatio*, since it often quotes mnemonic verses which can be found in other sources as well;

3-the citations of Lambertus by other theorists only refer to the section on mensurable music.[9]

I would not exclude that the original treatise by Lambertus, which cannot be plausibly identified with any of the extant sources, contained an introductory part, mostly based on quotations, and a second section on plainchant, according to a plan which is quite common in medieval treatises. Furthermore, the introductory part, which is indeed mostly based on quotations from Boethius and Gundissalinus, does not seem to be a mere compendium and shows, according to Pietzsche, "a series of interesting interpretations of earlier concepts and characteristic additions."[10] The same consideration could be placed on

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has such a division; the paragraph on *falsa musica* seems to be out of place, as if it was an interpolation. Pinegar prefers the name *Ars musice* which she takes from the first sentence of the treatise as transmitted by the manuscripts I-Sc L.V. 30 and F-On lat. 6755/2.

[8]For the exact reconstruction of all the sources of the quotations in the first part of the treatise see G. Pietzsch, *Die Klassifikation der Musik von Boetius bis Ugolino von Orvieto* (Halle: Druck von Karras, Kröber & Nietschmann, 1929), pp. 29-30. Aside from Boethius and Gundissalinus, there are also a few quotations from Guido, Richard of St. Victor, and Isidor.

[9]Pinegar, "Textual and Conceptual Relationships," pp. 124-126.

[10]"Eine Reihe interessanter Umdeutung früherer Begriffe und charakteristischer Erweiterungen." Pietzsche, *Die Klassifikation*, p. 85.

the section on plainchant which, as we will see, presents some original observations. Therefore, I will refer to Lambertus as the author of both the first and second sections.

As to the date of the treatise, the one proposed by Reaney, 1270, seems to be most widely accepted, the *terminus ante quem* being 1279, the date of the St. Emmeram treatise which quotes Lambertus.[11]

As seen above, Lambertus's treatise opens with a speculative introduction mostly based on Boethius and Gundissalinus; the next section comprises a discussion of plainchant and a poetical treatment of modes, followed by a tonary; finally, the third and most extensive part deals with *musica mensurabilis*.[12] The hexachordal theory is, as expected, outlined in the second section, which, in Coussemaker's edition, runs from page 254 to page 268, of which pages 262-298 correspond to the tonary. I will discuss the content of this section with reference to the treatise *De musica plana breve compendium*, in Paris BN 15128, which, as we saw, is closely related to the *Tractatus de musica* for the part on *musica plana*.[13]

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[11]Reaney, "Lambertus," p. 130, and Pinegar, "Textual and Conceptual Relationships," p. 120. The latter also mentions the dates 1250-60 proposed by Glorieux and Gastoué, as well as 1240, suggested by Wolf.

[12]According to Pinegar, this could be the "earliest effort to encompass all musical knowledge within a single compilation under this tripartite division." (Pinegar, "Textual and Conceptual Relationships," pp. 119-120) Later examples are Jerome's compilation, Odington's *Summa* and Jacques of Liege's *Speculum*.

[13]For a modern edition of the treatise and some general information, see A. Gilles, "De musica plana breve compendium: Un temoignage de l'enseignement de Lambertus," *Musica Disciplina* 43 (1989): 33-62. Abbreviated here as Gilles.

2. Letters and syllables

The section on plainchant theory in Lambertus's treatise opens with the division of music into four *partes principales*: 1) signs and names of sounds, 2) lines and spaces, 3) properties, 4) mutations. A similar division is provided by the Lambertean *De musica plana*, right after a preliminary short section on definitions, which is clearly taken from Lambertus's introductory section.[14] While most of this prefatory material in *De musica plana* is an abridged quotation of Lambertus's sources, that is, Boethius and Gundissalinus, two definitions are shorter versions of what appears to be Lambertus's own thinking.[15] The abbreviation of the sources quoted by Lambertus, along with the simplification of Lambertus's original definitions, speak in favor of a derivation of *De musica plana* from the *Tractatus*, rather than vice versa.

In the treatment of the first *pars in musica*, namely the signs and names of sounds, the two treatises present some slight, yet interesting differences. Lambertus starts with the presentation of the seven Latin letters which express all sounds and are also called *claves*; *De musica plana* first presents twenty *claves* or *signa*--actually

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[14]At the beginning of the second part, the author of *De musica plana* actually divides music into three parts, by throwing together names and figures of sounds with lines and spaces, which in Lambertus's treatise constitute two separate sections. However, in the following treatment the two subjects are split into two different chapters. See Gilles, pp. 42-44, and his remark in the Introduction, p. 34.

[15]"Musica est liberalis scientia perite cantandi copiam subministrans," and "Inter enim omnes liberales *artes* sive scientias ipsa est liberalior, jocundior, laetior, amabilior, curialior." Cf. Gilles, p. 40 and CS I, pp. 252 and 253.

twenty-two with the two round *b*'s--which are then divided into eight *graves*, seven *acutae* and five *superacutae*.[16] Later, in the same chapter, the compendium does quote Lambertus's statement about the seven Latin letters also called *claves*; however, the impression is that there is some subtle distinction between letters and *claves*, as the latter refer more specifically to notes or pitch locations and the former to their designations. Indeed, even Lambertus, when finally speaking of the subdivision of notes into *graves, acutae* and *superacutae* drops the term *littera* and uses *clavis* or *signum*.[17] The use of the term *clavis* is explained in both treatises with the common analogy with keys: as keys open locks, musical *claves* open (reveal) the melody of music.[18] In the next sentence, a further analogy is allowed by the double meaning of the verb *revolvo*, as either "turn" and "return:" so, as the key is turned again and again in the lock, so all the music of the year is repeated, returns, in these seven letters.[19]

As to the addition of Γ, the Greek letter that precedes the seven Latin letters, both treatises explain it as being for the purpose of having the octave under *G* and the tone under *A*. Lambertus's version seems a little more precise when saying that Γ was added so that *A* would have a tone "altrinsecus," while the *De musica plana* modifies the

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[16]See Gilles, p. 42 and CS I, p. 254.

[17]The subdivision is found after the diagram showing all the letter-syllable combinations in the gamut with the mutations involved. See CS I, p. 257.

[18]"Quae etiam claves vocantur, quia sicut per clavem reseratur sera, per has litteras reseratur musice melodia." CS I, p. 254.

[19]"Et sicut clavis in sera revolvitur, ita totus annus et totus anni cantus in istis septem litteris replicatur." Ibid.

sentence with the adverb "intrinsecus." The former means "on the other side," while the latter indicates "internally," and therefore appears less precisely applicable to a note. The source for the statement about the necessity of having a tone below the note *A* is probably John of Afflighem, who provides a modal justification.[20] On the other hand, the remark about forming an octave between Γ and *G* could relate to modal needs only in order to sing the seventh and eighth modes in the lower octave. *De musica plana* adds a remark that could provide another kind of explanation, possibly related to the hexachordal system: the addition of Γ, to have the octave with *G*, results in the distinction of three different *alphabeta supina*, i.e., three different forms of the letter *G*, which correspond to the three deductions of the hard hexachord.[21]

The introduction of the "names" of sounds, that is, the six solmization syllables (*voces*), is again slightly different in the two treatises:

Lambertus:	*De musica plana*:
In these seven letters six syllables [*voces*] only are contained [*continentur*].[22]	Through the aforementioned seven letters six syllables [*voces*] only are designated [*designantur*].[23]

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[20]The necessity to go below A in the plagal protus. See *Hucbald, Guido, and John on Music*, pp. 107-8.

[21]"And the Greek G adds the [lower] octave to the Latin G, and thus [that letter] is distinguished into three forms from low to high, which are contained in the lower part of the hand." ("Et G graeca ad G latinam diapason introducat, et sic distinguitur in tria alphabeta supina quae continentur in manu inferius." Gilles, p. 42).

[22]"In istis septem litteris sex voces tantummodo continentur." CS I, p. 254.

[23]"Per has septem litteras supradictas sex voces tantummodo designantur." Gilles, p. 42.

Both versions refer to the seven letters, which earlier were said to express all sounds (*voces*), as designating only six different "types of sound" (*voces*), with the term *voces* now specifically meaning hexachord degrees. Lambertus's phrasing seems more precise, by stating that the seven letters "contain," rather than "designate," hexachord degrees, since, strictly speaking, hexachord degrees are designated by the syllables ut, re, mi, fa, sol, la. At this point the two treatises diverge in a major way: while *De musica plana* offers a diagram showing letters and syllables in the gamut, Lambertus introduces, in the scholatic form of a *quaestio*, the problem of the discrepancy between the number of letters and that of syllables: "however, it is asked why letters are more than *voces*, since *voces* are expressed through these letters."[24] The letters *F* and *G*, Lambertus explains, seem to be superfluous, since through the six preceding letters, from Γ to *E*, the six "types of sound" can be expressed. To this he objects:

> However, since we considered that both the immovability of syllables and the paucity of letters would not be sufficient to expand [*propagare*] the proportions of all songs, we placed the Latin *G* in the eighth location [*clavis*], and granted it three syllables: sol and re and ut, so that the ascending and descending movements are properly shown by them, and the Latin *G* could make an octave with the

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[24]"Sed quaeritur quare plures sint littere quam voces, cum tamen voces per has listeras [*sic*] exprimantur." CS I, p. 254. As regards this quotation, Henderson remarks: "he [Lambertus] thinks of the letter names as giving expression to the syllables, quite the opposite of the modern view." (Henderson, "Solmization Syllables," p. 40). Henderson's remark is based on the assumption that pitches are expressed by letters and that syllables are then superimposed for the singing of intervals; however, the medieval theorist seems to have regarded the six syllables as the six basic sounds, which can be found at different locations, maybe even an infinite number of locations or pitches, which, in turn, are always led back to the six *voces*.

> Greek Gamma. But certainly also we placed *F* in the seventh location so that the ascent from the others [notes] to *G* would not appear not gradual, and also vice versa the descent from *G* to the others, to which *F* we gave two syllables [*voces*], that is, fa and ut, so that it could with one ascend stepwise to *G*, and with the other conveniently descend in turn to *E*.[25]

Lambertus seems to imply the following reasoning: the six types of sounds, or hexachord degrees, cannot express all the possible sounds in the gamut, as letters do, unless they can be moved, that is, unless they can mutate. However, with only six locations, it would be impossible to mutate (*immobilitas vocum*) and six sounds are not enough to cover the range of most chants. On the other hand, the addition of G has been made necessary also to establish the octave. Through the addition of *F*, the passage from the first six hexachord degrees to the established new *G* is made gradual, so that now the six hexachord degrees can be moved further ahead. Another implication could be that, while the hexachordal syllables appear to be sufficient to express the fundamental melodic intervals (semitone, tone, major and minor third, fourth and fifth), letters are necessary for the vertical proportions,

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[25]"Sed quia consideravimus quod tam vocum immobilitas, quam litterarum paucitas omnium proportiones cantuum non sufficeret propagare, G latinum in octava clavi locavimus, et eidem tres voces concessimus, scilicet: sol et re et ut, quatinus per ipsas ascensum et descensum competenter ostenderet, et ad Gamma grecum G latinum diapason consonaret. Sed quidem et F in septima similiter clave locavimus nec non gradatim ad G pareret ascensus ab aliis et a G descensus ad alias e converso, cui F duas voces concessimus, scilicet F [*sic*] et ut, quatinus cum una possit ad G gradatim ascendere, cum reliqua nec ad E deinceps descendere competenter." CS I, p. 254. The latter negative "nec" in the last sentence contradicts the point Lambertus is making, so that it is clearly a mistake, either by the scribe or by Coussemaker. Rather than take the "nec" out of the sentence, probably a "non" should be added before "descendere," thus making a double negative, which actually affirms, such as the one used by Lambertus a few lines above ("nec non gradatim.") In this case, the translation of the last clause would be: "nor with the other could not descend conveniently to *E* in turn."

among which the octave is the most important and cannot be expressed through the hexachord.[26] However we interpret this passage it is significant that it appears in Lambertus but not in *De musica plana*: one could infer that the latter treatise is more of a "neutral" compendium of the theory related to plainchant, while the former has a more critical approach--is the work of a theorist, not just a compiler. This supposition is confirmed by the fact that Jacques--one of the later theorists referring to Lambertus, although by naming him Pseudo Aristotle--quotes this explanation in his own treatment of the different number of letters and syllables.[27]

The illustration of the seven deductions, that is, the combination of letters and syllables throughout the gamut, is shown, in Lambertus's treatise and in *De musica plana*, in the form of a diagram, not a hand. This diagram is preceded by the remark that the six syllables occur in the hand (*palma*) seven times, with the addition, in *De musica plana* only, that the diagram is called *claustrum musicae*, that is, lock or key of music.[28] This designation recalls Salomon's definition of the hand as *clavis ut species*: the knowledge of music is

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[26]Lucy Cross interprets this passage as if Lambertus was assuming that the use of syllables to denote pitches preceded chronologically the use of letters. See L. Cross, "Chromatic Alteration and Extrahexachordal Intervals in 14th-Century Repertoires" (Ph.D. diss, Columbia University, 1990), p. 30. I do not think it is necessary to assume such a presumption in Lambertus's statement: in a treatise on plainchant, where syllables are used to utter notes, it makes sense to wonder why we need another separate set of pitch definers, the letters, which does not even coincide with the number of syllables.

[27]Bragard, p. 166.

[28]The Latin word *claustrum*, just as *clavis*, *claudo*, derives from the root *clavus* (=nail), from the Greek *klais*.

"unlocked" by a thorough knowledge of the hand.[29]

3. Property and mutation

The section on property is very similar in both treatises. Property is defined as a difference:

> Property, as is assumed here, is nothing else but a difference; and there are three species of differences, that is: hard *b*, soft *b*, and nature. Thus hard *b* is said to be a tone before square *b*; soft *b* is said to be a semitone before round *b*; nature is the hexachord (*cantus*) taken without any *b*, that is, without difference, and this [is said] properly inasmuch as every natural song begins and ends in its boundary.[30]

In this definition, the word "difference" seems to be used in two ways: as a synonym of property, both theorists say that there are three types of differences; but then, the term is applied to the two forms of *b*, natural and flat, so that the natural hexachord becomes the one without difference, since it does not contain either of the two *b*'s. The identification of the difference with the two types of *b* could be at the origin of the later development of only two types of *cantus*, either with *b* natural or with *b* flat. The last sentence in the quotation above likely refers to the fact that any natural, regular song, is supposed to begin and end on one of the four finals which are

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[29]See Salomon's multiple definition of *clavis* in chapter 4 of the present study.

[30]"Unde proprietas, ut hic sumitur, nihil aliud est quam differentia; et sunt tres species differentiarum, scilicet: b durum, b molle et natura. Unde b durum dicitur esse tonus ante b quadratum; b molle dicitur esse semitonium ante b rotundum; natura dicitur [*De musica plana*: dicitur esse] cantus sumptus sine aliquid [*De musica plana*: aliquo] b, id est sine [*De musica plana*: aliqua] differentia, et hoc proprie, eo quod omnis cantus naturalis in ejus confinio principium habet et finem." CS I, pp. 255-6. Cf. Gilles, p. 45.

contained in the natural hexachord.[31]

The following remark seems to exclude the use of other flats: "and it should be noted that soft *b* is not [proper] of other *claves*, by origin."[32] Brothers, following Turrell, interprets this passage as a prohibition to use hexachords built on *b* flat and *e* flat, understanding the expression *de origine* as referred to the beginning of new hexachords.[33] However, since later on Lambertus admits *falsa mutatio*, and consequently the possibility of using other flats, perhaps this passage should be intended as referred to the original gamut (*de origine*), which indeed allows only one soft *b* property.[34]

The placement of the three properties is then clarified by a rule

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[31]At least, this is the interpretation given by Jacques, who also notices that the remark is more true for the endings than for the beginnings of natural songs. Bragard, p. 179.

[32]"Et notandum est quod b molle non est de origine aliarum claves." CS I, p. 256. Cross translates "Note that b-molle is not of the same family as the other clefs." (Cross, "Chromatic Alteration," p. 400. Aside from the inappropriate use of the English word "clefs" for *clavis*, the expression *de origine* is not conveyed in her translation.

[33]"Lambertus, in his *Tractatus de musica* (ca. 1270), expressly stated that hexachords on Bb and Eb were not permissible." L. D. Brothers, "The hexachord Mass: 1600-1720" (Ph.D. diss., University of California, 1973), p. 11. In note, Brothers refers to Turrell, who has the passage quoted above. F. Turrell, "Modulation," p. 420. A similar interpretation of the same passage is found in Seay's translation of the anonymous *Tractatus de discantu*, where the same sentence appears. Seay translates "Unde notandum est quod b molle non est origine aliarum clavium" as "hence it must be noticed that soft b is not at the foundation of another hexachord." See *Anonymous II. Tractatus de discantu*, ed. A. Seay (Colorado Springs: Colorado College Music Press, 1978), pp. 28-9.

[34]Other treatises insert this statement in the context of *falsa musica*, thus suggesting that when round *b* is found in other locations that is a clue for *falsa musica*. See *De plana musica* (Reaney-Gilles-Maillard, p. 22) and the *Tractatus de discantu* (CS I, p. 310).

and a mnemonic verse.[35] The versions in the two treatises are slightly different:

Lambertus:	*De musica plana*:
Thus the rule: every ut beginning in *C* is sung by *natura* with its following [notes]; in *F*, by soft *b*; in *G*, by hard *b*. Thus the verse: *C* gives *natura*, *F* indicates to you the soft *b*; in *G* you always have to sing only hard *b*.[36]	Every ut in *C* is sung by *natura*, and the following syllables are pertinent to it; every ut in *F* is sung by soft *b* etc; every ut in *G* is sung by square *b* etc. Thus the verse: *C* gives *natura*, *F* indicates to you the soft *b* *G* also [indicates] that you always find square *b*.[37]

The section on mutation represents the most interesting part of hexachordal theory as discussed by Lambertus and *De musica plana*. The two treatises diverge slightly in the definition of mutation:

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[35]Pinegar notices that a text in verse points to an oral transmission, and that in the thirteenth century the quotation of anonymous didactic verses is more frequent, as if theorists were writing down what had been, thus far, only transmitted orally. Pinegar, pp. 14-15 and 24.

[36]"Unde regula: omne ut incipiens in C cantatur per naturam cum suis sequentibus; in F, per b molle; in G, per b durum; unde versus: C naturam dat, F b mollem tibi signat; G quoque b durum tu semper habes cani tantum." CS I, p. 256. For the significance of "unde versus" see Pinegar, "Textual and Conceptual Relationships," p. 136. She also corrects Coussemakers's version "tu semper cani tantum" with "tu semper caniturum."

[37]"Omne ut in C cantatur per naturam, et sequentes voces sunt sibi pertinentes; omne ut in F cantatur per b molle etc.; omne ut in G cantatur per b quadratum etc. Unde versus: "C naturam dat, F b molle tibi signat, G quoque b durum tu semper quis reperire." Gilles, p. 44.

Lambertus:	*De musica plana*:
Mutation, as taken here, is nothing else but the division (*divisio*) of one syllable next to another under the same sign and in the same sound.[38]	Mutation is nothing else, as taken here than the removal (*dimissio*) of one syllable because of another under the same sign, that is, the same sound. Or thus: mutation is the delivery [*prolatio*] of two different syllables under the same sign and the same sound.[39]

The two definitions are very close, and both stress the importance of having two syllables in the same sign and sound. The different terms used, *divisio* and *dimissio* could be the result of an error by the copyist, since they are graphically very similar and close in meaning. *De musica plana* adds a slightly different second definition which seems to refer to the actual process of mutating by singing two syllables on a note. The necessity of having two syllables makes it immediately apparent why the notes with only one syllable (Γ ut, *A* re, *B* mi, and *ee* la) cannot mutate. As to the impossibility to mutate in *b* fa *b* mi, Lambertus explains that in *b* fa *b* mi there are two different signs and not the same sound, so there cannot be mutation, by definition.[40] *De musica plana* enters into a more substantial demonstration, which goes through the following steps:

1-Even though in *b* fa *b* mi there are two different syllables, there is no mutation because that would be against the definition of mutation;

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[38]"Mutatio vero, ut hic sumitur, nihil aliud est quam divisio vocis unius prope aliam sub eodem signo et in eodem sono." CS I, p. 256.

[39]"Mutatio nihil aliud est, prout hic sumitur, quam dimissio unius vocis propter aliam sub eodem signo, id est eodem sono. Vel sic: mutatio est duarum vocum diversarum prolatio sub eodem signo et eodem sono." Gilles, p. 45.

[40]Ibid.

2-Indeed, there are two different signs: square *b* and round *b*, which are as opposite as black and white. The syllables mi and fa, therefore, are not compatible, since mi belongs to square *b* and fa to round *b*.

3-*E contrario*, if those two syllables were under the same sign we could say *b* fa mi, which is never found.

4-These two syllables are not in the same sound; on the contrary, between the sound indicated by round *b* and the one indicated by square *b* there is the distance of a major semitone.[41]

Thus, all the elements of the definition concur in this demonstration: the number of syllables involved, and the identity of sign and sound. The latter is not only demonstrated theoretically by the absence of a *b* fa mi *clavis*, but also practically by the recognition that round *b* and square *b* are separated by a certain distance, the major semitone. It seems also worthwhile to note a remark about round *b* which is found in the middle of the previous demonstration: the *clavis rotunda* is said to be unable to "open the lock," either by nature or by custom, maybe meaning that it is a special sign which somehow stands apart from the other *claves*.[42] The discussion of mutation proceeds with the rules about the number and the direction of mutations. Both theorists first state the correspondence between number of syllables and number of mutations (two to two, three

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[41]Gilles, p. 45.

[42]"Et sic clavis rotunda nec usu nec natura, potest reserare seram." Ibid. The remark could be related to the statement that we found in Lambertus about the round *b* not being like the other *claves* by origin. See above, p. 75.

to six), and then give the rule about the ascending and descending syllables. This rule is offered again, as an *unde regula*, that is, as a commonly known precept:

> Thus the rule that every mutation which ends with [the syllables] ut, re, [or] mi is uttered in ascending, since it has more to ascend than to descend; and every mutation which ends with [the syllables] fa, sol, [or] la is uttered in descending, for it has more to descend than to ascend.[43]

Thus Lambertus. *De musica plana* adds as *unde versus*: "Ut re mi climb, go down fa sol la."[44]

Mutation occurs for two reasons, both treatises explain, to ascend and to descend, that is, to transcend the six-note limit of one single hexachord, either up or down. The two treatises diverge on the example shown, probably because of a different transmission of the expression *in proprio*. Taking as an example the note *C* fa ut, Lambertus says that in order to ascend more than a third it is necessary to mutate properly (*in proprio*) from fa to ut; *De musica plana* has, in place of the expression *in proprio*, the adverb *improprie*, a likely scribal mistake.[45]

In one of the manuscripts transmitting Lambertus's treatise (ms Paris BN lat. 6755) all regular mutations are shown in a picture in which the twenty pitches from Γ to *ee* are enclosed in twenty circles, four per line. This, however, turns out to be just a spatial

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[43]"Unde regula quod omnis mutatio desinens in ut, re, mi dicitur ascendendo, quia plus habet ascendere quam descendere; et omnis mutatio desinens in fa, sol, la dicitur descendendo, quia plus habet descendere quam ascendere." CS I, p. 256.

[44]"Ut re mi scandunt, descendunt fa sol la." Gilles, p. 45.

[45]The possibility that "in proprio" refers to the natural property, called *proprius cantus* by other theorists, seems unlikely here since Lambertus never uses such a terminology.

arrangement, without any visible intent to relate the twenty pitches to a tetrachordal system, since on each line there is always a different succession of tones and semitones. On the rim of each circle the single property or, where mutation occurs, the change from one property to another is shown: *b quadratum, natura, b molle*. Inside the circles, aside from the letter-syllable combinations which designate each pitch, either the sentence *non est mutatio* or the mutations are shown, in the latter case in both direction (for instance for *C* faut there is fa-ut on one side and ut-fa on the other). The picture is missing in *De musica plana*, even though the treatise refers to it.[46] This treatise adds one further specification about mutation which is not provided in Lambertus's treatise:

> It should be known that every mutation occurs either because of the syllable [*vocis*] or of the sign [*signum*] or of both, that is, syllable and sign. A mutation occurs because of the syllable when through the taken hexachord the syllable cannot reach another particular hexachord, and therefore the upper syllable needs to be abandoned and the lower one to be taken and vice versa; mutation is made because of the sign when an intervening sign changes the hexachord [or property].[47]

The specification is very interesting, not only because it states another cause of mutation, but also for the use of the word *signum* to mean the two different graphic forms of the letter *b*. This might even

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[46]"Et hoc in sequenti figura plenius patebit sive in manu." Gilles, p. 46.

[47]"Sciendum est igitur quod omnis mutatio efficitur aut ratione vocis aut ratione signi aut ratione utriusque, scilicet vocis et signi. Ratione vocis efficitur mutatio quando per cantum inceptum vox non potest attingere - sive discendendo sive ascendendo - ad cantum determinatum, et tunc dimittenda est illa superior, et assumenda est illa inferior et e converso; ratione signi efficitur mutatio quando signum superveniens mutat cantum." Gilles, p. 46.

imply mutations on other steps, "signalled" by the presence of either a square or round *b*.

At this point, the treatise refers again to a picture which would show all the cases of mutations; we can assume that it is the same picture we found in Lambertus's treatise, so that the aforementioned *signum* is actually meant just to refer to the square *b* and round *b* of the hard and soft hexachord. However, the lack of the figure, and the generality of the statement, especially if related to what both authors say about *falsa musica*, leave some room for speculation about the possibility to mutate into other hexachords, aside from the standard ones.

4. *Falsa musica* and *falsa mutatio*

Both treatises introduce an important passage about *falsa musica* in the course of the treatment of intervals, right after the semitone. First of all, it should be noted that they both recognize twelve kinds of intervals: unison, tone, semitone, ditone, semiditone, diatessaron, diapente, tone with diapente, semitone with diapente, ditone with diapente, semiditone with diapente, and diapason. Actually, in the first list Lambertus omits the major seventh (ditone with diapente), and *De musica plana* omits both sevenths. However, all intervals are present either in Lambertus's musical examples or in *De musica plana*'s verbal descriptions, which include the tritone as well.[48] The classification of these intervals differs in the two treatises. *De*

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[48]The musical examples are missing in *De musica plana*, while Lambertus's detailed description of each interval leaves out both the major and minor seventh.

musica plana uses a classification which is reminiscent of Guido's six *consonantiae*, since it states that there are only six *concordantiae*: unison and diapason, which are perfect; minor and major third, which are imperfect; and fourth and fifth, which are median. The substitution of tone and semitone with unison and octave makes the Guidonian six *consonantiae*--or *concordantiae*, in the terminology of *De musica plana*--usable in polyphony too. Lambertus's classification, on the other hand, goes even farther, by saying that there are not only *concordantiae* but also *discordantiae* which are perfect, imperfect, and median.

Both treatises insert the discussion of *falsa musica* after the description of the semitone. This somehow peculiar placement may be explained in two ways: first of all, *falsa musica* is defined in relation to tone and semitone, as the "making of a semitone where there is a tone and vice versa;" secondly, later on, in dealing with the intervals of fourth and fifth, Lambertus is able to correct the tritone and the diminished fifth occurring respectively between *F* and *b*, and *B* and *F*, by invoking the application of *falsa musica*, which he needed, therefore, to have already introduced at that point.[49] In view of these considerations, I don't think that this passage on *musica falsa* should be considered necessarily an interpolation, as Pinegar believes.[50] Aside from the definition of *falsa musica*, which is echoed

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[49]CS I, p. 258.

[50]Pinegar, "Textual and Conceptual Relationships," pp. 133-34. Pinegar bases her assumption on the idea that the passage seems to be misplaced and should belong in the discussion on mutation. It is my opinion, on the contrary, that here Lambertus is referring to mutation to explain a phenomenon that is somewhat marginal to *musica plana* and more concerned with secular and polyphonic music.

by many contemporary as well as later treatises, the most interesting part in this passage is the association of *falsa musica* with a particular kind of mutation, called *falsa mutatio*, as if Lambertus was trying to grant legitimacy to a procedure more common to secular and polyphonic music, by inserting it somehow in the hexachordal system. Seeing the importance of the passage, and also that the two treatises differ some in the wording, both versions are quoted below, side by side:

Lambertus	*De musica plana*
To this it needs to be said why mutation or *falsa musica* is not useless, but rather necessary to find a good consonance.	For this it needs to be stated that false mutation or *falsa musica* is not useless, but rather necessary to find a good consonance, and avoid a bad one.
Indeed, if we want to have a fifth, by necessity it is convenient that we have three tones and a semitone, so that if a certain note [*figura*] is in fa *b* mi [*sic*] under *b quadratum* and another is in *f* fa ut *per naturam*, then there is no consonance, but a very displeasing dissonance with the semitone, because there are not three tones with semitone, but two tones with double semitone.	Indeed, if we want to have a fifth, which is a median *concordantia*, it is necessary that we have three tones with a semitone so that if a certain note [*figura*] is in *b* fa *b* mi under *b quadratum*, and another is in *f* fa ut *per naturam*, then there is no consonance, but a very displeasing dissonance.
However, it may be done there, but through *falsa musica*. We say it to be done through *falsa musica* when we make from a semitone a tone or vice versa. However, it is not false, but changed [*mutata*].	However, a consonance may be provided, but through *falsa musica*: we say it to be done "through *falsa musica*" when we make from a semitone a tone and vice versa; however, it is not false, but unusual [*inusitato*].
This we recognize through the sign [*signum*] of square *b*, or round *b* placed in a changed [*mutato*] location, so that we say mi *durum*	This we known through the sign [*signum*] of square *b* or round *b* placed in an unusual [*inusitato*] location, as when we say mi *durum*

in high fa [*sic*] with the sign of square *b*; or we put round *b* in *b* fa mi, or in similar notes, so that, in the ratio of a tone, there will be the consonance of a fifth.
And therefore *falsa musica* is sometime necessary, also in order to perfect any consonance or harmony [*melodia*] in any sign.[52]

in *f* fa ut with the sign of square *b* or if we place round *b* in *b* fa *b* mi or in similar notes, so that it is in the ratio of a tone: then there will be the consonance of a fifth.[51]

The most interesting difference between the two versions concerns the second part of the definition of *falsa musica*: after saying that *falsa musica* is the change from a semitone to a tone, and vice versa, the author of *De musica plana* concludes by saying that it is not false

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[51]"Ad hoc dicendum est quod mutatio falsa sive falsa musica non est inutilis sed necessaria propter consonantiam bonam inveniendam, malam vero evitandam. Nam si velimus habere diapente, quae est media concordantia, de necessitate oportet quod nos habemus tres tonos cum semitono ita quod si aliqua figura sit in b fa b mi sub b quadrato, et alia sit in f fa ut acuto per naturam, tunc non est ibi consonantia, sed per falsam musicam: "per falsam musicam" appellamus fieri quando nos facimus de semitono tonum et e converso; non tamen est falsa, sed inusitata. Hoc autem cognoscitur per signum b quadrati vel rotundi in loco inusitato locatum, ita quod dicamus mi durum in f fa ut acuto cum signo b quadrati vel si b rotundum ponimus in b fa b mi vel in similibus, ita quod sit in proportione toni: tunc erit dyapente consonantia." Gilles, p. 48.

[52]"Ad hoc dicendum est quid mutatio sive falsa musica non est inutilis, immo necessaria propter consonantiam bonam inveniendam. Nam si velimus habere diapente, de necessitate oportet quod habeamus tres tonos cum semitonio, ita quod si aliqua figura sit in fabmi, sub b quadrato, et alia sit in ffaut acuto per naturam, tunc non est ibi consonantia, sed dissonantia cum semitonio pessima, quia non sunt ibi tres toni cum semitonio; sed duo tantummodo cum duplici semitonio. Verumtamen fieri potest ibidem, sed hoc per falsam musicam. Per falsam musicam fieri appellamus, quando facimus de semitonio tonum, vel e converso. Non tamen est falsa, sed mutata. Hoc autem cognoscitur per signum b quadrati, vel b rotundi in loco mutato locatum, ita quod dicamus mi durum in fa acutam cum signo b quadrati; vel b rotundum ponamus in bfami, vel in consimilibus, ita quod in toni proportione tunc erit diapente consonantia. Et ideo falsa musica quandoque necessaria est; etiam et ut omnis consonantia seu melodia in quolibet signo perficiatur." CS I, p. 258.

but *inusitata*, unusual, while Lambertus has *mutata*, changed. The same deviation is found some lines down, when we read in Lambertus that *falsa musica* is recognized through the use of the sign of square *b* or round *b* in a changed position (*in loco mutato*), while the other treatise speaks again of an unusual position (*in loco inusitato*). According to Cross's interpretation, the adjective "inusitata," found in other sources as well, could derive from a confusing reading of the word "mutata," since the initial "m," which was written as a series of three strokes, could be read as "in," equally written as a series of three strokes.[53] According to Cross, "by 'mutation' Lambertus means only that the position of the semitone has changed," and not necessarily a mutation, that is, the implication of other fictive hexachords.[54] However, another possible interpretation could be that Lambertus is indeed speaking of a particular form of mutation, a kind that is outside the system, when he speaks of *falsa musica or falsa mutatio*, at the beginning of the aforementioned paragraph; on the contrary, in the following occurrences of the word *mutatus*, he could be referring to a change of position of the semitone with respect to its normal position in the standard gamut. That provides an explanation for the substitution, in *De musica plana*, of the adjective *mutatus* with *inusitatus*, which better clarifies the use of the semitone in different places from those allowed by the system, while leaving intact the basic statement that we are indeed in the presence of a particular kind of mutation. In fact, if Lambertus were only speaking of a change and not

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[53]L. E. Cross, "Chromatic Alteration," pp. 46ff.

[54]Ibid., p. 47.

of a real mutation, he would not have used the qualifier *falsa* for mutation, but would have simply said *falsa musica or mutata*.

5. Syllables and Intervals

After introducing the six "Guidonian" syllables a short poem (*unde versus*) follows in both treatises. It refers to six *motus*, likely the six melodic intervals recognized by Guido: semitone, tone, semiditone (minor third), ditone (major third), diatessaron (fourth), and diapente (fifth), which can all be expressed through the six syllables.[55] The *unde versus* also clarifies the distances between syllables, either a tone or a semitone. Here follow the two versions in Lambertus and in *De musica plana*:

Lambertus:

With these six [syllables] six
intervals are formed and varied:/
ut with re are wholly measured;
also mi with re;/
and mi fa give a semi[tone]
nor a whole tone occurs
underneath."[56]

De musica plana:

By these six [syllables] six
intervals are formed and varied/
ut re mi sol la we would sing
with full voice/
and mi fa give a semi[tone] but
a whole tone occurs
underneath."[57]

The quoted passage cannot be interpreted as merely referring to tone and semitone, because, even if we count all the tones occurring

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[55]For the relationship between intervals and hexachords see also Salomon's wheel of *claves*, in chapter four of the present study.

[56]"His sex formantur sex motus et variantur:/ Ut cum re plene modulantur; mi quoque cum re/ dantque semi mi fa, nec fit plenus tonus infra." CS I, p. 254.

[57]"Hiis sex formantur motus et variantur/ ut re mi - sol la cantemus voce plena,/ dantque semi mi fa, sed fit plenus tonus infra." Gilles, p. 43. Pinegar offers the reading "modus" instead of "motus." See Pinegar, "Textual and Conceptual Relationships," p. 136.

between syllables, that only amounts to four, plus the semitone, five, but does not account for the number six.[58] Thus, it is more likely that both versions are expressing the possibility to learn and sing the fundamental six melodic intervals through the six syllables, while also calling attention to the difference between whole tone, which occurs between almost each couple of syllables, and semitone, which occurs only between mi and fa. The last sentence shows a slight difference in the two versions: a "nec" in Lambertus is substituted by a "sed" in *De musica plana*. I think both versions can be accepted: in the first case, it is stressed that, as there is a semitone from mi to fa, so there is no whole tone from fa to mi; in the second case, after stating that between mi and fa there is a semitone, it is then specified that underneath this interval, and therefore under mi, there is a whole tone. The result is, indeed, the same; we only need to change the note to which to refer that "under" (*infra*).

As to the classification of intervals, Lambertus and *De musica plana* recognize twelve *species*: unison, tone, semitone, ditone, semiditone, diatessaron, diapente, tone with diapente (major sixth), semitone with diapente (minor sixth), ditone with diapente (major seventh), semiditone with diapente (minor seventh), and octave.[59] However, *De plana musica* is more ambiguous with respect to the tritone,

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[58]Even if we consider the tones and semitone in both ascending and descending motion, we come to the number ten, not six (ut-re, re-ut, re-mi, mi-re, mi-fa, fa-mi, fa-sol, sol-fa, sol-la, la-sol).

[59]Coussemaker's edition shows some inconsistency in the handling of intervals. All twelve intervals, as I have listed them, appear in the musical examples, while in the text, once the ditone plus diapente is missing, and in another instance, both the ditone plus diapente and the semiditone plus diapente are not listed. See CS I, pp. 257-259.

and uses syllables only in the case of the semitone.[60] Lambertus, on the contrary, employs syllables to describe most intervals, to show their position in the hexachord and, at times, their articulation. Therefore, the analysis according to Lambertus seems more relevant for the present study.

As for the unison, the definition stresses the lack of progression and does not refer to any syllable. The whole tone is described as having four *modi*, four positions in the hexachord: ut-re, re-mi, fa-sol, sol-la. The semitone, consequently, has only one *modus*, that is, mi-fa. The ditone has two types, ut-mi and fa-la, as well as the semiditone. In the latter case, though, the solmization syllables also show the articulation, since in re-fa the semitone comes after the tone, while in mi-sol, the semitone comes first. Syllables also show the three different articulations of the diatessaron: ut-fa, with the semitone at the end, re-sol, with the semitone in the middle, and mi-la, with the semitone in first position. However, in the case of the diapente only the two articulations which are found inside the hexachord are shown, that is, ut-sol and re-la. Thus, it seems that *modi* for Lambertus have more to do with positions in the hexachord than with species of intervals. He does add that a fifth can be formed from any note, except from square *b* to *F*, although the intervention of *falsa*

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[60]In *De musica plana* the theorist first states that there are twelve intervals, and then, when dealing with them individually, describes the tritone, the thirteenth interval, with the other ones. Gilles sees in this phenomenon the effort to reconcile two different traditions, one which counts thirteen intervals (the Garlandean tradition), from the smallest to the largest, and one which counts only twelve (the Lambertean tradition), from the simple to the compound (indeed, in Lambertus's classification the tone comes before the semitone, the ditone before the semiditone.) See Gilles, p. 34.

musica can restore the correct interval.[61] The major sixth or tone with diapente is the last interval to be described with syllables, ut-la.

The musical examples show all the intervals from the unison to the major sixth inside the natural hexachord on the low *C*. The remaining intervals, the minor sixth, the two sevenths, and the octave, which do not fit inside one hexachord, are notated with a different clef, even though all the lines maintain the same notes as before. This could be an indication that the new clef highlights a shift of hexachord, a mutation.[62] Following the musical examples of intervals, six deductions are shown on the staff, from the second on low *C* to the seventh on the high *g*. Their presence after the exposition of the intervals may be interpreted as an exercise in transposing the intervals inside one hexachord to the other locations in the gamut, that is, to the other deductions. However, it is not clear why Lambertus skips the first deduction: perhaps he wants to start from the *C* hexachord, as in Guido's Epistula, or to create a symmetry in the exercise by using two natural, two hard, and two soft properties.

6. Hexachord and modes

In the section on modes, which is found only in Lambertus's treatise, the only hexachordal reference can be seen in the use of syllables to define the modal finals: re, mi, fa, sol are the *voces finales*, while *D*, *E*, *F*, *G* are the *sedes finales*. A brief reference to

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[61]The same remark is found for the diatessaron *F*-square *b*.

[62]See CS I, p. 259.

alternative positions for the finals only hints at the transposition of the fourth mode onto *a*, through the use of soft *b*, and of the sixth mode onto *c*. Before the tonary, a short didactic poem is provided, where all intonations and median cadences of psalm tones are expressed through syllables.[63] Syllables are also used to describe the modes' *differentiae*. However, there are no further indications of a direct relationship between hexachords and modes.

7. Summary

Lambertus's treatment of the hexachordal system focuses more on theoretical definitions than on practical applications. There is no reference to the Guidonian hand, nor is the solmization method carefully described. On the other hand, the concept of property finds in Lambertus a definition which most other theorists will adopt. Furthermore, as for the discrepancy between the number of letters and that of syllables, Lambertus offers an explanation which emphasizes the different roles of the the two sets of pitch definers, rather than resorting to symbolic reasons.

Lambertus's most original contribution regards the particular type of mutation that he defines as *falsa mutatio*. In such an operation one can mutate in places normally not allowed by the system,

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[63]"Primum cum sexto fa sol la semper habeto/ Tertius octavus ut re fa, sicque secundus. La sol la quartus. Ut mi sol tibi quintus." CS I, p. 262.

and thus achieve notes which are not part of the standard gamut. Lambertus emphasizes the importance and usefulness of such a procedure in order to avoid undesirable intervals.

Chapter 3

PRACTICA ARTIS MUSICAE BY AMERUS

1. Introduction

Amerus's treatise *Practica artis musicae* is available in a modern edition by C. Ruini in the Corpus Scriptorum de Musica series.[1] The text survives in two major manuscript sources: Bamberg, Staatliche Bibliothek Lit. 115 and Trier, Seminarbibliothek, 44.[2] A compendium of the treatise, containing the prologue and a few passages, is found in Oxford, Bodleian Library, Bodley 77, where the author is called Aluredus. Two references to the treatise come from the sixteenth and eighteenth centuries. The first one is the quotation of a passage from the treatise in a letter of Giovanni del Lago to Giovanni Spataro, where the author is called Annuerus; the second reference is in Boston of Bury's *Catalogus scriptorum Ecclesie*, in which he mentions an English treatise with the same incipit and ending as Amerus's.[3]

On the basis of these data, as well as through a careful examination and comparison of the three manuscript sources, Ruini

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[1] *Ameri Practica artis musice*, ed. C. Ruini, Corpus Scriptorum de Musica 25 (N.p.: American Institute of Musicology, 1977). Abbreviated here as Ruini.

[2] Ibid., pp. 9ff.

[3] F. A. Gallo, "Citazioni di teorici medievali nelle lettere di Giovanni del Lago," *Quadrivium* 14 (1973), p. 172; T. Tanner, *Bibliotheca Britannico-Hibernica* (London 1748), p. 28, both quoted by Ruini, pp. 10-11.

proposes a *stemma* in which the transmission of the original treatise comes through two main branches: the English tradition, testified by the Oxford manuscript and the citation of Boston of Bury, and the Eastern French tradition, to which both the Bamberg and the Trier manuscripts seem to belong. As the only testimony of an Italian transmission of the treatise, which may very likely have been written in Italy, stands the afore-mentioned quotation in Giovanni del Lago's letter.[4]

The major source of information on Amerus comes from the treatise itself. Here, in the prologue, the author says "I Amerus, English cleric and presbyter, member of the household of the venerable Father Lord Ottobono Deacon Cardinal of St. Adrian, compiled in his house, in August 1271 A.D."[5] The affiliation with Cardinal Ottobono Fieschi makes it quite plausible that Amerus was in Italy in 1271, the year of the compilation of the treatise. However, since in that year the Cardinal attended the conclave in Viterbo for the election of the new pope, probably, as Gallo has suggested, the treatise was written in that place, rather than in Genoa, where the Cardinal normally resided.[6]

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[4]Ruini, p. 14.

[5]"Ego Amerus presbiter anglicus clericus et familiaris venerabilis patris domini Octoboni Sancti Adriani dyaconi cardinalis in domo eiusdem, anno Domini m. cc. lxxi. mense augusti compilavi." Ruini, p. 20.

[6]See the discussion about this point in Ruini, p. 15, which refers to both Gallo's and Kromolicki's different hypotheses about the place where Amerus wrote his treatise, either Rome or Genoa. See A. Gallo, *La teoria della notazione in Italia dalla fine del XIII all'inizio del XV secolo* (Bologna: Tamari, 1966), p. 14; J. Kromolicki, *Die Practica Artis Musice des Amerus und ihre Stellung in der Musiktheorie des Mittelalters* (Berlin: Rother, 1909), pp. 3-4.

Ruini does not exclude the possibility that Amerus was a singer in the Papal Chapel, since the designations *clericus*, in Amerus's prologue, and *cappellanus commensalis*, in Boston of Bury's testimony, were often used to indicate singers of the Papal Court. Furthermore, the term *magister* in the explicit of the treatise lets one suppose that he might have been a teacher in the Schola Cantorum.[7]

The treatise *Practica artis musice* is primarily concerned with *musica plana* and includes the tonaries according to the French and English churches and the Roman curia. A chapter by the end of the treatise is devoted to polyphonic music and might be the first treatise on measured music written in Italy.[8] Chapters two through five, in Ruini's edition, constitute the core of hexachordal theory, but several other passages have proven to be relevant to this topic.

The *Practica artis musice*, as the title suggests, is primarily intended to instruct singers in the practice of plainchant.

2. The Gamut

Amerus opens his treatment of the fundamentals of *musica plana* with the gamut. The first concern is with the presence of the Greek letter Gamma as the first letter of the gamut, to which Amerus responds both in symbolic and practical terms: the placement of a Greek letter at the beginning of the gamut is a recognition of the Greeks' invention of music; yet, it is also a way to show difference among notes.[9] While

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[7]Ruini, p. 16.

[8]Gallo, *La teoria della notazione*, p. 16.

[9]The sentence shows some ambiguity, as the Latin text reads: "quia greci fuerant primi inventores huius artis, vel ab alio homine (primo apud grecos inventa fuit ars ista), vel ut notaretur diversitas

the meaning of the first part of the answer is clear enough, as it refers to a justification for the presence of Gamma found in other theorists as well, the other motivation, "to show difference among notes," needs some explanation.[10] Possibly it may be interpreted as the recognition of the necessity to have the octave below *G*; now, in order to notate this other pitch the capital *G* cannot be used, as it already appears in the gamut, or the distinction between letters would be disrupted. Thus, in order to maintain the differentiation among the letters in the gamut, the Greek letter Gamma, corresponding to the Latin *G*, was introduced to notate the lower *G*.

By still using the method of the rhetorical question, Amerus tries to give justification for the placement of the gamut on the left rather than on the right hand. The question assumes the positioning of the gamut on the hand as a given, and the answer is again both symbolical and practical. The antithesis between the divine and the human is reflected by the two hands, Amerus says, where the right one, the hand of glory, represents Heavens, while the left one stands for suffering and labor; therefore, we aptly start from the left, our human world, moving towards the right, the celestial world. Amerus also

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inter litteras." It is not clear whether the part of the sentence which reads "vel ab alio homine (primo apud grecos inventa fuit ars ista)" should be put in relation with the following "vel ut notaretur," or rather with the first part of the sentence. I propose the following translation: "because Greeks were the first inventors of this art, or, according to somebody else, [both because] this art was found first among Greeks, and in order to show the difference among letters." For the text, see Ruini, p. 21.

[10]For instance, Lambertus and the *Tractatus de musica plana et organica* also explain the presence of Gamma at the beginning of the gamut as a recognition of the Greeks' invention of music (CS I, p. 254; CS II, p. 484).

offers a more practical reason: since we write, read, and necessarily sing from left to right, for the same reason we put the gamut on the left hand, to make the hand agree with the song.[11] The explanation seems to imply the actual use of the left hand while singing and reading music, not just as a theoretical reference, but as a practical tool to compare notes and syllables while reading a notated chant.[12]

As to the elements of the gamut, Amerus states that in the hand there are nineteen *voces*, which are sufficient to express any chant, and nineteen *claves*, which correspond to the nineteen joints of the human hand:

> I answer: because the author understood that nineteen *voces* would be sufficient in any chant and the *claves* would agree with the human hand, and that they cannot be more or less, including in the count the fingertips, and as if determined by this, he did not want to add more.[13]

The sentence above is the response to another question, concerned with the seven deductions or hexachords present in the gamut. At this

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[11]"Quia scribere et legere et necessarie ergo cantare a sinistris versus dextram inchoamus, et claves cantionum secundum ordinem littere de necessitate ponuntur in sinistra parte, ideo ut natura manus concordet cum ratione cantus, ponimus gamma in manu sinistra, quoniam in dextra cum littera non concordaret, nisi forte cum hebraica." Ruini, pp. 21-22.

[12]The same supposition about the use of the hand in performance can be gathered from Salomon's words about using the left hand for the gamut, since with the right one "we make rests, show notes with the finger, and the stylus, and sometimes turn pages." ("Facimus pausas, ostendimus punctos cum digito, et stilo, et aliquotiens volvimus librum," GS III, p. 24.) Cf. chapter four, p. 149, in the present study.

[13]"Respondeo: quia auctor intellexit quod decem novem voces essent sufficientes in omni cantu et quod claves concordarent cum iuncturis manus hominis nec plures esset, nec pauciores computatis summitatibus digitorum." Ruini, p. 22. The *auctor* Amerus refers to is probably Guido.

point, the discussion of the gamut becomes so intermingled with the explanation of the hexachordal system, that it seems more appropriate to continue our analysis in the next section of the present chapter. It should be noted, however, that Amerus does not provide any definition for either the term *clavis* or *vox*. However, in the treatment of the hexachordal system, he seems to use both *clavis* and *littera* with basically the same meaning ("littera vel clavi") to define the nineteen locations of the gamut. Amerus is aware of the presence of two more pitches or *voces*, the flat *b* and *bb*, which could actually increase the number of letters or *claves* to twenty-one. However, in the effort to stay consistent with the nineteen joints of the hand, he states that *b* fa *b* mi is a double *clavis* (*duplicem clavem*), rather than say that it contains two separate *claves*, as Jerome does; thus, later in the treatise, he can restate the number of letters or *claves* as nineteen.[14] As to the particular species of *clavis* named *clavis principalis*, a complete discussion will be found in the third section of the present chapter.

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[14]The passage about *b* fa *b* mi reads: "It should be noted, however, that twenty-three [actually twenty-one] letters and as many *voces*, that is, notes, can be said in the gamut because of the double *clavis* and double *vox* [which is] in either one of the two *b* fa *b* mi." ("Notandum tamen quod viginti tres littere and totidem voces, idest note, possunt dici in gamma propter duplicem clavem et duplicem vocem in utroque b-fa-b-mi." Ruini, p. 22). Later on, in the context of the treatment of *claves principales* Amerus states: "These are *claves principales* in a special way, not as if the other letters of the gamut were not as much *claves* as these ones, but because they are used more principally. Note that *claves* are nineteen, but *principales* only seven." ("Iste tamen specialiter sunt claves principales non quasi alie littere gamme non sint claves ut iste, sed quia iste principalius habentur in usu. Nota quod decem et novem sunt claves, sed principales non sunt nisi septem." Ruini, p. 27). See the third section of the present chapter for a discussion of *claves principales*. For Jerome's discussion of *claves* see chapter five of the present study, pp. 169ff.

The term *vox* is used mainly with the meaning of sound, vocal sound, and the author makes a point of distinguishing between *voces* (=sounds) and solmization syllables, which are defined as *vocabula vocum, note, signa vocum, nomina vocum.*

3. *Radices, cunae* and *cantus*

Amerus is about the only thirteenth-century theorist, as far as I know, to use a specific terminology to define some concepts related to the hexachordal theory:

> How many roots [*radices*] are in the gamut and through what are they sung? Seven are the roots in the gamut, three on *G* through square *b* [*b quadratum*], two on *C* through *proprius cantus*, and two on *F* through soft *b* [*b molle*]. How many cradles [*cunae*] are in the gamut? Six complete ones and one incomplete.[15]

Thus, roots or *radices* are the hexachord starting points, namely the seven ut's in the gamut, while cradles or *cunae* are the seven deductions. The three properties are mentioned as three different ways of singing, through *b* natural, *b* flat, or *proprius cantus*; the designation *proprius cantus* for the natural property seems to point to an English usage, as the term is used by Odington as well.[16]

Amerus's gamut stops at dd la sol, like Guido's. Therefore the author notes that the seventh *cuna* is actually incomplete, providing, as we saw, two reasons for that phenomenon: the sufficiency of nineteen notes to express any song, and the necessity of having the notes of the

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[15]"Item quot sunt radices in gamma et per quid canitur? Respondeo: septem sunt radices in gamma, tres super G per b quadratum, due super C per proprium cantum, due super F per b molle." Ruini, p. 22.

[16]Hammond, p. 99.

gamut correspond with the joints of the hand, which are nineteen if we take into account the fingertips as well.

As a further clarification of the structure of the gamut, Amerus points out that there are only five semitones in the whole gamut: by *C* and *F*, both *graves* and *acutae*, and by *cc superacuta*. To the reasonable objection that there are two semitones by each of the two *b* fa *b* mi, so that the number of semitones in the whole gamut should amount to seven, Amerus replies:

> If somebody wants to object [to the fact that there are five semitones] because of each *b* fa *b* mi, it should be answered that, naturally ascending throughout the whole gamut through all lines and spaces and also descending, in whatever way one wants to mutate, he won't find more than five semitones.[17]

Rather than an explanation, this sounds like a mere restatement. Now, this passage could leave some room for interpretation due to the presence of the adverb *naturaliter*. The first interpretation that comes to mind, that is, that the adverb refers to the natural hexachord, should be discarded in view of the fact that Amerus always uses the designation *proper cantus* for that. Therefore, the adverb seems better interpreted as a reference to the natural or regular way of interlocking hexachords. Indeed, a few lines below, Amerus presents two forms of the gamut with notes on the stave: in the first form, the whole range is covered by natural and hard hexachords; in the second version, by natural and soft.[18] The previous passage could be

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[17]"Si quis velit opponere propter utrumque b-fa-b-mi, respondum est quod, naturaliter ascendendo totum gamma per omnes rigas et spacia et etiam descendendo quocumque modo velit mutare, non inveniet ultra quinque semitonos." Ruini, p. 22 (underlining mine).

[18]See Ruini, p. 27.

interpreted, then, as a statement that in the gamut only five semitones are given at a time because soft and hard hexachords are never (or should never be) used together, but they belong to two different arrangements of notes in the gamut.

The discussion about the number of semitones is carried through a digression on intervals which seems to be primarily of pedagogical concern. In this part of the treatise Amerus corrects some misusages, like the naming of intervals (*modi*) by some people as *secunda, tertia, quarta vox*. The theorist accurately points out that such a naming is not sufficient to define an interval, since a second, third, or fourth could be either with the semitone (semitone, semiditone, diatessaron) or without it (tone, ditone, tritone). He also objects to those who speak of first, second, third, fourth, and fifth tone: in fact, if there can be intervals with only tones for the first three cases (tone, ditone, tritone), the other intervals always need one semitone.[19] This digression seems also to be the pretext for asserting the importance of the knowledge of the gamut in order to sing properly:

> Therefore, it is better and more properly said as above, that when some people, [truly] deceived, say that many seem to sing well without having any knowledge of the doctrine of singing, that is really impossible . . . . In the same way singers of this type, who drift away from the common practice, cannot sing thoroughly, because they do not know how to find the difference and the theory [*artem*] of tones and semitones.[20]

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[19]Ruini, pp. 22-23.

[20]"Ideoque melius et proprius dicetur ut supra in proximo cum quidam decepti dicunt quod viderunt plures bene cantantes et artem cantandi omnino ignorantes quod veraciter est impossible [sic] . . . . Eodem modo huiusmodi cantores usum consuetum excedentes, penitus canere nequeunt, quia differenciam artemque tonorum et semitonorum invenire non norunt." Ruini, p. 23.

Such a remark shows a particular concern for singers' lack of knowledge and technique. It is surely an indication of Amerus's practical intent in writing the treatise.

4. The hand and the claves principales

The knowledge of tones and semitones is thus absolutely prioritary. For this reason, Amerus recalls once more the three properties and finally provides the picture of the hand, with the following sentence written on the palm: "If one knows this hand, he knows all mutations and whatever is necessary for the gamut."[21]

This particular picture of the hand serves indeed several functions, by showing:

1-the possible combinations of letters and syllables, according to the hexachordal doctrine;

2-the properties to which syllables belong, indicated by either a square *b*, a round *b*, or a p (for *proprius cantus*);

3-the position of each note on the stave, by drawing a short line for those which go on the line;

4-the *radices*, that is, the beginnings (ut) of the hexachords for each of the three properties (on *G-C-F*);

5-the endings (la) of the hexachords for each of the three properties (on *E-A-D*).

The last two items of information are drawn from two diagrams on the palm of the hand figure; one for the *radices*:

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[21]"Si quis scit istam manum, scit omnes mutaciones et quicquid est necesse ad gamma." Ruini, p. 24.

/ *G* /square *b*

Roots on- *c* ut according to-p (proprius cantus)

\ *f* \round *b*

and the other for the endings:

/*e* /square *b*

La on-*a* according to-p (proprius cantus)

d \round *b*

This picture of the hand thus seems to provide more information than other contemporary examples, and is really a quick reminder of the whole doctrine. Some incongruities may be found, especially as far as the staff lines are concerned, but they do not compromise the instructional significance of the picture, and could well be the result of careless copying.[22]

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[22]Among such incongruities one can note:

1) the square *b*, for the property of *b quadratum* is missing for *G* sol re ut;

2) square *b* and p, for *proprius cantus*, are missing on the note *d* la sol re;

3) p and round *b* are found on *dd* la sol, which should have square *b* and round *b* instead;

4) round *b*, along with the right properties p and square *b*, is erroneously marked on *e* la mi;

5) the lines which correspond to staff lines are missing on *D* sol re, *a* la mi re, *c* sol fa ut, *bb* fa *bb* mi;

6) Lines are shown on wrong notes, like *f* fa ut, *aa* la mi re, *cc* sol fa, which in the staff correspond to spaces.

These incongruities about lines make one wonder whether the lines are really intended to show the correspondence with staff lines, or they are simply division lines, to separate notes on the finger. However, since even if lines are taken with this second meaning, the drawing is not altogether consistent, the first interpretation could still be plausible.

All the letters of the gamut are then shown on a series of ten lines, where they are also divided, according to Guido's classification, into *graves*, *acutae*, and *superacutae*.[23] Still on the same ten-line grid, the seven hexachords (or *cunae*) are shown, each with the specification of the property it belongs to. The syllables are shown too, while only for the first *cuna*, the one on Gamma, does Amerus also indicate the intervals (tone or semitone).[24] The text below the staff still insists on the difference between tone and semitone: "Note that all other notes [or syllables] have a full tone (*plenum tonum*), except for those where a semitone is written."[25] The discussion continues with the etymological explanation of the word semitone, for which, it should be noted, Amerus provides two spellings, *semitonus vel semitonium*.[26] The theorist derives the word *semitonus* from the adjective *semus*, which stands for imperfect, not full, and quotes Uguccio da Pisa's definition for *semus*, as "that which is beyond the mean and before perfection."[27] This last definition seems to

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[23]As usual, the range of *graves* encompasses the notes from Gamma to G, that of *acutae* the notes from a to g, and that of the *superacutae* the remaining four notes. It should also be noted that Amerus does not adopt the doubling of letters for the *superacutae*, which are still written as a, b, c, d, both in the hand picture and on the staff.

[24]See the figure in Ruini, p. 26.

[25]"Nota quod omnes alie note habent plenum tonum, illis tamen exceptis ubi semitonus vel semitonium scribitur." Ibid.

[26]While the masculine noun *semitonus* seems to be preferred by Amerus, the neuter form *semitonium* appears to be more commonly used in contemporary treatises.

[27]"Illud quod ultra medietatem et citra perfectionem est." C. D. Du Cange, *Glossarium mediae et infimae Latinitatis* (Graz: Akademische Druck-Verlagsanstalt, 1954), s.v. "Semus."

create some inconvenience, since the minor semitone, which was used in the gamut at this time, was actually less than half the tone, and therefore not "beyond the mean." In his "medieval" effort to solve this evident disagreement between definition and reality, Amerus provides this quite obscure explanation:

> But notes (*claves*) are named according to the lower part, whence it is well-named after *semus*, which is "mean," because it ascends above the middle and around perfection of the tone.[28]

Here is a possible interpretation. Let us use the syllables mi and fa to indicate a semitone. Between mi and fa there is indeed a minor semitone, so that if we consider the tone which mi would form with a note above, ascending, this semitone is before the middle point, and not really around perfection. But, since we name notes from what comes before, then we should consider the tone that fa would form, descending, with a note below, so that mi comes beyond the middle point and is closer to the tone. Indeed, if we take into account the semitone *b-c*, the square *b* is beyond the middle point between *c* and *b* flat.[29]

At this point of the treatise, the afore-mentioned two versions of the gamut are shown on two ten-line staves, with two different sets

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[28]"sed claves dicuntur respectu partis inferioris, unde bene dicitur de semis quod est medietas, quia ultra medietatem ascendit et circa perfectionem toni." Ruini, p. 27.

[29]The explanation does not seem to be related to the one offered by Odington in chapter five of the second part of his *Summa* (See Hammond, pp. 64-65). According to Odington, *semis* or *medietas* in the case of the semitone should be explained with reference to a number which cannot be divided into two equal halves, like the number 9. In this case, the *medietas* is the number that exceeds one third of the given number (like the number 4 in relation to 9) and does not reach the two thirds of it (like the number 5 in relation to 9).

of clefs. In the first version, only hard and natural hexachords are interlocked, in both ascending and descending motion; in the second version natural and soft hexachords are connected, again in both ascending and descending direction.[30]

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[30]See Ruini, p. 27.

First staff, hard and natural hexachords only, ascending:

Γ A B C D E F G a b c d e f g aa bb cc dd

ut re mi fa sol la-

mi fa sol la-

la-

re mi fa sol la-

mi fa sol la-

re mi fa sol

Descending:

dd cc bb aa g f e d c b a G F E D C B A Γ

sol fa mi re ut-

ut-

sol fa mi re ut-

ut-

fa mi re ut-

ut-

sol fa mi re ut-

ut-

fa mi re ut

The first staff bears the following eight letters in a way similar to our modern clefs:

Γ, on the first line;

d, on the third;

F, on the fourth;

square *b*, on the fifth space;

c and round *b*, both on the sixth line;

g, on the eighth line;

double square *b* on the ninth;

d, on the tenth.

Second staff, natural and soft hexachords only, ascending:

Γ *A B C D E F G a b c d e f g aa bb cc dd*

ut re mi fa sol la-

la-

mi fa sol la-

la-

mi fa sol la-

la-

re mi fa sol la-

la-

mi fa sol la

Descending:

dd cc bb aa g f e d c b a G F E D C B A Γ

la sol fa mi re ut-

ut-

fa mi re ut-

ut-

sol fa mi re ut-

ut-

fa mi re ut-

ut-

fa mi re ut

The second staff provides the following seven clefs:

d, on the third line;

F, on the fourth;

round *b*, on the fifth space;

c, on the sixth line;

e, on the seventh;

g, on the eightht;

double round *b*, on the ninth.

The interlocking of hexachords in both versions shows the application of one of the basic rules of thirteenth-century hexachordal theory: a mutation should occur at the last possible moment, that is, only when the outermost syllables of the hexachord are reached, la in

ascending, and ut in descending motion. A first consequence of this rule is that only two types of mutations are shown in both versions: la/mi-la/re for ascending, and ut/sol-ut/fa, for descending. Another consequence is the reduction *de facto* of hexachordal syllables from six to five, since in ascending the syllable ut is never used except for the very beginning on Γ, and in descending the syllable la is found only on the topmost note of the second staff (*dd* in the soft hexachord). It is also possible that the mutations shown in these two staves are the ones to be preferred, provided that the corresponding notes are present in the song.[31] If this is Amerus's intention, then his remark about the so called *claves principales* could be interpreted in terms of the mutation doctrine as well. Likely, Amerus uses the term *clavis principalis*, like Odington, to refer to clefs.[32] As already noted, Amerus offers two slightly different sets of clefs at the beginning of each of the two staves.[33] After the first staff, he says: "<u>these</u> can be the *claves principales* for some people," while after the second staff he states: "<u>these</u> however are particularly *claves principales*, not as if the other letters of the gamut were not as much *claves* as these, but because these are used principally."[34]

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[31]For instance, to go from the first hard hexachord on Γ to the next natural hexachord on *C*, it would be better to make the mutation on the last syllable, that is, on the note *E*, if such note is present in the song. Mutations are amply discussed in the next section of the treatise, chapter five in Ruini's edition (pp. 28 through 33).

[32]For the reference to Odington, see Reckow, "Clavis," p. 6, and Hammond, pp. 98-99.

[33]See the two sets of clefs as shown above in correspondence with the two versions of the gamut (either hard and natural hexachords interlocked, or natural and soft hexachords.)

[34]Below the first staff: "Iste possunt esse claves principales secundum quosdam." Below the second staff: "Iste tamen specialiter

The two quoted statements do not necessarily imply some sort of conflict, even though it seems plausible to suppose that the theorist is comparing two different views, one held by "certain people" and the other one as his own. Therefore, it could well be that the *claves principales* according to certain people are the clefs shown in the first staff, while the ones on the second staff are those more widely used and preferred by Amerus. If the interpretation is correct, it also agrees with Amerus's next remark about the number seven, since clefs are eight in the first staff, but seven in the second:

> Note that nineteen are *claves*, but *principales* are but seven and seven times ut is begun in the gamut, and as many times [seven] all syllables are [repeated], except for la when ut starts on high *g*.[35]

The recurrence of the number seven must have looked intriguing to the medieval theorist. Also, another reason to prefer the second set of clefs could be that it includes the round *b*, which is important to determine the use of the *F* hexachord, while the square *b*, appearing in the first set, can be dismissed without causing any confusion.

On the other hand, should some kind of relation between clefs and mutations exist, the second set of clefs also adheres to the places of mutation better: in fact, the clefs Γ and high *dd* of the first set are omitted here, as they do not point to any place of mutation, but only to the extremes of the gamut; the other letters, on the contrary, are all near one or more places of mutation, as the following diagram will

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sunt claves principales non quasi alie littere gamme non sint claves ut iste, sed quia iste principaliter habentur in usu." Ruini, p. 27.

[35]"Nota quod decem et novem sunt claves, sed principales non sunt nisi septem et sepcies incipitur ut in gamma, et tociens sunt omnes note excepto la quando incipitur ut in g acutum." Ibid.

show:

NOTES	CLEFS	MUTATIONS (1st gamut) natural/hard ascending	MUTATIONS (1st gamut) natural/hard descending	MUTATIONS (2nd gamut) natural/soft ascending	MUTATIONS (2nd gamut) natural/soft descending
dd					
cc					
bb	*bb*/sq.*bb*				
aa		re-la		mi-la	
g	*g*		ut-sol		
f					ut-fa
e	*e*	mi-la			
d				re-la	
c	*c*		ut-fa		ut-sol
b	*b*/sq.*b*				
a		re-la		mi-la	
G			ut-sol		
F	*F*				ut-fa
E		mi-la		mi-la	
D	*D*				
C			ut-fa		ut-fa
B					
A					
Γ					

The chosen clefs, which also seem to be arranged by thirds, except for the presence of *b* instead of *a*, are close to the "regular" points of mutation, which can occur either on the same note, or a note above or below the clef. However, even in the event that those clefs were chosen only because of their wider usage, it is evident in the next chapter about mutation that the theorist sets some kind of relationship between clefs and mutation.[36]

In chapter twenty-one, after many musical examples showing different intervals and deductions, Amerus briefly discusses properties again, by posing two new questions: why does the property of *b quadratum* come first, and why does the *proprius cantus* have this name, since each property (*cantus*) is specific (*proprius*) to its location? The discussion introduces the matter of clefs again: the first property should have as its clef square *b*, but instead modern musicians use *F*; the second property should have as its clef *D* or *a*, but again modern musicians prefer *F*; the third should have, and has, the round *b*.[37] The musical examples, on the other hand, show the following clefs: Γ, *F*, round and square *b*, *c*, *g*, and round *bb*.[38] Thus, there seems to have been some confusion about the lower clefs, since either Γ, or *B*, or *D* are proposed at different times; in any case, the clef that is consistentently used throughout the treatise is *F*, which also is the *clavis* right after the first mutation.

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[36]It should be noticed that in the musical examples thoughout the treatise the clef *D* is replaced by the older Γ, and *e* never appears. See below, note 53.

[37]See Ruini, pp. 90-91.

[38]See Ruini, pp. 87-89.

5. Mutations

Chapter five in Amerus's treatise seems to be concerned particularly with mutations occurring with leaping notes. The first sentence, if applied to the notated examples provided right above the text, refers to notes or syllables which are a fifth apart, like Γ and *D*, *A* and *E* etc., or, in hexachord terms, ut-sol, re-la, mi-mi, fa-fa. The word *nota* allows both interpretations, as a note and a syllable; indeed, the expression "de quinta nota in quinta nota" should not be intended to refer only to the fifth hexachordal syllable (sol), that is, "from the fifth syllable to the fifth syllable," but rather to all syllables (or notes) which are in the relationship of a fifth:

> In all notes in the relationship of a fifth [*notis dyapente*], that is, from one note to another [which is] a fifth apart [*de quinta nota in quinta nota*], I find a good mutation [*bona mutacio*] except from mi to mi, and from fa to fa; however in notes a fourth apart, from fa ascending to fa, and from mi descending to mi, there is a natural mutation [*mutacio naturalis*][39]

A look at the gamut will make the previous remark more easily understandable. The fifths allowed by the system are:

Γ-*D* ut-sol: both syllables belong to the same hexachord, so with no mutation involved;

A-*D* re-la: same situation as before;

C-*G* fa/ut-sol: a "good mutation" applies to the first note, which shifts from the first hard to the first natural

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[39] "In omnibus notis dyapente, id est de quinta nota in quintam notam, invenio bona mutacionem excepto de mi in mi et de fa in fa, sed in quarta nota de fa ascendendo in fa, de mi descendendo in mi est mutacio naturalis." Ruini, p. 28.

hexachord, so that the two notes of the leap can be sung inside the same hexachord;

D-a sol/re-la: again a "good mutation" on the first note;

E-b mi-mi: the two notes belong to two different hexachords and therefore have no place to mutate syllables;

F-c (with *b* natural) fa-fa: same situation as before, no mutation is possible;

F-c (with *b* flat) fa/ut-sol: the "good mutation" on the first note makes it possible for the leap to be included in the same hexachord;

G-d sol/ut-sol or sol/re-la: in both cases there is a "good mutation;"

A-e (with *b* natural) la/re-la: here too the "good mutation" moves the leap inside the same hexachord;

A-e (with *b* flat) la/mi-mi: even if a mutation occurs on the first note, the leaping notes (and syllables) do not belong to the same hexachord.

Analogous situations apply to the notes of the higher octave.

As mentioned in the quoted passage and visualized in the diagram above, the mi-mi and fa-fa relationships do not involve mutation. These cases are shown in the notated example above the text, where the following notes are linked:

E-b: mi of the first natural hexachord and mi of the second hard hexachord;

F-c: fa of the first natural hexachord and fa of the second hard one;

e-b: mi of the second natural hexachord and mi of the third hard one;

f-c: fa of the first natural hexachord and fa of the second hard one;

a-e: preceded by a *b* flat signature, mi of the first soft hexachord and mi of the second natural one;

b-f: the *b* flat is fa of the first soft hexachord and *f* is fa of the second natural one.[40]

The musical example also shows the fa-fa and mi-mi relationships which do involve a "natural mutation" because this time they refer to notes (or syllables) a fourth apart: ascending from *F* to *b* flat, in fact, there is a mutation on the first note (fa/ut), and thus the two syllables of the leap belong to the same soft hexachord; descending from *A* to *E* there is a mutation on *A* (mi/la), which makes the two notes belong to the same hard hexachord. The use of two different but related qualifications for these types of mutation, *bona* and *naturalis*, could either be a subtle distinction between syllables in a different intervallic relationship, fifth or fourth, or just imply a basic equivalence of righteousness for mutations which are in the system (good as equivalent to natural).

The next passage, still related to mutations in a leaping melody, seems to set up some kind of connection between clefs (*claves principales*) and mutations:

> When a certain song descends by leap [*immediate*] through the lower place of the next clef [*clavis principalis*], the name of the higher note needs to be adjusted if the note is before the [regular] place of mutation. Thus a syllable [*nota*] is feigned where there is none.

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[40]See Ruini, p. 28.



> If a song ascends without intermediate steps before the [regular] place of mutation through the higher place of the clef, the name of the note can be adjusted as in the notated example.[41]

The passage is far from being absolutely clear; therefore the interpretation I am offering does not claim to be definitive.

After showing, in his discussion of the gamut, all the regular mutations that occur in the stepwise gamut, and consequently in any melodic material made up of fragments of the scale, in this chapter Amerus is trying to help singers execute mutations in a melody with leaps.[42] In this process the seven clefs, or *claves principales*, play a very important role as reminders of the *loca mutacionis*, that is, the regular places of mutation.[43] Now, if a melody moving around a certain clef leaps to the next one, either in ascending or descending, the

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[41]"Quando aliquis cantus immediate descenderit per inferiorem locum proxime clavis principalis, debet vocabulum note superioris probari si nota sit ante locum mutacionis. Sic fingatur nota ubi nulla est. Si vero cantus sine medio ante locum mutacionis ascenderit per superiorem locum clavis principalis, nomen note probari protest [sic] exemplo prenotato." Ruini, p. 28.

[42]Mutations in a stepwise motion are shown on the two versions of the gamut (Ruini, p. 27). See the discussion of that part of the treatise in the previous section of the present chapter.

[43]The regular places of mutation are the ones made with la, ascending, and ut, descending. They were all shown in Amerus's double gamut and in my diagram above.

singer is asked to "adjust the name" of the first note of the leap, namely to mutate syllable, if this note is before the normal place of mutation. Thus the remark about "feigning" a note or syllable where there isn't one may be interpreted as referring to the note of the normal place of mutation, which needs to be taken into account even though it is not "physically" there.[44]

In the musical example Amerus provides there are several instances of mutation in a leap, in either ascending or descending direction. In the sixth melodic fragment, for instance, the melody ascends from the *F* clef to the *c* clef with the leap of a fourth:[45]

E F G A G *c b d*

If we solmize the previous notes, we start with the syllables mi fa sol la sol before facing the leap which goes up to the next clef. At this point, by "feigning" the note where the regular mutation applies (*A* la/mi), we realize that the first note of the leap is before a place of mutation and therefore needs to switch syllables ("adjust the name"). The result is a mutation on the note *G*, from sol of the natural hexachord to ut of the hard one, so that the leap becomes

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[44]The verb *fingo* is used again in another passage (see later discussion in this same chapter) with the idea of imagining the filling notes of a leap in order to choose the right hexachordal syllables. Therefore, any reference to accidentals is highly unlikely here, also because the expression *musica ficta* seems to belong to a later terminology.

[45]I think the melody provided in the example should be considered as a succession of separate examples divided by a vertical stroke. The one I am referrring here is the penultimate in the first stave of Ruini's edition. Ruini, p. 28.

singable inside the same hexahord (ut-fa).[46]

As a final reminder for this kind of mutation, Amerus recommends:

> Note that mutation never occurs unless the song [*cantus*] ascends beyond la or under ut of any hexachord [*cantus*].[47]

A brief explanation about the number of notes and syllables is provided at this point of the treatise, followed by the usual account of the origin of the solmization syllables from the hymn "Ut queant laxis." Whereas the number seven for the notes (*claves*) is justified by the extramusical analogy with the seven days of the week, the number six of the solmization syllables receives a purely musical explanation:

> In which letters six different names of notes [=syllables] are placed for the same sufficiency. Indeed in the same six syllables, either ascending or descending, the semitone holds the middle position while having two whole tones on both sides. If it descends below ut in *f* or *c gravis* or *acuta*, it runs into a semitone. If it ascends above la in *e gravis* or *acuta*, it goes up into a semitone.

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[46]As to the other melodic fragments of the example shown on p. 117, the first four move inside the same hexachord (one and four inside the natural, two and three inside the hard), so that no mutation is really necessary. The fifth fragment moves from the hard hexachord on Γ to the natural on *C*. The clef *D* is not marked, but could well be implied, since the clef that really triggers the mutation is the *F* clef. In any event, mutation can regularly occur on *a* (la/mi). In the seventh fragment the melody descends from the hard hexachord, marked by the *c* clef, to the natural one by a leap that goes below the next clef, *F*. Thus, a mutation on *a* (re-la), rather than on the regular *G* (ut-sol) has to occur. The last fragment first shows a descent from the natural to the hard hexachord, without using the *D* clef, and then ascends by leap first to the natural hexachord (*F* clef) and then to the hard on *G* (*c* clef). This last example also ends with a tritone, which either is a mistake or needs to be corrected. In the second event, it is strange that, in discussing *claves*, Amerus would not provide the clef that is absolutely necessary to distinguish between hard and soft hexachords. We can suppose either that there is a scribal omission, like in the previous case of the *D* clef, or that the singer is supposed to refer to *claves principales* even if they are not written down.

[47]"Nota quod mutacio numquam fit nisi cantus ascenderit ultra la vel subtus, ut cuiuscumque cantus." Ruini, pp. 28-29. I believe the comma in the previous sentence should be omitted.

> In *a acuta* or *superacuta* the first ascent is likewise a semitone. Therefore more than six names of notes would be superfluous, since they return in the same.[48]

The fact that the number of letters, and their repetition through the gamut, is not explained on the basis of octave recurrence may imply a certain disregard for the octave, especially when compared to the emphasis Amerus puts on the hexachordal module. As a matter of fact, the octave does not play a primary role in medieval hexachordal solmization. From a melodic point of view, the hexachord is a self-sufficient unit which embodies the most commonly sung intervals, from semitone to fifth (and even sixth), while the octave unit, which is seldom used as a melodic interval itself, only adds the quite unsingable seventh. As do other theorists primarily concerned with the teaching of singing, Amerus seems to regard *claves*, that is, the nineteen pitches of the system, not so much as nineteen different sounds to use in singing, but rather as different positions in which the basic six sounds of the hexachord can be found. Since it is inside the hexachord unit that most intervals must be analyzed and sung, *claves* (as well as clefs) really matter only in terms of mutation, in terms of the hexachord shifting position in the gamut. Therefore, Amerus adds as a final recommendation, when the singer is not sure where and how a mutation should occur, meaning that he does not know

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[48] "Namque in eisdem sex notis ascendendo vel descendendo semitonus medium locum tenet ex utraque parte dous tonos habens. Si ascendat sub ut in f vel c gravi aut acuta, in semitonium vadit. Si ascendit ultra la in e gravi aut acutum, ascendit in semitonio. In a acutum et superacutum primus ascensus similter est in semitonio. Unde plura quam sex notarum vocabula essent superflua cum redeant in idem." Ruini, p. 29. The grammatical mistakes in the third and fourth sentence ("in e gravi et acutum," "in a acutum et superacutum"), as well as the evident misuse of the verb "ascendat" in the second sentence, do not obscure the basic meaning of the whole passage.

what syllables and hexachords are involved because of losing track of the *claves*, it is wise to partly reconstruct the gamut, by "feigning" all the notes, from the notated clef up to the place where the mutation is supposed to happen.[49] Thus, it is for the sake of mutation that the knowledge of *claves*, as well as of *claves principales*, is really fundamental.[50] A complete list of all *claves* with their related syllables and mutations is finally provided at the end of the chapter. This list does not differ from others found in contemporary treatises except for the note *D* la sol re, which seems to show an inconsistency. In fact, even though Amerus does not state anywhere, as other contemporary theorists do, that the syllables ut re mi are used in mutation to ascend and fa sol la to descend, in his list of *claves*, syllables and mutations, that basic rule seems to be in force. However, for the letter *d* Amerus says that the mutation la/sol is used to ascend from the *b molle* to the *b quadratum* property.[51] Now, if it

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[49]This seems to be the meaning of the following passage: "Likewise note that when a mutation needs to be made and the name of the note to be mutated is not known on either places, namely of the higher or lower *clavis*, according to whether it ascends or descends through mutation, by feigning notes (syllables) as if they were principal, even though they are not, up to the place of the note whose name is not known, you may know the names (syllables) of the notes that are actually there and of the notes that need to mutate." ("Item nota quando mutacio fieri debet et nomen note mutande ignoratur ab utroque loco scilicet clavis superioris vel inferioris, secundum quod ascendet vel decendet per mutacionem fingendo notas licet non sint quasi essent principales usque ad locum note cuius nomen in mutando ignoratur, potes cognoscere nomina notarum presencium et mutandarum." Ruini, p. 29).

[50]"Through these notes written above you can understand what is the value of knowing the places of the *claves principales* and learning the *claves*." ("Per istas notas ultimo scriptas potest intelligi quod valet scire loca clavium principalium et claves cognoscere." Ruini, p. 30).

[51]See Ruini, p.31.

is true that from *d* sol we can ascend to *e* la, even though the syllable sol seems more useful in descending towards the lower part of the hexachord, the same should apply to other analogous situations, like the mutation sol/fa on *c*, which would make even more sense in terms of an ascent, but is instead classified as a descending mutation.

6. Syllables and Intervals

Amerus is faithful to Guido in his classification of *consonantiae* or *coniunctiones*, although he includes the octave among them. Thus, there are seven melodic intervals: tone, semitone, ditone, semiditone, diatessaron, diapente, and octave. As for the tone, Amerus defines it as the legitimate space between two full voices such as re-mi, mi-re, fa-sol, sol-fa, sol-la, and la-sol. His starting from the syllable re, the syllable of the first mode, does not seem to be accidental. Indeed, in discussing the diatessaron and the diapente, Amerus also starts from re: re-sol, mi-la, for the fourth; re-la, ut-sol for the fifth. The lack of completeness in the case of the tone (three cases instead of four) is found also in the diatessaron, where Amerus lists two cases out of three. Probably the theorist is not interested in showing the different positions and articulations of the intervals inside the hexachord, but rather intends to provide some examples, since all the positions can be found further on, in a new diagram and in musical exercises:

> In order to show the aforementioned things more clearly I drew the picture which stands for the hand. By means of the writing which is put in this as in the preceding picture, all the modes and tones are found more easily. So that what I said first and then [put] in a

> diagram would appear even more manifest, I will reveal [*reserabo*] the same things through singing with syllables.[52]

The musical examples Amerus is referring to in the last part of the quoted passage are found after the next chapter and illustrate several points. First of all, each of the seven intervals are shown, yet not isolated and repeated schematically, as in other theorists's exercises, but inside a suitable melodic context, with an appropriate text.

All the types of tone (on ut, on re, on mi, on fa), ditone (ut-mi, fa-la), semiditone (re-fa, mi-sol), diatessaron (ut-fa, re-sol, mi-la), and diapente (ut-sol, re-la, mi-mi, fa-fa) are shown and spelled out with their syllables. After the intervals, the musical examples represent the seven deductions, which now are called *distinctiones*, starting from Γ, "prima distinctio vocum per b gravium quadratum," up to g, "septima per b quadratum superacutarum."[53] Then, again, all the intervals are shown in a more schematic way, in different locations of the hand. The numerous musical examples and exercises demonstrate the importance of learning intervals for the training of singers.

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[52]"Ut dicta manifestius appareant, hanc figuram manum significantem depixi. Per istam scripturam que in hac figura vel in precedenti apponitur, omnes modi et toni levius reperiuntur. Ut evidencius appareant que primus predixi et in figuris, iam per cantum etiam in vocibus eadem reserabo," Ruini, p. 81.

[53]See Ruini, pp. 87-88. It is interesting to notice that in this particular exercise several clefs are used, and particularly Γ, *F*, *c*, *g*, *b*, and *bb*. Thus either Amerus or the scribe that copied the text replaced the *D* clef with Γ and decided to do without the *e* clef.

7. Summary

Amerus's treatment is mainly concerned with the application of the hexachordal system in sight-singing. His words hint at the actual use of the hand while reading music, and his numerous musical examples are intended as exercizes in the practice of solmization.

The most interesting aspect of his treatment regards the explanation of how to perform mutations. After establishing some preferential places of mutation in a stepwise motion, Amerus deals with mutations implied by melodic leaps. In either case, he seems to set a close relationship between mutations and clefs.

Amerus's discussion is also interesting for the use of an original terminology (*cunae, radices*). His definition of the natural property as *proprius cantus*, along with the recognition of seven clefs, speaks in favor of the existence of an English tradition of hexachordal theory to which Amerus and other theorists belong.

Chapter 4

ELIAS SALOMON'S *SCIENTIA ARTIS MUSICAE*

1. Introduction

The treatise that will be discussed in this chapter represents a systematic and original synthesis of the general theory related to *musica plana*, and of hexachordal theory in particular.

The *Scientia artis musicae*, by Elias Salomon, survives in only one manuscript, in the Biblioteca Ambrosiana of Milan.[1] As noted by Dyer, this seems to be a unique copy written by a French scribe and corrected by Salomon himself.[2] It is not recorded when or how the library acquired the manuscript.

As to the author, the very little information we have comes from the treatise itself, and particularly from a picture showing Elias Salomon presenting his book at the feet of pope Gregory X.[3] In this picture, as well as in the introduction to the treatise, Salomon

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[1]MS D.75 inf. For a description see *Répertoire internationale des sources musicales*, B III/2,55. A modern edition of the treatise, not always reliable, as we will see, is found in GS III, pp. 16-64. All citations, unless otherwise stated, will be from Gerbert's edition.

[2]J. Dyer, "A Thirteenth-Century Choirmaster: The *Scientia Artis Musicae* of Elias Salomon," *The Musical Quarterly* 66 (1980): p. 84. Like Dyer, I prefer the spelling of the name as Salomon, rather than Salomo; the treatise itself has the nominative "Helyas Salomonis" in the Introduction.

[3]MS D.75 inf., f. 4v. Also shown by Dyer, ibid. The picture is missing in Gerbert's edition, but a brief description of it is found in Gerbert's preface (*monitum*) along with Salomon's pleading to Gregory X.

identifies himself as a cleric of Saint-Astier, in the county of Périgueux (today the department of Dordogne), in the south of France.[4] According to the words that accompany the aforementioned picture, Salomon was trying to be appointed to the chapter of canons of Périgueux as a reward for dedicating the treatise to the Pope; and for this same reason, he also asked to have his work reviewed by experts, in order to prove its value.[5] This evaluation was apparently done, as a note on the first page of the treatise reads "I parish priest recommend and approve the present work of musical art, and find in it enough usefulness."[6]

Aside from the personal motivations, it seems that Salomon's fundamental intention was to reform the misusages in the performance of chant; therefore, according to Hüschen, the treatise may be regarded as part of the more general reform of liturgical uses, promoted by Gregory X in the council of Lyon (1274).[7] The date of the treatise, 1274, as stated in the explicit, seems to point to a possible connection between the composition of the treatise and the council of Lyon. Salomon's reformistic aim is declared in the introduction, where he, deploring the ignorance and carelessness of his brothers in performing chant,

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[4]"Ego Elias Salomonis, clericus de sancto Asterio Petrigoricensis dioecesis," GS III, p. 17.

[5]See GS III, p. 16, in the *monitum*.

[6]"Ego plebanus praesens opus artis musicae commendo, et approbo, et in ipso satis utilitatis reperi," ibid. Dyer believes that a certain "Helyas Sasomotus," who obtained that canonry in 1274, should be identified with Elias Salomon, a hypothesis supported by the coincidence of place and date, and by a close resemblance of the names.

[7]H. Hüschen, "Elias Salomo," *Die Musik in Geschichte und Gegenwart* 3: 1281-82.

affirms the necessity to restate the fundamental principles of chant theory, and also in the last chapter, where he advocates the revision of chant books by an expert musician. Several other poignant observations against contemporary practices occur throughout the work.

The title *Scientia artis musicae* emphasizes both the theoretical and practical sides of the treatment. The term *scientia* stresses a type of knowledge in which phenomena are analyzed according to their causes, while *ars* is generally used in medieval treatises with the meaning of a collection of practical precepts and rules.[8]

The treatise, comprising thirty-one chapters, may be divided into three parts:

1-exposition of the basic elements of musica plana (letters, sylables, gamut), from ch. one through eight;

2-exposition of the modal theory, from ch. nine through twenty-seven (including a tonary):

3-observations on the notation and performance of chant, from ch. twenty-eight through the end.[9]

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[8]For example, the twelfth-century *Tractatus quidam de philosophia et partibus eius* defines *scientia* and *ars* in these terms: "Science is different from art in that art is a collection of precepts through which we are informed about doing something in an easier way than it would be naturally. Science is the knowledge of things with the sure reason of why it is that way. Thus sciences are different from arts." ("Differt autem scientia ab arte quum ars est collectio preceptorum quibus ad aliquid faciendum facilius quam per naturam informamur. Scientia autem est rerum cognitio cum certa ratione quare ita sit. Sic itaque scientie ab artibus differunt," quoted in L. M. de Rijk, *Logica Modernorum. A Contribution to History of Early Terminist Logic* (Assen: Van Gorcum and Comp., 1967), Vol. II/1, p. 173). Pinegar too mentions that *ars*, from the Greek *technè*, refers to the achievement of a certain skill, craft, while *scientia*, from the Greek *episteme*, refers to a more theoretical knowledge. See Pinegar, "Textual and Conceptual Relationships," p. 3.

[9]Proposed by Hüschen, "Salomo," c. 1281.

The first part of the treatise, presenting all the fundamentals of musica plana, is particularly important for the scope of my research, even though some other passages, and especially the chapter on the relationship between modes and hexachords, have proved to be very relevant.

Furthermore, the terminology used by Salomon reveals a certain knowledge of Aristotelian phylosophy, and seems to underlie a personal interpretation of chant theory in terms of some Aristotelian concepts.

2. The basic elements of music: *litterae* and *puncti*

The first chapters, one through five, introduce the basic elements of music: *littera* and *punctus*.[10] While the word *littera* was widely used in theoretical treatises to mean pitch designations, or points of division on the monochord, the term *punctus* is here used in what seems to be Salomon's own terminology: a *punctus* is a solmization syllable, or the hexachordal degree designated by a solmization syllable.[11] *Punctus* can also stand for a notational, graphic sign.

Salomon's definition of the first element, *littera*, comes right after the list of the seven Latin letters used in music. The definition is introduced in the scholastic style of the *quaestio*:

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[10]In medieval Latin the spelling *punctus*, masculine, is found along with the classic *punctum*, neuter. Among the various meanings of the term, the closest to Salomon's concept seems to be a syllable in psalmody. See Du Cange, *Glossarium*, s.v. "Punctus," p. 519. See also *Handwörterbuch der musikalische Terminologien*, s.v. "Punctus," by K. J. Sachs.

[11]For a survey of alphabetical notation see D. Hiley, "Notation III: History of Western Notation," *The New Grove* 13: 344-362. The term *clavis* in medieval and Renaissance music theory is analyzed in *Handwörterbuch der musikalischen Terminologie*, s.v. "Clavis," by F. Reckow.

> What is a letter? The smallest part of a compound sound [*vox*] which cannot be written; since it cannot be written by itself, therefore it is called subject [*subjectum*] of the *punctus*. A letter is not a *punctus*, but the sign [*signum*], subject and support [*firmamentum*] of the *punctus* . . . . Yet the letter is the matter [*materia*] in which the *punctus* takes root.[12]

The first part of Salomon's description is reminiscent of the definition of *littera* given by grammarians, such as Priscian: "a letter is the smallest part of a compound sound, that is, of a sound which is composed of letters . . . a letter is a sound, which can be written by itself."[13] The last sentence is clearly in contrast with Salomon's statement that a letter cannot be written; his deviation from the standard definition is not a matter of little importance since, for the Latin grammarians, "the sound of language (*vox articulata*) is distinguished from the other vocal sounds (*vox confusa*) in that it is composed of letters and <u>can</u> be written."[14] Was Salomon simply

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[12]"Quid est littera? Minima pars vocis compositae, quae scribi non potest; quia individua scribi non potest, ideo subiectum puncti appellatur. Littera non est punctus, sed signum, subiectum et firmamentum puncti . . . . Sed littera est materia, super quam radicatus punctus." GS III, p. 18.

[13] "Litera est pars minima vocis compositae, hoc est quae constat compositione literarum . . . litera est vox quae scribi potest." Priscian, *Institutione gramaticae*, in *Grammatici latini*, ed. Keil (Hildesheim: G. Olms Verlagsbuchhandlung, 1961) 2: 6. A similar definition is given by Rhabanus Maurus: "Littera est pars minima vocis articulatae, hoc eat, quae constat compositione litterarum . . . . Littera est vocis, qua scribi potest, forma." R. Maurus, *De arte grammatica Prisciani*, in Migne, *Patrologiae latinae* 101: 848. Both grammarians are quoted by Sachs, "Punctus," p. 6, and by M. Duchez, "Description grammaticale et description arithmetique des phenomenes musicaux: le tournant du IXe siecle," in *Sprache und Erkenntnis im Mittelalter. Akten des VI. Internationalen Kongresses der Société Internationale pour la philosophie médiévale. Bonn 1977*, ed. W. Kluxen (Berlin: n.p., 1977), pp. 569-70.

[14]"Le son du language (*vox articulata*) est distinct des autres sons vocaux (*vox confusa*) en ce qu'il est formé de lettres et peut être écrit." Duchez, "Description grammaticale," p. 569. (Underlining

carelessly quoting his source? This seems highly unlikely, since he states the same point again to stress the dependence of letters on *puncti*. A possible explanation is that Salomon is referring to musical writing: a letter cannot be written on the staff, and therefore it depends on the note (*punctus*); however, the letter is the first identification of a sound, as a point of division of the monochord, and therefore can be said to be "the matter in which the *punctus* takes root."

Another possible explanation relies on the identification of the word *punctus* with solmization syllable, which is the meaning preferred by Salomon. In this case, the definition aims primarily at affirming the supremacy of syllables over letters in defining sounds. The first part of the definition stresses the necessity to have both letters and syllables when indicating a sound (the *composita vox* could be, indeed, the combination of letters and syllables to denote a pitch, like in *C* fa ut or *G* sol re ut); the second part, which uses a terminology that betrays some familiarity with Aristotelian concepts, perhaps intends to lay a philosophical foundation for the knowledge of music. Letters are defined as "matter," "substratum" of syllables, thus implying that the latter could be regarded as "forms."[15] Now, in Aristotelian terms, matter is unintelligible, for only what has a form and is determined can be known. Therefore, as for all substances, it is only from the

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mine).

[15]For a review of Aristotelian theory of matter and form, in the interpretation by St. Thomas, I have consulted C. Giacon, *Le grandi tesi del tomismo* (Bologna: Patron, 1967).

union of letters and syllables, matter and form, that the objects of music theory, sounds, can become knowable.

The primary role of syllables in defining sounds also points to the structural significance of the hexachord, even though this concept is still implicit at this point of the treatise: in fact, while letters, derived from the monochord division, merely show a succession of pitches, syllables also identify the function of a sound, by defining its position with respect to what precedes and follows inside the unit of the hexachord.

The relationship with solmization syllables brings about Salomon's concern with the possibility of making the number of letters and syllables match. The issue is again introduced by a quaestion on whether the number of letters could be increased or reduced: the answer is affirmative in the direction of a reduction to five, since the letters *C*, *F*, and *G*, Salomon says, have a similar character and use almost the same syllables, ut and fa, and sol and re.[16] The desire to make the number of letters agree with that of syllables seems to come from the need to resolve the contradiction between two sets of pitch definers which use a different number of elements (six versus seven); a similar attempt we found in Lambertus's treatise, when that theorist says that letters could have been just six, from Γ to *E*, but then *G* was

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[16]The unifying syllable for the three letters is ut, while fa is found only for all the *C*'s and *F*'s, and sol for all *G*'s and two *C*'s out of three. This possibility is stated even more forcefully at the end of this first chapter: "and thus their [i.e., letters'] number could be confined to six or five letters. What I believe to be true, and so must it be, according to the rigorousness of science, in the likeness of the six syllables." ("Et sic numerus earum posset ad numerum quinque vel sex litterarum restringi. Quod verum credo, et ita de rigore scientiae debet esse ad similitudinem sex punctorum." GS III, p. 18).

added to complete the octave and *F* to fill the gap between *E* and *G*.[17] Both Salomon and Lambertus show a similar concern, and they both seem to stress the supremacy of syllables; however, while Lambertus justifies the seven letters (or better eight, in his reasoning) in order to show the octave equivalence, Salomon doesn't seem to be concerned with the problem of the octave and reasserts the primacy of syllables.

Letters are further analyzed by Salomon in a new chapter regarding their nature. However, in the course of this treatment it becomes clear that letters assume a certain character only in that they are linked to particular syllables. Salomon appears to be consistent with the initial definition of letters: as "matter," in the Aristotelian sense, they cannot be known, except when in conjunction with "forms," syllables. Indeed, the chapter only aims at showing which syllables can be used in connection with each letter; therefore, since the character of a letter depends on the character of its syllables, the whole matter will become more clear in the following chapters, no. three ("On the nature of Gamma") and especially no. four and five ("On the nature of syllables"). Here follows the list of letters, as given in chapter two, with their syllables and their consequent characters:

1-"*A* is harsh (*rigida*), like a good leader, who does not allow himself to be bent by anybody, and requires a harsh syllable, so that in *A* it is always said either re or mi or la."[18] The verb "to be bent"

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[17]See CS I, pp. 251ff., and chapter two, pp. 71ff, in the present study.

[18]"Et est notandum, quod littera A rigida est ad modum boni rectoris, quae non permitti se flecti ab aliquo, et rigidum punctum

(*flecti*) may have a more specifically musical meaning, referring to the possibility, denied by Salomon, to inflect the note and have an *A* flat.

2-The nature of *B* is not defined, while only its associated syllables are shown, mi and fa. Since mi and fa, as we will see, have opposite characters, it just makes sense that *B* is not characterized.

3-For letter *C* too only the associated syllables are shown, ut, fa, and sol. These syllables have different natures, as we will see, and prevent any characterization of the letter.

4-Letter *D* is missing, as Gerbert notes. This seems to be an involuntary omission by the scribe; however, it does not compromise the treatment of this subject since the different nature of the syllables associated with *D* (re, sol, la) seems to prevent, again, the characterization of the letter.

5-"*E* is of such a nature, as to have a very virile and hard value, and it bears [the syllables] mi and la and nothing else, and is always followed by a semitone."[19]

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requirit, ita quod semper dicatur in A re vel mi vel la." GS III, p. 18.

[19]"E. talis est naturae, quod virilissimi et rigidi valoris est, et patitur mi, et la, et nihil aliud, et semper plangatur." GS III, p. 19. The verb *plangi* is used throughout the treatise with the specific meaning of "being followed by a semitone." I was unable to find such a particular meaning in the medieval Latin dictionaries I have consulted, so I think this is another instance of Salomon's own terminology, as we already saw for the word *punctus*, which substitutes the more common *vox* or *syllaba*, and, as far as I know, is found only in this treatise with the particular meaning of solmization syllable. Now, as to *plangi*, the original meanings are "to be beaten," and "to bewail, cry." Perhaps the latter meaning relates the semitone inflection to a musical characteristic of laments. Handschin noticed an analogous expression in a thirteenth-century Spanish poet who says "plorant semiton," that is, "crying the semitone." Handschin, *Der Toncharakter*, p. 14.

6-"*F* has the nature of and the agreement with the female sex, and [no other syllables] can be sung in it but ut and fa, and however the singer needs an *F*, either ascending or descending, it is necessary to soften it.[20]

7-As to *G*, only the related syllables are listed, ut, re, and sol, which are, again, of different nature. The final remark of this chapter is about *falsa musica*: whoever uses letters in any other way, that is, with other syllables, will fall in the error of falsa musica.[21]

A particular chapter is devoted to the nature of Γ, since this letter is unique in the scale. First of all, Salomon justifies the presence of Γ as first letter in hexachordal terms: Γ was placed first, not as a letter, but as a syllable; the first hexachord, in fact, could not start on *A*, and consequently it would lack its ut. Therefore, the Greek letter Γ was chosen, lest the order of the Latin alphabet should be disrupted. Moreover, the letter Γ, which corresponds to the Latin *G*, has a more temperate sound than any other letter.[22] Following the same systematic approach used for letters, Salomon moves on to discussing the number and nature of *puncti*. After stating that *puncti* are six, the theorist draws a distinction between *puncti* in the sense

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[20]"Muliebrem consensum et naturam feminei sexus habet, nec potest cantari in ea nisi ut et fa, et quocumque modo cantor indigeat F. sive ascendendo, sive discendendo, ipsam humiliare oportet et ipsam mollificare." GS III, p. 19. Again, the terms *humiliare* and *mollificare* have a precise musical meaning, which is the opposite of *plangi*: while the latter refers to "having a semitone above," the former two verbs mean "to have a semitone below."

[21]Ibid.

[22]Ibid.

of hexachord degrees and the syllables used to name them: strictly speaking, ut re mi fa sol la are not *puncti* but denominations of *puncti*, a specification which is found in other theorists as well.[23] Salomon then proposes a *quaestio* which is parallel to the one concerning the number of letters: why are not syllables seven, as letters are? The answer repeats the argument that *C*, *F*, and *G* do not need separate syllables, for they have the same nature; yet this time our theorist goes as far as to say that, for the same reason, only five syllables are really necessary, re mi fa sol la, since fa could be used in place of ut or *G*.[24] In trying to explain the suggestion of using the syllable fa for the letter *G*, one should bear in mind that the syllable fa is followed by two tones, as far as ascent goes, and therefore it is suitable especially for the first *G*, Γ, which, if we took away the syllable ut, would not have any syllable. However, Salomon might as well refer to any *G*, but if that is the case, I do not think that another hexachord should be implied. At this point we can imagine a gamut formed with five solmization syllables, according to Salomon's instructions:

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[23]In particular, the author of *Summa musice* (Page, p. 154) distinguishes between hexachord degrees and syllables to define them, while Amerus (Ruini, p. 22) and Engelbert (GS II, p. 292) draw the distinction between sounds (*voces*) and syllables (*notae* or *vocabula vocum*).

[24]"And thus they can be fewer, as was said for letters . . .and by the rigor of the theory of music art, there should not be but five *puncti*, that is, re, mi, fa, sol, la; and [that is] because we use fa as ut or *G*, as we do in multiplying the art." ("Et sic pauciores numero, ut dictum est de litteris, possent esse . . . ; nec *de rigore scientiae* artis musicae debent esse nisi quinque puncta, scilicet re, mi, fa, sol, la; et quod fa utemur pro ut vel G. sicuti facimus artem multiplicando." GS III, p. 19). Note that Salomon uses the same expression "de rigore scientiae" (the italics in the quotation is mine) to justify his proposition.

dd la sol

cc sol fa

bb mi

bb fa

aa la mi re

g sol re [fa?]

f fa

e la mi

d la sol re

c sol fa

b mi

b fa

a la mi re

G sol re [fa?]

F fa

E la mi

D sol re

C fa

B mi

A re

Γ fa

The next observation, introduced in the form of a rhetorical question, seems to bear out the hypothesis that such a solmization was already in use:

> Is it not true that in the hand we use first the second [syllable], second the third, third the fourth, and fourth the fifth, re mi fa sol la? Thus, the hand is interwoven by quinary ascents and descents and, consequently the whole [musical] art should be.[25]

Salomon adduces two reasons why five syllables should be enough: first of all, all ascents and descents, without intermediate notes, should not exceed the fifth; secondly, each mode expresses its nature through only five notes and cannot go up, in one leap, by more than five notes without incurring *falsa musica*. As regards the first reason, the French theorist seems to have a more conservative attitude about melodic intervals than other theorists do: bearing in his mind Guido's six *consonantiae* (semitone, tone, ditone, semiditone, diatessaron, diapente), Salomon seems to say that a five-syllable unit is enough to cover all possible intervals, and that we do not really need a hexachord for that reason.[26] The second motivation is based on the fact that it takes only five notes to define a mode, as will become evident in the chapters devoted to modality.[27] As to the last remark, that a mode cannot go up by more than five notes, either this is just a repetition of the first reason, or Salomon is referring to the modal fifth as a particular case of ascent.

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[25]"Nonne primo utimur in palma secundis, secundo utimur tertiis, tertio utimur quartiis, quarto utimur quintis, *re, mi, fa, sol, la*?" GS III, p. 19. The passage is far from being completely unambiguous for the presence of the pronouns *secundis, tertiis, quartis, quintis* which I have attributed to syllables, but could also refer to intervals.

[26]Already Johannes of Afflighem lists nine rather than six intervals which can be found in a melody, including the sixths. *Hucbald, Guido, and John on Music*, pp. 110-111.

[27]See the treatise, from chapter eleven on, and its discussion in the present study, pp. 157ff.

The next *quaestio* is still concerned with the number of letters and syllables: is it not true, he says, that actually there are 19 letters in the gamut, rather than seven, and that in singing we use all of them, and sometime even more? In answering positively, Salomon hastens to clarify that the number nineteen derives from the "multiplication" of letters, and the same process applies to syllables. Now, this concept of "multiplication" could have been drawn from Aristotelian and scholastic philosophy: it is the term to describe the process that makes it possible to have many individuals in the same species without changing the degree of substantial perfection.[28] In the same way, the seven letters and six syllables can be repeated, "multiplied" in other letters and syllables, without changing their nature: the essential identity of octaves (the seven-letter rows) and hexachords (the six-syllable rows) has now a scientific foundation.

We finally come to the definition of *punctus*:

> What is a *punctus*? A *punctus* is the smallest part of a simple sound [*vox*], which cannot be written nor performed unless integrally.[29]

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[28]"To multiply within the species means to multiply without modifying the perfection that is multiplied. This multiplication is therefore exclusively numerical; there is only a numerical "more," not a specific "more"; there is a number which can be greater or lesser, but there is no modification in the degree of perfection of individuals; the latter, belonging to the same specific perfection, even though they differ according to secondary and accidental determinations, are identical with respect to substantial perfection; they are all equally men or lions." ("Moltiplicare entro la specie significa moltiplicare senza modificare essenzialmente la perfezione che si moltiplica. Tale moltiplicazione pertanto è puramente numerica; vi è soltanto un "più" numerico, che può essere maggiore o minore, ma non vi è modificazione nel grado di perfezione degli individui; questi, appartenendo alla stessa perfezione specifica, benchè possano essere, e siano di fatto, diversi secondo varie determinazioni secondarie e accidentali, sono identici quanto alla perfezione sostanziale, sono tutti ugualmente uomini o leoni." C. Giacon, *Le grandi tesi*, p. 180.)

[29]"Quid est punctus? Punctus est minima pars vocis simplicis,

From this definition, *punctus* appears to be an equivalent of sound and of its representation: it is used to write sounds down, and to utter them (*pronuntiari*); therefore, a *punctus* is here both a graphic sign, a note, and a singable syllable. As sounds, syllables have different ways of being performed, which Salomon describes in some detail, starting from ut. It should be noted that after the syllable re the theorist switches to letters (*e*, *f*, and *g*), thus showing a certain inconsistency in the handling of letters and syllables.[30] Furthermore, the lack of the final syllable (la, or letter *A*) seems quite incongruous, and could be either a mistake or an intentional omission due to the similarity of nature with the syllable mi. As for ut, the basic instruction is "you, friar Minor, should conform to the syllable and the syllable to yourself," which probably means that ut should not be performed in any special way and is only a reference point to start the hexachord.[31] Re needs to be performed *grossum et rigidum*, that is, hard and full-bodied, without making a semitone afterwards (*sine planctu*). *E*, that is, mi, should start boldly, followed by a semitone (*plangendo*), without any softness, while *F*, or fa, needs to be uttered with an appealing and docile voice. Finally, *G*, that is, sol, should be performed without either *planctu* or *mollificatione*, starting moderately.[32] If we now resume the previous

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quae scribi seu pronuntiari non posset, nisi integre." GS III, p. 20.

[30]It should be noted that Salomon starts his singing exercizes always on *C*, so that even here he must have had in mind the hexachord on *C*. See below, section four.

[31]"Nam si punctus fuerit in ut in principio, tu minor debes moderare te cum puncto, et punctum tecum." GS III, p. 20.

[32]Ibid.

discussion about the nature of letters, it becomes clear why only *A*, *E*, and *F* can be defined, since they either bear syllables of a similar character (re, mi, and la), or, in the case of *F*, have basically only one syllable, seeing that ut does not have any specific nature. On the contrary, *C*, *D*, and *G* mix syllables of different nature, and thus assume different characterizations according to the syllable to which they are associated at each particular moment. A peculiar case is represented by *B*, which actually refers to two distinct pitches.

The next remarks in chapter five are more concerned with the rhythmic performance of *puncti* and with the insertion of rests, and therefore go beyond the scope of the present research.

3. The *clavis*: hexachord, deduction, and clef

This section focuses on the word *clavis*, which is used, especially in chapters six and seven, to mean hexachord, both as an absolute sequence of tones and as a specific position in the gamut. The term is also used by Salomon to define a clef: the three meanings are all related to the basic idea of "key," that is, an instrument to open, and, metaphorically, to access some kind of knowledge.

According to Fritz Reckow, the term *clavis* is found in contemporary treatises with the following most common meanings:

1-the *finalis* of a mode;

2-a synonym for letter or syllable-letter combination to denote a pitch;

3-a key in a keyed instrument;

4-a sign (usually a letter) written at the beginning of the staff to indicate the pitch of written notes.[33]

Therefore, the meaning "hexachord" is not included in Reckow's list, even though he quotes Salomon with reference to the second and fourth meaning. It is my opinion that the basic meaning for *clavis* in Salomon's treatise is hexachord, while he also admits the other meaning of "clef," but only in the second part of the treatise, in discussing modes.[34]

There are a few passages in which the theorist specifically refers to the term *clavis*, aside from other occasional references. The official definition is given in chapter seven:

> What is *clavis* in this art? *Clavis* is [the tool] which opens [reveals] the knowledge of the musical art through seven letters and six syllables, which was discovered by our teachers by divine inspiration.[35]

This definition is found in several other theorists of the late thirteenth and early fourteenth century.[36] But what does Salomon really mean by *clavis*? This becomes clear if we look at the previous

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[33]Reckow, "Clavis," p. 1.

[34]R. Henderson comes to a similar conclusion, and states that the term *clavis* refers ambiguously to both property and hexachord. See Henderson, *Solmization Syllables*, p. 78. I do not agree with his assumption of Salomon's dislike for the concept of property, based on a passage in chapter ninenteen, where the theorist objects to the idea, supported by some French people, that a song can be governed partly by *B* natural (*B quadratum*) and partly by *B* flat (*B molle*). I think Salomon is referring here not to the concept of property, but rather to the idea that the presence of *B* flat can classify a song, against the precept that only modes can classify chants. See GS III, p. 41.

[35]"Quid est clavis? Clavis est scientiam artis musicae aperiens artificialiter per septem litteras et sex punctos a doctoribus nostris instinctu divino reperta." GS III, p. 21.

[36]Such as Lambertus, Jerome of Moravia, Odington, Marchettus; as cited by Reckow, "Punctus," p. 8.

chapter, where, as usual, the number is analyzed first. Here follows the direct quotation:

> *Claves*, according to some people, are thirty-five: seven for seconds, fourteen for thirds, seven for fourths, and seven for fifths, and together, thirty-five. According to others they are but seven: indeed, those [*claves*] that are in seconds, through the same syllables are in thirds, fourths, and fifths; but, they increase their course by pairing, according to what the nature of thirds, fourths, and fifths requires. I assert that there is but one *clavis*, but it is multiplied seven times minus one syllable, [making] nineteen notes, which we have in the hand: in the same way it could be multiplied infinitely.[37]

The last sentence of this passage seems to leave no further doubts about the meaning of *clavis*: it is the hexachord, which is repeated seven times in the gamut, making up nineteen notes because the last repetition lacks the final note-syllable, *ee* la. In fact, Salomon follows Guido's gamut, which does not include the superacuta ee, although several theorists in the thirteenth century preferred the twenty-note gamut. Let us try to explain, now, the rest of the quotation, which corresponds to the entire chapter six of the treatise. As to the first remark, that *claves* are thirty-five, a possible explanation arises after examining the picture of the wheel in chapter eight. The picture shows a circle surrounded by two circumferences: the first one contains the seven letters, the second one the syllables

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[37] "Claves secundum quosdam sunt triginta quinque, septem de secundis, quatuordecim de tertiis, septem de quartis, septem de quintis, et simul triginta quinque. Secundum alios non sunt nisi septem: nam illae, quae sunt in secundis, et per eosdem punctos sunt in tertiis et quartiis et quintis; sed augmentant copulando cursum suum, secundum quod natura de tertiis et quartis et quintis requirit. Assertive dico, quod non est nisi unica clavis, sed multiplicatur septies uno puncto minus per XIX punctos, quos habemus in palma: similiter posset multiplicari in infinitum." GS III, p. 21. The term *punctus* is used here in the more general sense of note, rather than in the specific meaning of syllable.

ut re mi fa sol la. The internal circle is divided, vertically, by a straight line: on each side of this line there are five staves where ascending and descending hexachords are notated, with their syllables underneath. Following the discussion of the picture, in the same chapter eight, these hexachords turn out to be singing exercises to learn the intervals inside the hexachord: seconds, thirds (both as leaps and as filled thirds), fourths, and fifths, and they are called *claves*. If Salomon, as I believe, is referring to these exercises in the first part of the quotation above, then the thirty-five *claves* derive from the repetition of the five hexachordal exercises on all the deductions of the gamut (on *Γ, C, F, G, c, f, g*).[38] Also the remark that *claves* are seven by seconds, fourths, and fifths, but fourteen by thirds, becomes clear in the light of this interpretation, since for thirds there are two exercises, which, repeated seven times, add up to the number fourteen. As to the second opinion reported by Salomon, the thirty-five *claves* are reduced to seven--the seven positions of the hexachord in the gamut--since the five exercises use the same syllables paired in different ways (by two, by three etc.). Salomon goes one step further and declares that there is only one *clavis*, one hexachord, with its "multiplications," that is, its different projections on the gamut. The Aristotelian concept of "multiplication" guarantees, once again, the absolutely identical degree of perfection of the seven hexachords found in the hand: they are, indeed, of one and the same

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[38]It should also be noted that Guido, when speaking of the six *consonantiae* which the singer needs to commit to memory, uses the term *claves* ("Since when you hold these as keys, you can command skill in singing--intelligently, and therefore more easily." *Hucbald, Guido, and John*, p. 61.)

substance. It also allows Salomon to use the term *clavis* for both hexachord and deduction without contradiction: as one can use the word "man" to denote both the substance and the individual man, so one can use *clavis* to mean the concept of the hexachord and its seven deductions.

After the official definition of *clavis*, Salomon discusses the hand, as a second *clavis*:

> Thus, we imagine to have one note on each joint [of the hand] and we multiply the knowledge of music, that is, the first *clavis*, which we have as genus, by the *clavis* that we call hand [*palma*] which is [so] named as species or instrument, and by means of it the first *clavis* works.[39]

My interpretation of the previous passage still rests on the opinion that *clavis* means hexachord. The word *clavis* is here referring to three slightly different things, all related to hexachords: the *clavis* as genus, which represents the fundamental knowledge of music, is the hexachord ut re mi fa sol la without any reference to specific pitches; the *clavis* as species is the hand, a tool meant to show and remind of the different positions that the hexachord can take in the gamut (deductions); the *prima clavis* is the first of these deductions. Therefore a possible better reading of the quotation above may be the following: when we use the mnemonic tool of the hand, we imagine to have one note on each joint by projecting the hexachord unit at different points of the hand, and from this operation the first deduction arises. A further reading might reveal that the singer needs

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[39]"Ita per quamlibet unciam fingimus unicum habere punctum, et multiplicamus scientiam artis musicae, sive primam clavem, quae habetur ut genus, per clavem, quam appellamus palmam, quae ut species sive instrumentum nuncupatur, et ipsa mediante prima clavis operatur." GS III, p. 22.

first to learn the intervals in the hexachord (and this would be the first, basic knowledge of music); then, with the help of the hand, would learn to transpose the basic unit at different pitch levels, that is, the deductions.

The last reference to *clavis* occurs in chapter twenty-eight, when it is used in the meaning of "clef":

> In a third way it is called *clavis* the letter which is placed at the beginning of the lines [staff], or as if it opens the whole rule [*regimen*] of lines, between which it is placed, and defines of which mode [the notated chant] should be.[40]

Salomon follows the usage, found especially in southern French notation, to put different clefs with different modes: *F* for the first, *D* for the second, *G* for the third, *E* for the fourth, *a* for the fifth, *F* for the sixth, *b* for the seventh, and *G* for the eighth.[41] What is very

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[40]"Item tertio modo appellatur clavis littera illa quae ponitur in principio linearum, vel quasi totum regimen linearum, inter quas est posita, aperit, et declarat, cuius toni debet esse." GS III, p. 56. Note that the word *regimen* has the same root as *regula*, the term used for staff.

[41]Quoted by D. Hiley, "Notation," p. 350. See also B. Stäblein, *Schriftbild der einstimmigen Musik*, Musikgeschichte in Bildern, III/4 (Leipzig: VEB Deutscher Verlag für Musik, 1975). Stäblein traces the origin of these clefs in the use, in the eleventh-century Aquitanian notation, of a single line corresponding to different tones according to the mode of the notated chant (*tonuslinie*). The clefs for these lines are the same as the ones shown by Salomon, except for the fourth mode, which has *F* instead of *E*. However, the same system is found in Rudolf of St. Trond's *Quaestiones in musica*, who not only has *E* for the fourth mode, but also uses different colors for each modal pair: red for modes one and two, respectively with *D* or *F*; green for modes three and four, with *G* or *E*; yellow for modes five and six, with *a* or *F*; purple for modes seven and eight, with *b* or *G*. See R. Steglich, *Die Quaestiones in Musica: Ein Choraltraktat des zentralen Mittelalters und ihr mutmasslicher Verfasser Rudolf von St. Trond (1070-1138)*, Publikationen der Internationalen Musikgesellschaft beihefte, Zweite Folge, Heft X (Leipzig, 1911; reprint, Wiesbaden: Breitkopf & Härtel, 1970), p. 98. Handschin notes that in Salomon too there is a reference to notes associated with colors, when, in describing a four-part discant, he says that singers singing an octave apart wear gowns of the same color. See Handschin, *Toncharakter*, p. 327 and GS III, p. 61.

important about the previous quotation, is that Salomon recognizes that this is a different meaning for the word *clavis*, already used to mean hexachord and hand. I do not agree with Reckow's interpretation according to which *clavis* means also pitch letter (*Tonbuchstaben*), since I think that in all the passages of this chapter where *clavis* appears, it stands for "clef." Reckow quotes the following passage to support his interpretation:

> Likewise, it should be noted that in this song the letter in which the note must ascend or descend is called *clavis*. [42]

This sentence is extrapolated from a discussion about notating chants on lines: the basic idea Salomon is stating is that the scribe uses only four or five lines, so that if he needs to go further down or up than what the number of lines would allow, then he has to change *clavis*, that is, clef. The meaning of *clavis* as pitch-definer is never found, as far as I know, in this treatise, even though it is very common in contemporary treatises.

4. The hand and the wheel

The graphic representation of the so-called Guidonian hand in Salomon's treatise is a beautiful drawing in which not only a realistic left hand, but also the head, the upper body, and the right hand of a

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[42] "Item notandum, quod clavis in hoc cantu appellatur littera, in qua punctus ascendere vel descendere debet." GS III, p. 56. Reckow, in quoting the passage, puts between brackets the translation for the word *punctus* as "solmization syllable," but in this case, since Salomon is talking about notational problems, I think the meaning "note" should be preferred. See Reckow, "Clavis," p. 5.

monk are shown. Smits van Waesberghe has suggested that maybe the scribe was depicting himself or Guido.[43] The drawing of the monk is inscribed in a circle, on the rim of which the six syllables ut re mi fa sol la are written in both ascending and descending direction. On the left hand, the so called Guidonian hand is represented: each knuckle bears a note, defined both with a number, followed by the word *punctus*, and with the customary letter-syllable combination. So, for instance, the first note is: Γ ut, primus punctus.

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[43]Smits von Waesberghe, *Musikerziehung*, p. 136.



Figure 2 - Salomon's Hand

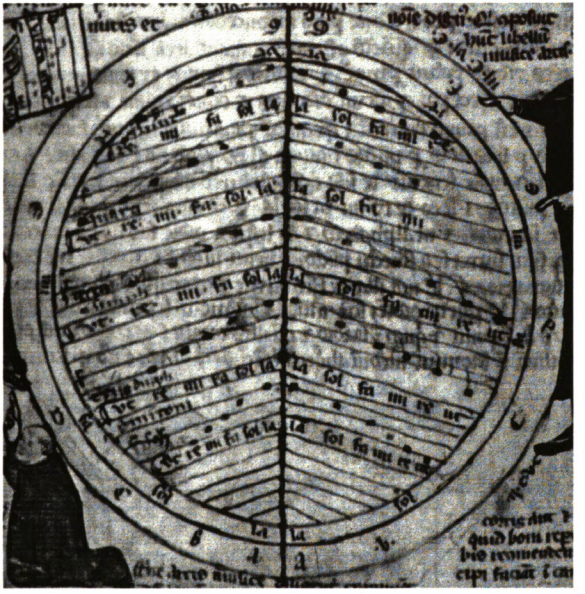


Figure 3 - Salomon's Wheel

It should be noted that here again the term *punctus* is used with the more general meaning of "note," rather than "syllable."[44] On each note associated with the syllable ut, that is, on each new hexachord beginning, there appears the marking of "I *clavis*," "II *clavis*," and so forth, up to the "VII *clavis*." The representation of the right hand is interesting too, since it is shown in the act of pointing, with the forefinger clearly raised. This may refer to the last remark in chapter seven:

> It should be noted that the representation of the left hand should be put in this picture; in fact, with the right hand we make rests, show the notes with the finger and the stylus, and some times turn the book [pages][45]

The explanation of the musical hand covers the whole of chapter seven. As we already saw, the chapter starts with the definition of *clavis* and the attribution of the term "key" to the hand as well.[46] The definition of the hand follows:

> What is the hand in this science? The hand is the key [*clavis*], form [*figura*], and instrument which contains all the knowledge of the musical art, that is, of all those things which can be correctly sung, and without the knowledge of which there is no science; otherwise, one is considered not a singer, but a jongleur [*ioculator seu iauglator*].[47]

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[44]Gerbert, in his stylized diagram of the hand, wrote *punctum*, while the original clearly shows the spelling *punctus*. Compare GS III, p. 22 with the ms, f. 3v.

[45]"Est et notandum, quod in figura ista debet poni imaginatio sinistrae manus; nam cum dextra facimus pausas, ostendimus punctos cum digito, et stilo, et aliquotiens volvimus librum." GS III, p. 24. The underlining is mine.

[46]See section three in the present chapter.

[47]"Quid est palma in hac scientia? Palma est clavis, figura, sive instrumentum continens omnimodam notitiam artis musicae, seu omnium, quae recte cantari possunt, sine cuius notitia scientia nulla; nec alias cantor, sed ioculator seu iauglator reputatur." GS III, p. 23. I have not been able so far to find the word *iauglator* in the Latin

The definition clearly involves the request to use only the seven "official" hexachords and the relative mutations, leaving out any possibility for *falsa musica*. As has been noted, Salomon reveals a quite conservative attitude in this matter, since other contemporary theorists admit some instances of *falsa musica*. Salomon's recommendations become even more forceful in his criticism of singers from Toulouse, who used letters in place of syllables, thus disrupting the orders in the hand.[48] As our theorist recognizes, there are three orders in the hand: the letters, the syllables, and the hexachord with its deductions.[49] Therefore, to use letters with the function of syllables, *pro punctos*, as singers from Toulouse do, means to destroy the order of letters as well as that of the whole science of music. But what does it mean to use letters *pro punctos*? It probably suggests another system for reading music, in which letters are sung instead of

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dictionaries I have consulted. It is probably a gallicism (cf. the modern *jongleur*).

[48]"Why certain people from provence, namely, from Toulouse, use letters for letters, as well as for [solmization] syllables? I answer: that is nothing but a misuse and a corruption, . . . Letters are ordered by philosophers according to a certain and unchangeable order." ("Quare quidam Provinciales sive Tolosani utuntur litteris pro litteris, litteris pro punctis in palma? Respondeo: illud non est nisi abusus et corruptela, . . . Litterae ordinatae sunt per philosophos ordine certo et immutabili." GS III, p. 23.)

[49]Actually, when speaking of the three *ordines* Salomon mentions Γ, *A*, *B* etc. as first order, and Γ ut, *A* re, etc, as second order. Therefore, one would think that the second order is the combination of letters and syllables. However, later in the chapter, he states that the hand consists of four things: seven letters, six syllables, one hexachord and its deductions, and modes. The first three elements seem to correspond to the three previous *ordines*, and they are mentioned here and there in the treatise, while the combination of letters and syllables is never treated as a unit. However, in this case maybe Salomon is referring to syllables as they appear in the succession of ninenteen notes in the gamut: (Γ) ut, (*A*) re, (*B*) mi, (*C*) fa ut, and so forth.

syllables: if such a system was indeed used in Toulouse, we might infer that it was based on the octave, rather than on the hexachord, since letters are arranged according to the principle of octave repetition. Thus, Salomon was opposing a practice that would favor the octave over the hexachord, and he needed to reaffirm the hexachord's importance by stressing its priority over the other series:

> The orders above derive from the multiplication of the art, except the last one [the *clavis*] which governs the order of the hand, and begins with the hand, and with the hand ends.[50]

The repetition of the word *palma*, hand, so many times in such a little sentence hints at the close relationship between hexachord and hand: if the former is abandoned in favor of some other system for reading music, then the hand, and the whole theoretical system based on it, falls. Salomon restates the importance of the three *ordines*, to which a fourth one is now added (the modes), through an analogy with the real human hand: as in the human hand there are four matters (bones, nerves, flesh, skin), four liquids (blood, phlegm, melancholy, and bile), and four elements (earth, water, fire, and air), so in the musical hand there are four things (letters, syllables, hexachords, modes): they represent the only instrument by which all songs can be sung in the Church Militant and Triumphant.[51] Thus, Salomon is

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[50]"Ordines qui supersunt, ex multiplicatione artis procedunt, excepto quod ultimus ordo regit ordinem palmae, et incipit cum palma, et cum palma terminatur." GS III, p. 23.

[51]"Et est notandum, quod sicuti in corpore humano palma compacta est ex quatuor, ossibus, nervis, carne et corio, et ex quatuor humoribus, sanguine, phlegma, melancholia, colera [medieval spelling for "cholera"], et in palma sunt quatuor elementa, terra, aqua, ignis, aër: ita sunt in arte ista de quatuor ut instrumentum, mediante quo totus cantus et sonoritas in ecclesia militante et triumphante et etiam extra decantatur. Primo continet litteras septem, secundo punctos sex, tertio unam clavem cum multiplicatione consueta, quarto tonos, ex

banishing from the Church all the musical practices not based on the traditional principles, in agreement with a similar operation pursued by the Pope in the matter of liturgy.[52]

While the detailed discussion of modes is left for the second part of the treatise, the one that includes a tonary, the other three elements are depicted in a new picture, a wheel, the primary intent of which is to offer some singing exercises based on the hexachord. As seen before, the "wheel" is a circle, in which there are two rims containing letters and syllables, while the inner part is divided into *radii*, that is, spokes, which turn out to be staff lines. The beginnings of the seven deductions are also shown, but *extra rotam*, near the corresponding letters on the outer rim: so, by *G* we read "i c. iiii c., et vii c." (first, fourth, and seventh *claves*), by *F* "iii c. vi c." (third and sixth *claves*), and by *C* "ii c. v c." (second and fifth *claves*). Gerbert's diagram, which uses squares in place of circles, does not show these marks outside, thus making Salomon's remark about the *claves extra rotam* incomprehensible.[53] As to the inner part of the wheel, five double *radii*, namely musical staves, are drawn on both sides of a vertical line which divides the wheel into two halves. Each staff contains an exercise for singing a particular interval in the range of the hexachord *C-a*, in both ascending (on the

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quibus constat et regitur totus cantus." GS III, p. 23.

[52]See the Introduction above.

[53]"Through those things which are outside the wheel we know the *claves*, and in which letter any *clavis* has to begin." ("Per illa, quae sunt extra rotam, habemus claves, et in qua littera clavis quaelibet incipere debet." GS III, p. 25).

left side) and descending motion (on the right). For these exercises the term *clavis* carries a dual connotation; it seems to refer both to hexachord (the actual range of these exercises), and to the generic meaning of key, since this practice will "open," reveal, another aspect of music, namely how to sing different intervals.[54] The passage in Salomon's text that illustrates these new *claves* shows some level of ambiguity. It has been discussed by Dyer, especially for the information it conveys on the articulation of sounds; however, his treatment leaves some of the matter unclarified, particularly with respect to the function of the exercises.[55] Here follows a translation of the whole passage about these new *claves*:

> As the first spoke of the wheel or picture we have the first key [*clavis*] of the musical art, which opens and teaches how to sing notes by seconds, ascending on one side, and descending on the other, and therefore they are called seconds. Those slashes [*scissurae*], which are drawn after any note, indicate that the notes, separated [*separati*] one from the other, have to be sung divided [*divisi*], almost with a rest [*quasi pausatim*] afterwards. As second spoke, we have the second key or second instruction about singing three notes at a time continuously [*continue*] without a rest [first] almost separately [*quasi divisim*], and then joined [*copulatim*] without a rest. And since they need to be sung separately [*divisim*], therefore there are slashes [*trictae*] between the notes, and afterwards they have to be linked as the slur directs them: and since they are sung three by three, they are called thirds. As third spoke we have another way to sing, in which [notes] are linked two by two, as is shown by the slur which holds them united: and since they are sung two by two, there is no slash [*tricta*] between the notes, likewise they are called thirds of a different kind than the first. As fourth spoke we have the fourth way of singing and linking four by four, as [notes] are linked by slurs, and therefore are called fourths. Slashes [*trictae*] are put between notes; indeed, even though they are linked by four, nevertheless they need to be sung

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[54]See the next quotation, below.

[55]Dyer, "The *Scientia Artis Musicae*," pp. 106ff.

> separated [*separatim*]. As fifth spoke we have the fifth way of singing, as shown by slurs, and slashes, which are contained in the same spoke.[56]

Dyer offers the following interpretation of this passage:

> The *rota* is a compendium of the possibilities of articulation in chant and a method of instruction in executing them. Most of the exercises are to be sung in two different ways: every note separately and distinctly or notes joined in groups of two to five pitches. Salomon appears to be distinguishing among three types of articulation, reflecting varying degrees of separation between notes:
>
> 1. *quasi pausatim*
> 2. *quasi divisim* (or *separatim*)
> 3. *copulatim*
>
> The degree of separation implied by the *tricta* is flexible and intentionally ambiguous.[57]

In my opinion, Salomon is speaking of only two types of articulation, a staccato, indicated by *trictae*, and a legato, indicated by slurs, as Salomon says regarding the second *clavis*: "And since they need to be sung separately, therefore there are slashes between the

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[56]"Per primum radium rotae seu figurae habemus primam clavem artis musicae, quae aperit et docet punctos cantare de secundo in secundum, ex una parte ascendendo, ex alia descendendo, et ideo vocantur secundi. Illae scissurae, quae factae sunt post quemlibet punctum, designant, quod puncti separati unus ab alio divisi et quasi pausatim cantari debent. Per secundum radium habemus secundam clavem seu secundam instructionem de tribus punctis continue cantandis sine pausa quasi divisim, et postea copulatim sine pausa. Et quia divisim cantari debent, ideo sunt trictae inter punctum et punctum, et postea debent copulari ut linea eos advertit: et quia trini et trini cantantur, tertii vocantur. Per tertium radium habemus alium modum cantandi, in quo copulantur bini et bini, ut patet per lineam, quae tenet eos copulatos: et quia bini et bini cantantur, non tricta inter punctum et punctum, et nihilominus vocantur tertii alterius modi, quam primi. Per quartum radium habemus quartum modum cantandi et copulandi quatuor et quatuor, ut per lineas copulantur, et ideo vocantur quartii. Trictae positae sunt inter punctum et punctum; nam quamquam copulentur quatuor et quatuor, nihilominus primo debent cantari separatim. Per quintum radium habemus quintum modum cantandi, ut patet per iam dicta, et per lineas et trictas, quae in eodem radio continentur." GS III, p. 25.

[57]Dyer, "The *Scientia Artis Musicae*," p. 106.

notes, and afterwards they have to be linked as the slur directs them."[58] The staccato articulation is precisely expressed through the adjectives *separati* and *divisi*, or the corresponding adverbs *separatim* and *(quasi) divisim*, while the legato is always indicated with *copulatim* or related forms. Now, in the explanation of the first spoke we find, along with *separati* and *divisi*, the expression *quasi pausatim*. I believe that this does not refer to another degree of articulation, but to the mere fact that, to sing the hexachord by seconds, one needs to repeat the last syllable of each pair in order to make the next pair (ut-re, re-mi, mi-fa, etc.) This results in a further separation, almost a rest, between each pair. In the second exercise Salomon specifies that now the groups of notes should be sung *sine pausa*, both when performed staccato ("sine pausa quasi divisim") and when performed legato ("copulatim sine pausa"): in my opinion, the repetition of the expression "sine pausa" in both cases clearly puts the matter of rests on a different level than that of articulation. Once clarified that for singing thirds there is no need to repeat syllables, and therefore to make a rest, and since this is true of the other exercises too, the question of rests is dismissed. Dyer's discussion also fails to explain why there are two exercises for thirds. Salomon specifies that in the second spoke notes have to be sung "trini et trini," while in the third one they are performed "bini et bini," thus making these latter thirds of a different type. So, in the first case one is supposed to sing the complete third (ut-re-mi, re-mi-fa, mi-fa-sol,

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[58]"Et quia divisim cantari debent, ideo sunt trictae inter punctum et punctum, et postea debent copulari ut linea eos advertit." GS III, p. 25 (underlining mine).

etc.), while in the next exercise only the outer notes are uttered (ut-mi, re-fa, mi-sol, etc.). But why do we need this second exercise for the thirds? The answer becomes clear if we regard these exercises not as a "compendium of the possibilities of articulation in chant," but rather as gradual exercises to learn to sing intervals. In this case, we start with the stepwise motion, first by seconds, then by thirds, and then we are led to the disjunct motion through the same thirds we just sung, by skipping the internal note. After learning that, we are ready to sing the other intervals as well. Thus, the intervals we need to learn in order to be able to sing chant are: seconds (tone and semitone), thirds (ditone and semiditone), fourths (diatessaron), and fifths (diapente): that is, Guido's *consonantiae*. The sixth is not contemplated in the list of the important intervals, and this explains Salomon's suggestion, earlier in the treatise, to switch to a five-syllable unit. However, he maintains the hexachord as the basic unit, probably in deference to Guido, in all exercises but the last one. Here, only one fifth is sung in the pentachord re mi fa sol la, for which Salomon adduces the following reason:

> Why does the fifth instruction of this art starts with re instead of ut? I answer: because it would have a weak beginning in ut, and a similar ending in *G*, and this art comes from divine command, through the great littleness of the praise directed to God, and from men's vice: therefore it requires to start small and hard in re, and to ascend more noble in *A*, and again end moderately in re, where it started.[59]

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[59]"Quaero: quare quintum documentum huius artis incipit per re, et non per ut? Respondeo: nam haberet debile principium in ut, et similem finem in G et ars ista procedit ex divina iussione, et magna parvitate laudis directae ad Deum, et ex lascivia hominum: ideo parve et rigide appetit incipere in re, et nobilius ascendere in A et iterum moderate finire in re, ubi incepit." GS III, p. 25.

We can only speculate, at this point, whether Salomon was trying to find some justification for a common usage or for his own choice: in any case, the preference for the fifth starting with re is in agreement with his idea to abolish the first syllable of the hexachord.

Another strangeness is to be found in the fourth exercise, in the descending part, where instead of a hexachord only four syllables occur, from la to mi. To explain the lack of the last two notes, Salomon simply turns to habit: "it is not unreasonable, but usage has abolished it."[60]

5. Hexachord and modes

Hexachord proves to be of fundamental importance in the treatment of modes as well. Such a treatment covers chapters nine through twenty-seven, which constitute a tonary. As noted by Huglo, Salomon's tonary cannot be regarded as the Franciscan thirteenth-century tonary that might have been attached to the new Antiphonary.[61] Even if one admits that such a Franciscan tonary really existed, Salomon's appears to be more related to regional usages than to an official exemplar.[62] However, his tonary proves to be particularly interesting, especially

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[60]"Nulla ratione caret, sed usus abolevit." Ibid. Dyer has pointed out that in Gerbert's diagram this fourth exercise is given complete, which change does not accord with Salomon's words about the non-integrity of the fourth spoke (Dyer, "A Thirteenth-Century Choirmaster," p. 106). Also, in the original one can see that in the fourth right spoke the last two notes of the hexachord were erased, maybe by Salomon himself, who might thus have corrected the picture drawn by the scribe.

[61]M. Huglo, *Les tonaires: inventaire, analyse, comparaison* (Paris: Société Française de Musicologie, 1971), pp. 226-27.

[62]Ibid.

for the classification of the *differentiae* into several *ordines*, according to their last note.[63]

It is again a nice picture that introduces the new subject of mode (see next page). A human figure, maybe a cleric, is inscribed in a circle and surrounded by eight small circles, four on each side. The three rims of the big circle embody the series of seven letters, six syllables, and seven deductions, while the eight circles inside describe the eight modes: the four circles on the left correspond to the authentic modes, the four on the right to the plagal. Inside each circle the degrees of kindred of each mode with the others are shown, followed by the five letters (notes) characteristic of each mode. In the explanation of this picture, Salomon introduces the definition of *tonus* by first distinguishing between *tonus in genere* and *tonus ut specie*:

> What is *tonus in genere*? It is the composition [*figura*] of seven letters, one hexachord, six syllables and eight modes, which contains the nature of every song, both artificial [instrumental] and natural [vocal].[64]

This *tonus in genere* is divided into eight species of *tonus*: four as "children," the authentic modes, and four as "grandchildren," the plagals. Inside each circle, modes are defined by the relationships they have with the *tonus in genere* and with each other; so, for instance, the first mode is "the son of the *tonus in genere*, the brother of the third mode, and the father of the second."[65]

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[63] Ibid.

[64] "Quid est tonus in genere? Tonus in genere est figura septem litterarum, et unius clavis, sex punctorum, et octo tonorum, et totius cantus tam artificialis quam naturalis continens naturam." GS III, p. 27.

[65] "Primus tonus, filius toni, frater tertii, pater secundi," as

As to the five letters included in each circle, Salomon notes:

> Which letters and syllables does each mode have by its nature? [It has] The first letter as clef [*pro regula*], the last as final [*pro fine*], and the others for the accepted ascending and descending [motions] both above and below itself.[66]

A full understanding of the previous statement can only be gathered from several different passages in the treatise. Some clarification comes from the discussion of the first modal pair, to which Salomon devotes quite a long section of his tonary, as it serves as a model for the other modal pairs. The examination of a modal pair is always preceded by a picture in which two human figures (clerics) represent the two modes under investigation: the bigger man corresponds to the authentic mode, the smaller one to the plagal.[67] They are both

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written in the first circle on the left in Gerbert's diagram (GS III, p. 26.) A similar affiliation (*padre-hijo*=father-son) is found in the Spanish treatise *Arte de canto llano*, which Gümpel relates to two other Iberian treatises, probably from the fourteenth-century, and regards as part of an original Spanish tradition of hexachordal theory. See W. Gümpel, "Zur Frühgeschichte der vulgärsprachlichen spanischen und katalanischen Musiktheorie," *Gesammelte Aufsätze zur Kulturgeschichte Spaniens* Band 24 (Münster: Aschendorffsche Verlagsbuchhandlung, 1968), pp. 312.

[66]Quot litteras et punctos quisque tonorum obtinet de sui natura? Primam litteram pro re, ultimam pro fine, reliquas pro placitu ascendendo et descendendo tam subtus quam supra se." GS III, p. 27. In the translation I have replaced the expression "pro re" with "pro regula" since the latter is commonly found in the rest of the tonary to describe the first letter.

[67]In Gerbert's edition only the first modal pair receives an illustration somehow related to the picture of the two clerics, even though the human figures are omitted altogether and the *differentiae* are shown in a squared diagram. I would like to point out, moreover, that this diagram lacks one *differentia*, which in the original is written at the end of the third staff on the left (*a-G-F-E-D-E*). Salomon refers to this *differentia* as "differentia scissa," and does not include it in his official classification, namely the four "ordines" of *differentiae* ending, respectively, on *D*, *F*, *G*, and *a*.

inscribed in a circle, horizontally divided by a line, so that the smaller cleric's height does not cross the dividing line. In the upper half of the circle, on both sides, the *differentiae* of the authentic mode are shown, whereas in the lower part we find the ones peculiar to the plagal; likewise, the upper part of the rim contains the five notes characteristic of the authentic mode, while the lower part shows the five notes that identify the plagal. In discussing the features of the first modal pair, Salomon offers the following definition:

> The first mode is the composition of ten *differentiae* [*seculorum*], which contains a certain five letters of the gamut, and which, if some other [letters] are inserted between those, rules all instrumental and vocal song; which begins in its line [*regula*] *F*, and ends in *D*.[68]

As to the first letter, it becomes clear, from a number of references, but especially in the chapter at the end of the tonary, that it refers to the clef associated with the mode, according to an usage we already mentioned:

> For every song of the first mode, with no exception, the clef has to be put in F, and that clef is put there as the true clef, and the line [*linea*] as the true line [*regula*] of the first mode.[69]

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[68]"Primus tonus est figura decem *seculorum*, certas quinque litteras continens, et si quae aliae fuerint insertae inter ipsas, regens totum cantum tam naturalem quam artificialem: quae incipit in F regula sua, et finit in D." GS III, p. 28. The term "seculorum (amen)" is the end of the minor doxology, which always concludes a psalm, and therefore corresponds to the term *differentia*. It should also be noted that the passage "if some other [letters] are inserted" refers to *G*, as Salomon clarifies a few sentences later, because some songs of the first mode can start on *G* as well (with a *G* clef?). See the second paragraph on the same p. 28.

[69]"Quod de omni cantu primi toni, nullo excepto, debet poni clavis in F et illa clavis ponitur ibi pro vera clave, et linea pro vera regula primi toni." GS III, p. 56. It seems that Salomon makes a terminological distinction between any line of the staff (*linea*) and the particular line which bears the clef (*regula*), which rules the entire notated chant.

The last letter is, beyond any reasonable doubt, the final of the mode. As to the three middle letters, whose meaning is not clear at this point of the treatise, here follows a complete list of them for each mode:

First mode: *a b E*

Second mode: *E a B*

Third mode: *a b E*

Fourth mode: *E a b*

Fifth mode: *b e E*

Sixth mode: *a b E*

Seventh mode: *b e a*

Eighth mode: *a b E*[70]

Aside from the aforementioned reference to the three middle letters as denoting the "accepted ascending and descending [motions]," which seems to be another way to express modal range, their significance becomes more clear in chapter twenty, "De practica clavium, qualiter debeant uti solfiando," a chapter devoted to hexachords and mutation. Since the matter discussed in this chapter is of primary importance for hexachordal theory, I will examine it in some detail.

The first instruction is a reassertion of the importance of the hand for finding out what syllables can be associated with letters, according to the different hexachords:

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[70]In Gerbert's diagram about *tonus*, the letters *g a b*, instead of *E a b*, are ascribed to the fourth mode (GS III, p. 26). However, it should be regarded as a mistake.

> Indeed, as is embodied in the hand, it is necessary to use syllables and letters in various ways according to the different properties [*cantuum*] and hexachords, as appears in the same [hand] by observation, without adding or taking away anything: this should be adhered to absolutely, and whoever should use [letters and syllables] in a different way would fall in the error of *falsa musica*.[71]

What seems puzzling about this quotation is the meaning of *cantus* in this context, since the word is sometime used, in other treatises, with the meaning of "hexachord." Here, either *cantuum et clavium* can be regarded as a stylistic device, an endyad, expressing the same concept with two similar words, or else a distinction is meant between hexachords' properties (natural, hard, and soft) and deductions (the seven locations).[72]

The next paragraph deals with mutation:

> Yet it needs be noted for the training of the monks, who solmize [*solfiant*], that they should be careful to note what hexachord their song begins in, and confidently follow it up to la in the same way as the song proceeds. Then, when [the singer?] would be at la, if the song should go up more, then [he] should mutate and take the hexachord which is the closest to the hexachord that is necessary to leave, and through that [hexachord] likewise [he] should go up to la: and thus ascending for each individual [la], and descending, whenever [the song] should be in ut: likewise if [he] should wish to go further down, [he] should take on the hexachord more suitable to itself [the song? the singer?].[73]

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[71]"Nam prout in palma continetur, necessarium est, quod punctis et litteris tot modis utantur secundum diversitatem cantuum et clavium, ut in eadem per inspectionem apparet, nullo addito, nullo remoto: hoc teneatur pro certo, et qui aliter uteretur, in vitium falsae musicae laberetur." GS III, p. 42.

[72]It does not seem likely that the term *clavis* refers to clef in this context.

[73]"Tamen notandum est ad instructionem minorum, qui solfiant, quod caveant, in qua clave incipit cantus suus, et ipsam audacter prosequantur usque la eodem modo, quo procedet cantus. Tunc cum fuerit ad la, si cantus ascenderet superius, tunc mutet et resumat clavem magis propinquam illi clavi, quam necessarium est dimittere, et per

Aside from the ambiguity of that singular third person in all the verbs that appear from the fifth line on--which I have suggested to refer mainly to the singer--it is worth noting in this passage the use, of which we have a record maybe for the first time, of a specific word to indicate the practice of reading music with syllables, namely *solfiare*. The basic rule stated about this *solfiare* is that a hexachord should be held as long as possible, before making a mutation; and whenever a mutation is called for, it should be done to the hexachord which immediately follows, either ascending or descending. The next rule is again about mutation, which should occur only in those notes that admit at least two syllables, again at the risk of incurring *falsa musica* if one should do otherwise.

After these instructions about mastering hexachords and solmization, the subject of modes is resumed with regard to the five notes that characterize them. As to first mode, Salomon writes:

> The first mode makes its line [*regula*] in *F* and has a semitone [*plangit*] a third above it, in *a*, and a fourth above it, in *b*, and a second below it, in *E*, and ends a third [below it] in *D*.[74]

As it turns out, these three middle letters indicate where the semitones occur in each mode, thus revealing which hexachords are implied. Here follows a new list of the three significant notes and the related hexachords:

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illam similiter ascendat usque la: et sic de singulis ascendendo, et descendendo, cum fuerit in ut: similiter si magis descendere voluerit, resumet clavem magis aptam sibi." GS III, p. 42.

[74]"Primus tonus facit regulam suam in F et plangit tertio supra se in a, quarto supra se in b et plangit secundo subtus se in E et facit finem tertio in D." GS III, p. 43.

1-The first mode *plangit*, that is, has the semitone on *a*, *b*, and *E*, meaning that there are three hexachords involved: the first natural on *C*, the first soft on *f*, and the second hard on *G*;

2-The second mode *plangit* on *E*, *a*, and *B*. The implied hexachords are the first natural on *C*, the first soft on *f*, and the first hard on Γ. As a consequence, while in the other mode *e* could be reached, here the ambitus is shifted to a lower register. Also these three notes seem to imply that only *b* flat should be used in the "acutae."

3-The third mode *plangit* on *a*, *b*, and *E*, thus implying the same set of hexachords as the first mode.

4-The fourth mode *plangit* on *E*, *a*, and *b*. The same hexachords as the authentic mode are implied, but the placing of the natural on *C* as the first one again shows a shift to the lower register.

5-The fifth mode has the semitone on *b*, *e* and *E*. The range now has shifted to a higher position, since the second natural hexachord on *c* is implied here. It sems rather odd that the hexachord on *f*, with the consequent semitone on *a*, is not listed for this mode. Maybe the hexachords here are used more to define the ranges than to show the frequence of *b* flat, and since they need to be kept in the number of three, Salomon must have just chosen one of the two possible in that range.

6-The sixth mode has the semitone on *a*, *b*, and *E*, thus excluding the higher register of the previous mode.

7-The seventh mode has the semitone on *b*, *e*, and *a*. These hexachords definetely show a higher register.

8-The last mode *plangit* on *a*, *b*, and *E*, thus restoring the register of

the first mode.

Before leaving the subject, I should like to add one last remark about these mode-definer letters. I think they represent a reconsideration of the five letters used by Johannes Afflighemensis, in a diagram of his *De musica*, where the ranges of the eight modes are expressed through the final, the two normal highest and lowest notes, and the *notae licentiales*.[75] By linking hexachords and modal ranges Salomon reveals, once again, the significance of hexachords also as an instrument of musical analysis.

6. Summary

Salomon's treatise aims at being both a practical and a theoretical formulation. His discussion of the relationship between letters and syllables hints at the Aristotelian concepts of matter and form, as does the process of multiplication invoked by the French theorist to justify the repetition of syllables in the gamut.

On the practical side, the treatise provides exercises for practicing and memorizing intervals inside the range of the hexachord, and suggests the actual use of the hand in singing. It even goes as far as proposing a new system of solmization based on five rather than six syllables, although without denying the traditional method altogether. In dealing with modes, Salomon establishes some sort of relationship between hexachords and modes, and between modes and clefs.

The *Scientia artis musicae* is also very interesting for the

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[75]See *Hucbald, Guido, and John on Music*, p. 142. As an example, the first mode is defined by *D*, *C* (the lowest note), *d* (the highest note), *e* and *f* (the highest notes *licentialiter*).

peculiar terminology used and for its references to certain specific usages--which Salomon harshly criticizes,--such as the reading of music through letters instead of syllables, and the recognition of only two properties instead of three.

Chapter 5

JEROME'S TRACTATUS DE MUSICA

1. Introduction

The *Tractatus de musica compilatus a fratre Jeronimo Moravo Ordinis Fratrum Praedicatorum* was published in a modern edition by S. Cserba in 1935.[1] The only manuscript that preserves the text is in the Bibliothèque Nationale of Paris, with the signature Ms. Latin 16.663, from the thirteenth century. According to Cserba's analysis, this is not the original manuscript, but rather an exemplar, that is, an official copy made in double-page (*binio*) parchment fascicles (*pecia*), which was examined, for completeness and correctness, by a committee appointed by the University.[2] The manuscript was acquired by Petrus de Limoges, *socius* of the Sorbonne since 1260, who donated the exemplar to the University after his death, in 1304. Cserba was able to trace, in Jerome's treatise, a quotation from St. Thomas's *De coelo et mundo*, which was written in 1272, and thus establish the possible date of the treatise between 1272 and 1304, correcting the hypotheses advanced by previous musicologists.[3]

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[1] *Hieronymus de Moravia O.P. Tractatus de Musica*, ed. P. Dr. S. M. Cserba (Regensburg: Verlag Friedrich Pustet, 1935). Abbreviated here as Cserba.

[2] Ibid., pp. LXXVII-LXXXIV.

[3] Ibid., pp. XX-XXIII.

As to the author, very little is known about Jerome, and it comes entirely from the treatise. He was from Moravia, and was a member of the Dominican Order, which was founded at the beginning of the thirteenth century. By Jerome's own admission, the treatise is a compilation written to help music students who encounter many difficulties in the study of music. Jerome mentions his sources, mainly Boethius and John of Afflighem, most of the times, but not always, as in the case of chapters eighteen through twenty-six, which Coussemaker thought were original for the lack of any author's name, but are actually made up of quotations from John.[4] Most of the quotations are literal, but some just reproduce the general sense. Some parts of the treatise are neither literal nor free quotations, but they refer to concepts of music theory which were commonly accepted in the thirteenth century. The only original sections, according to Cserba, are the twenty-fourth and the twenty-fifth chapters, which propose some composition and singing rules, and the twenty-eighth chapter, which is a description of string instruments.[5]

The exposition of the hexachordal theory is found in chapters ten through twelve, but several references, especially in connection with the modes, are found in other parts of the treatise. Jerome's treatment of the hexachordal theory, aside from the standard concepts, shows some peculiarity which may be regarded either as his original thinking, or as the reflection of a particular practice. They deserve a closer examination.

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[4]Ibid., pp. XIX-XX.

[5]Ibid., pp. LIff.

2. The elements of the system: *claves* and *voces*

The tenth chapter in Jerome's treatise introduces the basic elements of music, as announced at the end of the previuos chapter:

> Therefore the first and principal examination will be done about this genus [diatonic], not according to the Greek elements transmitted by Boethius, which will be discussed later according to the three genera, but rather according to the commonly accepted elements. These elements now are called *voces* and *claves*.[6]

After the statement of the subject of the chapter, "now we start dealing with *harmonices claves* and *voces*," the chapter is almost completely a collection of quotations from John of Afflighem's *De musica*, specifically from the first and fifth chapters.[7] The first quotation refers to the *litterae monochordi*, and Jerome explains in his own words that seven letters are borrowed from the alphabet for musical needs and that they are repeated (*geminatae*) to indicate all the points of division of the monochord.[8] In resuming the quotation from John, which now deals with the historical evolution of the gamut from fifteen to twenty-one *litterae*, Jerome adds that another *clavis* was attached to the others, that is, *ee* la, justifying the new addition with the words John used to account for Guido's insertion of *bb*, *cc*, and *dd* "so that no

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[6]"Ideo de ipso eodemque genere prima et praecipua speculatio fiet, non quidem secundum elementa Graeca a Boetio tradita, de quibus secundum tria genera infra dicetur, sed potius secundum elementa sumpta communiter. Quae quidem elementa nunc voces clavesque vocantur." Cserba, p. 45.

[7]Ibid.

[8]"Sunt autem VII litterae, quas ad opus musicae assumimus sumptae de alphabeto, scilicet: a, b, c, d, e, f, g, quas quidem litteras geminatas *vetustissimi XV in monochordo posuerunt, ab A videlicet inchoantes et in a desinentes*." The words in italics indicate the beginning of a new quotation from John. See Cserba, pp. 45-46.

defect could sneak in any song."[9] The following section of the chapter, about syllables, is again a lengthy quotation from John, who uses the term *syllabae*. The last remarks, however, are by Jerome and provide some important information:

> These mentioned syllables are linked [*conjunguntur*] with the above written letters, certain ones with certain [other] ones, like this: Γ ut, *A* re, *B* mi, *C* fa ut, *D* sol re, *E* la mi, *F* fa ut, *G* sol re ut, *a* la mi re, *b* fa, *b* mi, *c* sol fa ut, *d* la sol re, *e* la mi, *f* fa ut, *g* sol re ut, *a* la mi re, *bb* fa, *bb* mi, *cc* sol fa, *dd* la sol, *ee* la.
>
> Each single junction [*conjunctio*] is placed in a single and definite joint of the hand in different ways by different people. This way of locating them which is drawn in the following picture seems to be better, as later will be shown.[10]

The quoted passage, after listing all the letter-syllable combinations of the gamut, hints at the existence of different usages in the arrangement of these combinations on the joints of the hand. The arrangement chosen by Jerome and described in the picture of the hand in the treatise seems at first to follow the standard disposition of letter-syllable combinations, starting from the thumb and proceeding in a spiral up to the back of the middle finger. However, a closer look reveals that the combination *b* fa *b* mi, which is usually placed in the same joint, here is split, so that the two notes also occupy different

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[9]"Ne videlicet jam ullus in cantu posset subrepere defectu." GS II, p. 235.

[10]"Dictae autem syllabae cum litteris suprascriptis certae cum certis conjunguntur, sic videlicet: Γ ut, A re, B mi, C fa ut, D sol re, E la mi, F fa ut, G sol re ut, a la mi re, b fa, b mi, c sol fa ut, d la sol re, e la mi, f fa ut, g sol re ut, a la mi re, bb fa, bb mi, cc sol fa, dd la sol, ee la. Singulae vero conjunctiones in singulis et in determinatis digitorum articulis in manu diversimode a diversis collocantur. Hic autem modus collocandi ipsas qui scriptus est in sequenti figura, melior esse videtur, ut postea ostendetur." Cserba, p. 47.

locations on the hand: the round *b* of the second octave appears on the last joint of the little finger, while the square *b* is placed on the tip; the round and square *bb*'s of the third octave are placed on two different joints of the ring finger.[11] The resulting arrangement appears to be a little different from the one that is most commonly used, the main difference being the presence of five locations on the ring and little fingers:

	Thumb		Point F.	Middle F.	Ring F.	Little F.
		Tip	*e* la mi	*d* sollare *ee* la	*c* solreut	*b* mi
		1st		*dd* sol la	*cc* sol fa	*b* fa
Tip	Γ ut	2nd	*f* fa ut		*bb* mi	*a* lamire
1st	*A* re	3rd	*g* solreut	*aa* lamire	*bb* fa	*G* solreut
Base	*B* mi		*C* fa ut	*D* sol re	*E* la mi	*F* fa ut

The positioning of *ee* la between *dd* la sol and *d* la sol re rather than supposing another, non-existing joint, suggests that that *clavis* should be visualized on the back of the hand.

At this point of the treatise, Jerome discusses the term *clavis* in detail. He opens the discussion with an explanation of the derivation of the musical term *clavis* from the common term "key," which rests on the parallel between the opening of a door and the "opening," that is, the learning of a science.[12] Jerome seems particularly emphatic about the necessity to learn and be familiar with the *claves*, for whoever neglects them cannot really access the true knowledge of music. The

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[11]Already in the quoted passage about the letter-syllable *conjunctiones*, round b and square b are listed separately.

[12]Cserba, pp. 47-48.

mastery of the *claves* constitutes indeed the first step in the practice of solmization. Yet a *clavis* can also be a key in a keyboard instrument, like the organ; and even in that case, one might add, the thorough knowledge of the arrangement of keys is fundamental for the musician.[13]

We finally come to a definition, which Jerome attributes to "certain people:" "Clavis is the unison congeries of the primary elements of music, which opens the way of proper singing (*modulare*)."[14] The definition stresses that *clavis* is not a synonym for letter, but rather indicates the combination of letters and syllables since it joins, in the same sound [*unisona*], the primary elements of music, namely letters and syllables.

Jerome's discussion proceeds with the attribution of each *clavis* to either a line or a space on the staff. In particular, he specifies that square *b* and round *b*, although two different *claves*, occupy the same space, as *acutae*, and the same line, as *superacutae*. Cserba, commenting upon this passage, appears puzzled by Jerome's specification that both *b claves acutae* are on the same space, but in different places of the space, just as both *bb claves superacutae* are on the same line, but in different places of the line. In fact, he interprets the first specification as if the square and the round *b* had to be written in slightly different positions in the same space, one a little higher than

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[13]This is probably one of the first occurrences of such a meaning for the word *clavis*. See a complete discussion in Reckow, "Clavis," pp. 3-4.

[14]"Clavis est unisona congeries primorum elementorum musicae viam reserans modulandi." Cserba, p. 48.

the other; this, however, would not work for the square and round *b* on the line, since there is no way to notate signs in different positions.[15] My opinion is that Jerome is simply stating that these two *claves*, even though belonging to the same space or to the same line, cannot occur at the same time, but need to be notated perforce in different places on the staff. However, Jerome does not give any specification about how to identify the round *b* on the staff.

The last part of the chapter focuses on the letters' and syllables' number of repetitions in the hand: all the letters are repeated three times, except for *f* and *g*, which only occur twice (unless we count Γ as the first occurrence of *G*), and for *b*, which recurs five times. With this remark about the letter *b* it becomes clear that the term *clavis* and *littera* are really distinct for Jerome, and not equivalent, as Reckow suggests for some instances.[16] Indeed, the lowest *B*, the round and the square *b*'s of the second octave, and the round and square *bb*'s of the third octave are all under one and the same letter; but they do constitute two different *claves*, which occupy two different positions in the hand.

As to syllables, which are called "syllables or voices according to some people" they recur seven times in the hand.[17]

3. Mutation and the concept of property

The next chapter represents the core of Jerome's treatment of hexachordal theory. First of all, he provides the definition of *mutatio*, along with its etymology:

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[15]Cserba, p. XXVIII.

[16]See Reckow, "Clavis," p. 3, referring to Cserba, p. 41.

> Mutation is the transition from one syllable to another under one and the same unison *clavis*. And mutation is named after changing [*mutare*] in that a syllable of one property [*cantus*] is changed, indeed transformed into another [syllable] of another property.[18]

In the previous quotation, the term *cantus* may indicate either a property or a deduction. As a matter of fact, even though Jerome recognizes different locations in the gamut for each of the three properties, the idea of deduction does not appear in his treatise as an independent concept and, consequently, no specific term is used to define the seven locations. The term *cantus* is used mainly to indicate property, although sometimes the broader concept of hexachord is acceptable too.

As to mutation, Jerome continues, there are two ways it can occur: by using the lower (*inferiores*) three syllables (ut, re, mi), if the melody needs to go further up, and by means of the higher (*superiores*) three (fa, sol, la), if the melody needs to descend. Here Jerome is stating a rule which is common in medieval hexachordal theory and which seems to have been superseded by a simplified procedure during the Renaissance.[19] In discussing the two types of mutation, Jerome describes the passage from the first to the second syllable of mutation by using the expression "vim obtinere," which means, according to his

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[17]"Syllabae seu voces secundum quosdam." Cserba, p. 48.

[18]"Mutatio est sub una clavi et eadem unisona transitio vocis in vocem. Et dicitur mutatio a mutando eo quod una vox unius cantus mutatur, immo commutatur in aliam alterius cantus." Cserba, p. 49.

[19]Allaire quotes several sixteenth-century theorists who show that mutations are always done by means of the syllable re for ascending and through the syllable la for descending. See Allaire, *The Theory of Hexachords*, pp. 47ff.

explanation, that the second syllable takes over the melody of the previous syllable:

> If one of the lower syllables takes over (*obtineat vim*) in mutation, the mutation is done ascending, and vice versa. It is said to take over in mutation that syllable which takes over the melody of the one that precedes it.[20]

The underlined expression clearly refers to the operation of switching syllable on the same pitch; but instead of observing the operation from the singer's point of view, Jerome emphasizes the syllables' changing role in the melody. As a first consequence of the definition of mutation Jerome educes that syllables of different *claves*, that is, of different pitches, cannot mutate from one to another; this is the case with *b* fa *b* mi. However, a more extensive demonstration of the impossibility of mutating on *b* fa *b* mi is found later in the chapter, as we will see.[21]

At this point, Jerome provides the list of all *claves* and their mutations, starting from Γ ut, which contains only the syllable ut "per b durum ad usum Γ ut et sui" and has no mutation. The new concepts involved in the expressions quoted above ("per b durum" and "ad usum Gamma ut") are the subject of a first digression in the list, a digression that occurs right before mentioning the first note which involves mutation, i.e., *C* fa ut. As to the "b durum," Jerome specifies that there are three *cantus*, that is, properties, in the hand: *b duralis or durus*, *naturalis*, and *b mollis*. They all consist of six syllables,

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[20]"Si aliqua de notis inferioribus obtineat vim in mutatione, fiet mutatio ascendendo et e converso. Dicitur autem vox illa vim suam obtinere in mutatione, quae sumit melodiam suae praecedentis." Cserba, p. 49 (underlining mine).

[21]See below, p. 181.

ut re mi fa sol la, and have to begin in ut and end in la. Since the syllable "ut" by itself cannot form any property (*cantus*), Jerome continues, it requires the use of the other following syllables, and that is why each syllable in a given note is defined "ad usum" of a particular ut. With these two specifications, the type of *cantus* and the ut in which it starts, Jerome is able to show, for each syllable of a given *clavis*, its property and, indirectly, its deduction, by referring to the specific position of the beginning of the property (ut). Just as an example, let us rephrase Jerome's description of the *C* fa ut *clavis*, where the list was interrupted. It contains two syllables, fa and ut: the first, fa, belongs to the *b durus* property and the first deduction, that is, the one that starts in Γ ut; the second, ut, belongs to the natural property and the second deduction (starting on itself, *C* fa ut).

As Jerome reviews in the next paragraph, each property has a different "principal place to begin" (*principalis locus incipiendi*), that is, can be found at different positions in the gamut: the *b duralis* property can start on Γ ut on the staff line, *G* sol re ut *gravis* in the space, and *g* sol re ut *acuta* on the line; the *naturalis* property on *C* fa ut *gravis* in the space and *c* sol fa ut *acuta* on the line; finally, the *b mollis* property is found on *F* fa ut *gravis*, on the line, and *f* fa ut *acuta* in the space.[22] Once again, even in a more systematic way, the seven deductions of the gamut are listed, although without employing such a concept as deduction. Jerome continues his digression on

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[22]This matter, as well as the explanation about the names of the three proprieties, is discussed in the paragraph that contains lines 10 through 30, from which the quotations are taken. See Cserba, p. 50.

properties providing an explanation for the three properties' names which focuses mainly on the double character of the pitches labeled as square *b* and round *b*. Among the six syllables that form a hexachord, Jerome says, there are two sounds that are opposite in character: mi, which is hard and sharp in its delivery (*dura et aspera in sua pronuntiatione*), and fa, which is performed softly (*molliter pronuntiatur*). Since in the property that starts on Γ, *G* and *g* the syllable mi falls on the natural *b* (*b durus*), therefore the property is called *b duralis*; similarly, the property on *F*, by having its fa on the soft *b*, is called *b mollis*. Thus, Jerome's discussion seems to emphasize the opposite character of mi and fa and their particular roles in the hexachord, and to stress that when either of these particular syllables falls on a pitch that is qualified, respectively, as *durus* (square *b*) or *mollis* (round *b*), that causes the name *durus* or *mollis* for the corresponding property. As to the natural property, while other theorists, like Lambertus, still refer to *b* to explain its name, by saying that the *C* property is natural inasfar as it lacks either hard or soft *b*, Jerome prefers an explanation which stresses the natural hexachord as the one containing the finals, and therefore the places where every song "naturally" returns. This explanation, however clever, is good only for the first occurrence of the *C* property (the second deduction), not for the one on *c* sol fa ut (fifth deduction), which, strictly speaking, does not contain finals. Besides, the emphasis Jerome places on the *affinales*, in the chapter about modes, makes one wonder whether the *G* property should not have a similar modal connotation.

The list of *claves* and their mutations is interrupted by another digression after Jerome has run into the first instance of a *clavis* with three syllables, which bring about six mutations: *G* sol re ut. He speaks of a logical order of mutation, according to which first of all the first syllable mutates into the third, then the first mutates into the second, and finally the second mutates into the third.[23] Jerome offers three explanations for this ordering--the first musical, the second mathematical, and the third philosophical. First, he points out that the three syllables contained in a *clavis*, like G sol re ut, refer to three properties, and claims that the order of succession of these three properties should be maintained in the order of succession of the mutations. Thus, the syllables sol re ut of *G* sol re ut belong to the three properties in the *graves*, i.e., in our terms, to the second, third and fourth deductions. Now, the natural property, on *C*, precedes the *b mollis* on *F*, and the *b mollis* precedes the *b duralis* on *G*; therefore, sol comes before re and ut, while re comes before ut. The positioning of the mutation sol/ut (first/third syllable) as first, in place of sol/re (first/second syllable), might show Jerome's preference for mutations a fifth apart, since in a three-syllable note the first and the third syllable are always at the distance of a fifth.

The second explanation, taken from Boethius, refers to the *harmonica proportio*, a special relationship between three numbers, in

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[23]"And this order of mutation of syllables in all notes that have three syllables, that is, that the first syllable is mutated into the last and viceversa, the first into the middle one and viceversa, the middle into the last and viceversa, seems to be rational." ("Et hic ordo transmutationis vocum in omnibus clavibus tres voces habentibus, quod videlicet prima vox in ultimam et e converso, prima in mediam et e converso, media mutetur in ultimam et e converso, rationabilis esse videtur," Cserba, p. 51.)

which the extreme numbers are to each other as the difference between one extreme and the mean is to the difference of the mean with the other extreme.[24] As in the harmonic proportion we first compare the extremes and then the first number with the second and the second with the third, so in the mutation of syllables, we first go from the first syllable of a certain *clavis* to the last, then from the first to the second, and finally from the second to the last.

The third and last explanation claims that such an order applies to all genera of things, where the more common contains the less common and is contained in the most common, as the genus "animal" contains "man" and is contained in "animated substance." Similarly, the less common harmonic proportions, like the ones between the first and the mean, and between the mean and the third, is contained in the most common proportion of the extremes. However fascinating these explanations may appear, one might wonder what are the musical implications, if there are any. We may suppose that Jerome is rationalizing the preference to mutate from the natural to the hard property, or from the natural to the soft, in case the presence of *b* flat requires the choice of the soft property. The possibility to mutate from hard to soft, or vice versa, is then provided only as a third choice, a last resort. This order of mutation seems to reflect other theorists' objections against going directly from soft to hard

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[24]For instance, the three numbers 6, 4 an 3 are in this harmonic proportion, since 6 is to 3 as the difference between 6 and 4, that is, 2 is to the difference between 4 and 3, that is, 1. In mathematical terms, 6:3=2:1. Cf. A. M. S. Boethius, *Fundamentals of Music*, ed. C. Palisca, trans. C. Bower (New Haven and London: Yale University Press, 1989), p. 65.

hexachords and vice versa: a choice that Jerome does not exclude, but leaves as the last option. However, the preference for mutations involving the natural property does not work entirely for the *claves c* sol fa ut and *d* la sol re, where the passage from soft to hard property precedes the mutation from hard to natural.

In resuming the list of mutations, we should note that our theorist always specifies the direction of mutation, according to his previous statement that the syllables ut re mi are used for ascending, and fa sol la for descending. Consequentely, mutations that involve both types of syllables (descending and ascending) change direction according to the order of syllables: from fa to ut, for instance, the mutation is made to ascend, while from ut to fa it occurs to descend. In the opposite case, if the two syllables of mutation belong to the same type, no matter what the order is, the direction will always be the same: from sol to fa or from fa to sol, the direction of the mutation is always descending. Therefore, the corrections made by Gerbert to re-establish a supposed symmetry of ascent/descent for the syllabic pairs ut/re, re/mi, fa/sol, sol/la (which occur, respectively, in *G* sol re ut, *a* la mi re, *c* sol fa ut, and *d* la sol re) should be disregarded.[25] The

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[25]M. Robert-Tissot, in his edition of the *Ars musica* by Aegidius de Zamora, notes the same corrections applied by Gerbert to *G* sol re ut, *a* la mi re and *d* la sol re, in the list of mutations offered by the Spanish theorist. Robert-Tissot regards these corrections as contrary to the mutation theory. In discussing the syllabic pair re/ut in *G* sol re ut, he says that, starting from this note down, we enter a region of the gamut which does not imply, at the end of the natural hexachord, the mobile note *b*; therefore, it is useless to change from the hard to the soft hexachord (from ut to re) to descend, while the mutation makes sense in the ascending direction. This explanation, which could apply to *G* sol re ut and *a* la mi re, does not account for the other notes of the *acutae* which are in the same situation, that is, *c* sol fa ut, *d* la sol re, *g* sol re ut, and *aa* la mi re (this last one actually belongs to the *superacutae*). In fact, for these notes, there is a *b* flat below, so it would make sense, according to Tissot's reasoning, to move in the

last interesting remark that occurs in the list of mutations is about the lack of mutation in the note *b* fa *b* mi. This time Jerome proceeds with the logic of a syllogism:

1-the premise is the definition of mutation that was given at the beginning of the chapter: "mutation is the transition from one syllable to another under one and the same unison *clavis*."

2-the next statement tends to prove that square *b* and round *b* are two different *claves*: they have different shapes and they derive from different points of division of the monochord. Jerome explains how the two *b*'s happened to have the same letter: *b* flat was added later, to smooth out chant, and therefore, to leave the number of letters to seven (and, we could add, to leave intact the alphabetical order), musicians decided to indicate the two different pitches with two slightly different forms of the same letter *b*. The empirical test that the two *b*'s are found in different positions in the monochord division leaves no further doubt about their diversity.

3-The conclusion is that a mutation in *b* fa *b* mi would be contrary to the definition, and therefore cannot subsist.

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descending direction. The point is, in my opinion, if we mutate from ut to re in order to go down, we can only reach one note, the new ut, which is the lower boundary of the hexachord, and then we are forced to mutate again if we want to go further down. So it does not make sense to change from the hard to the soft property if then we have to change again from the soft to the natural. The same is true for the other pairs of syllables which belong to the same type, either ascending (ut re mi) or descending (fa sol la). In these cases, the mutation can only be seen as a passage from the soft to the hard property, or viceversa, without implying the change of direction as well. See Robert-Tissot, p. 72.

4. Hexachord and modes

Another important section regarding the hexachordal theory is found in chapter twenty-three. Before analyzing this chapter, in which modes are related to hexachords, we need to briefly examine Jerome's modal theory as it unfolds in chapters twenty through twenty-two.

After a long quotation from Johannes of Afflighem - in which the terms *tonus*, *modus*, *tropus*, and *phtongos*, are provided as denominations of "mode" - Jerome specifies that there are three types of *tonus*: the *tonus artificialis*, that is, the whole tone, which corresponds to the 9:8 ratio; the *tonus vulgaris*, that is, the church mode; and the *tonus differentialis*, which is the last note of a psalm *differentia*. Now, as to the definition of *tonus* in the second sense, Jerome gives four statements, in which the word *tropus* also appears as a synonym:

> The mode, in the common sense (*tonus vulgaris*), is the whole body of modulation of any song. For this [reason] also, with a true new song, it is commonly asked in which tone it is: which is also called *tropus*. *Tropus*, according to Johannes de Garlandia, is the rule which classifies every chant by its end. Otherwise, *tropus* is the species of each octave. Otherwise, *tropus* is [the principle] by which we know the beginning, middle, and end of any melody.[26]

Another lengthy quotation, this time from Boethius, follows, after which Jerome discusses the terminology related to the eight modes.[27] In

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[26]"Est autem vulgaris tonus totum modulationis corpus unius cujusque cantus. Unde et vulgariter, cum novus verus cantus, cujus toni sit quaeritur: Qui etiam tropus dicitur. Tropus autem secundum Johannes de Garlandia est regula, quae de omni cantu in fine dejiudicat. Aliter tropus est species uniuscujusque diapason. Aliter adhuc tropus est, per quem cognoscimus principium, medium et finem cujuslibet meli." Cserba, p. 154.

[27]Jerome mentions the Greek names (*dorius*, *phrygius* etc), the correspondence of Greek and Latin numerals (*protus* with *primus*, *deuterus* with *secundus*, etc.), and the ordering of modes into authentic

the course of this treatment, we are reminded that a mode is a rule that judges every chant by the beginning, middle, and end, a definition which quotes Amerus.[28] In the last part of the chapter Jerome states that each modal pair has its *convenientia*, that is, returns to a particular "seat" (*sedes*). The seats of the modes correspond to the four finals *D*, *E*, *F*, and *G*. However, modes are said to have another seat in the *acutae* tetrachord: the first and second modes can thus end on *a* with re, the third and fourth on *a* with mi or on *b* mi, the fifth and the sixth on *c*, and the seventh and eighth modes on *d*. Jerome refers here to affinity (*affinitas*), the particular relationship of similarity between certain notes in the gamut.[29] This similarity, in his statement, includes the notes *G* and *d*, which were excluded by Guido and other theorists, because of the little resemblance in the arrangement of tones and semitones above them. Jerome's inclusion of *G* and *d* among the affinities could be the result of a typically medieval penchant for symmetry, as Pesce believes, rather than indicating a real possibility of transposition. This view seems to be supported by Jerome's other statement, in chapter twenty-one, which excludes the affinity between *G* and *d*: "Every chant is ended in the middle *claves*, that is, *D, E, F, G graves*, and *a b c*

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and plagal, even and odd (*authenti, plagales, pares, impares*), devoting some detailed explanation for the etymology of the word *plaga*. Cf. Cserba, pp. 155ff.

[28]"Mode is a rule which judges any song according to its beginning, middle, and end." ("Tonus quidem regula que de omni cantu in principio, medio, in fine diiudicat." Ruini, p. 77.) Quoted by D. Pesce, *The Affinities and Medieval Transposition*, (Bloomington and Indianapolis: Indiana University Press, 1987), p. 55.

[29]*Affinitas* is "the similarity of melodic movement shared by certain tones in the gamut." Pesce, *The Affinities*, p. 1. In particular, Pesce discusses Jerome's treatment of affinity in chapter 3, pp. 57ff.

acutae."[30] Furthermore, aside from the customary affinities between *D* and *a*, *E* and *b*, and *F* and *c*, Jerome admits a similarity also between *E* and *a* with the syllable mi, that is, *a* followed by *b* flat, thus meaning a transposition of the third and fourth modes a fourth above through *b* flat. As a consequence of the double function of *a*--either, as re, the second final of the first and second modes, or, as mi, the second final of the third and fourth modes--it seems that, at least for the first two modal pairs, a relationship between modal finals and solmization syllables is established. This is shown by two passages, one at the end of chapter twenty and the other near the end of chapter twenty-one:

> Indeed first and second modes are ended in *a* with re, third and fourth in the same place, but with mi, third and fourth again in the high square *b*, fifth and sixth in the high *c*, seventh and eighth similarly in the high *d*.[31]

> Therefore first and second modes are ended in the low *D* or in the high *a* with re. Third and fourth are ended in the low *E* or in the high *a* with mi, or in the square *b* . . . Fifth and sixth modes are ended in the low *F* or in the high *c*, and seventh and eighth are ended only in the low *G*.[32]

As regards these two passages, one should also note the ambiguity about the possibility of a secondary final on *d* for the seventh and eighth modes: in the first statement *d* is listed with the other

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[30]"Omnis igitur cantus ecclesiasticus in mediis clavibus terminatur, hoc est in D E F G gravibus et in a b et c acutis." Cserba, p. 159, quoted by Pesce, p. 177 (footnote 32).

[31]"Nam primus et secundus tonus terminantur in a cum re, tertius et quartus ibidem, sed in mi, item tertius et quartus in b quadro et acuto, quintus et sextus in c acuto, septimus et octavus in d acuto similiter." Cserba, p. 157.

[32]"Igitur primus et secundus tonus terminantur in D gravi vel in a acuto cum re. Tertius et quartus tonus terminantur in E gravi vel in a acuto cum mi, vel in b quadro...Quintus et sextus tonus terminantur in F gravi vel in c acuto, septimus et octavus solum in G gravi terminantur." Cserba, pp. 159-160.

affinales, while in the second only *G* is ackowledged as final. It seems logical to suppose that here Jerome is struggling between his theoretical analysis, which symmetrically includes the affinity between *G* and *d*, and the reality of actual chants in seventh and eighth modes, which, as Cserba notes, seem to supply no evidence for the ending on *d*.[33] Another possibility could be that Jerome is making a distinction between secular and sacred songs: indeed, the whole paragraph in chapter twenty-one, from which the second quotation is taken, begins with the words "Omnis cantus ecclesiasticus," and therefore could intend to discuss the matter of the double finals as it occurs in that particular repertory. Finally, as a third possibility, we could suppose that Jerome was drawing this material from different sources, with different theoretical views.

The bulk of chapter twenty-one regards the ranges of modes, both in their normal position and with the finals on *a*, *b*, *c*, *d*. Since the ranges of modes are very important in terms of their relationship with hexachords, let us see, briefly, how they appear in this chapter:

1-the first mode covers the octave from *D* to *d*, but admits, as *notae licentiales*, the notes *C* as lower limit, and *e*, as upper limit;

2-the second mode goes from *A* to *a* with *b* flat as *licentialis*;

3-the third mode runs from *D* to *f*, both *licentialiter*;

4-the fourth mode spans the octave *b-b* plus the note *c licentialiter*;

5-the fifth mode goes from *E* to *g*, both *licentialiter*;

6-the sixth mode from *C* to *c*, plus the *licentialis d*;

7-the seventh mode from *F* to *aa*, both *licentialiter*;

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[33]Cserba, p. XL.

8-finally the eighth mode covers the octave *D-d*, plus the *licentialis e*. There is a nice symmetry in these modal ranges: all the authentic modes have one note above and below their octave as *licentiales*, while the plagal modes only have the upper note. The modal ranges in the other positions respect the same symmetry.

After stating the ranges, a new statement seems to point to still other possibilities of transposition:

> It should be noted here, that the followers of the afore-mentioned position end the fifth and the sixth modes in *b* [flat], which should seem not a little useful, and similarly, in order to tie Γ ut to modes by such rules, they end the first and second modes in low *C*.[34]

The passage contains some ambiguity; however, it does seem to refer to other modal transpositions aside from the ones on the *affinales*: in the first statement, the fifth and sixth modes are transposed a fourth up, on *b* flat, very likely implying the flattening of *E* as well, since Jerome spells the untransposed fifth mode with *b* flat. The other statement seems to imply for the first and second modes a transposition a tone down, that is, by two fourths, thus implying again the presence of both *b* and *e* flat. Another possible interpretation could be that the first and second modes do not have their final on *C*, but *C* is the lower limit of their range, so they are "ended" in *C* in this other sense, just as Γ "ends" the same modes in the untransposed position. If this interpretation is tenable, then Jerome is maybe referring here to the possibility of transposing the whole

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[34]"Hic notandum, quod dictae positionis sectatores in b acuto, ne parum utile videatur, tonum quintum et sextum finiunt, et iterum ut gama ut talibus regulis astringatur ad tonos, primum tonum et secundum terminant in C gravi." Cserba, p. 159.

gamut from Γ onto *C*, with the consequence of having as finals *G a b* flat and *c*. Jerome's connection of hexachords and modes does not make absolutely improbable that the threefold hexachordal distinction, the property, could be the theoretical justification for three modal positions: the hexachord *C-a* for the finals *D E F G*; the hexachord *G-e* for the *affinales a b c d*; the hexachord *F-d* for the other secundary finals *g a b* flat and *c*. It seems quite likely, though, that Jerome is quoting the opinion of some theorists about another modal ordering, in which modes are numbered starting from *C*, so that Γ could be part of their ranges: in fact, according to Jerome's own description of ranges, with the ending on *D* the second mode can only descend to *A*.[35] This interpretation could refer to the rearrangement of modes as seen in the syllable set Tri pro de nos te ad, where the third mode (tri-tus) is placed on *C*, and counted as the first.

We come finally, in chapter twenty-three, to a full discussion of the relationship between hexachords and modes. First of all, Jerome states the necessity to combine hexachords in order to cover the range of a mode:

> It needs to be noted that often none of the three above-mentioned properties is sufficient to complete the melody of the whole range of each mode. The reason for that is that any hexachord of the three mentioned, namely natural, hard *b* and also soft *b*, as we have said repeatedly, consists of only six notes.[36]

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[35]See chapter twenty-three of the treatise (Cserba, pp. 168-173) and its discussion in the present work, a little below.

[36]"Et principaliter est notandum, quod nullus saepe dictorum trium cantuum est sufficiens ad complendam melodiam totius corporis uniuscujusque toni. Cujus ratio est, quia quilibet cantus dictorum trium cantuum, naturalis scilicet, b duralis et etiam b mollis, ut saepe diximus, solum constat ex VI notis." Cserba, p. 168.

Since an authentic mode can span ten notes, Jerome continues, and a plagal nine, it is evident that one hexachord, or better one property (*cantus*) is not enough, and therefore each mode needs two properties. As to employing the third property as well, if it is true that what can be accomplished with the less, should not be done with the more, we should conclude that if two properties are enough, to use the third one would be superfluous and therefore to be avoided. It should be stressed, at this point, that Jerome is referring to properties, and not to deductions, since he does admit more than two hexachords for certain modes, while the third property is very rarely included, and only *licentialiter*. The list of the hexachords associated with each mode appears particularly interesting:

1-the first mode, which runs from *C* to *e* (both *licentiales*), employs the first natural hexachord (from *C* to *a*) and the second hard one (from *G* to *e*). A brief remark about *b* flat seems to imply that in some cases the hard property may be replaced by the first soft one;[37]

2-the second mode, going from *A* to *b* flat, requires the first hard hexachord and the first natural. The soft *b* property is taken *per accidens* only for the *nota licentialis b* flat;

3-the third mode, from *D* to *f*, is covered by the first natural and the second hard hexachord;

4-the fourth mode, from *B* to *c*, needs the first and the second hard hexachords (on Γ and on *G*), as well as the first natural one;

5-the fifth mode, which goes from *E* to *g*, employs the first and the

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[37]"When, in this mode as well as in others, soft *b* is used, the following reason will declare." ("B mollis autem, quando in hoc tono et in aliis assumitur, sequens ratio declarabit." Cserba, p. 169.)

second natural hexachords (on *C* and *c*) plus the first soft hexachord;
6-the sixth mode, which runs from *C* to *d*, is covered by the first natural and the first soft hexachords;
7-the seventh mode, from *F* to *aa*, is associated with the first and second natural hexachords and the second hard one;
8-finally, the eighth mode, whose range is from *D* to *e*, is covered by the first natural and the second hard hexachords.

In analyzing the preceding list, I would like to point out a few peculiarities:
1-in the second mode a third property is admitted but only *per accidens*, to cover the upper note *b* flat;
2-in the third mode the highest note, the *licentialis f*, is not covered by any hexachord, since Jerome only invokes the first natural (*C-a*) and the second hard one (*G-e*);
3-in the fourth and fifth modes, a whole hexachord is drawn for the lower limits, *B* and *E*, the latter of which is also *licentialis*;
4-in the fifth and sixth modes *b* flat is given as part of the mode.

At first sight, it seems inconsistent that a third hexachord is called for in the case of the lower limits of modes four and five (see under 3), while for the second mode the third hexachord is only admitted *per accidens* (see under 1). In reality, Jerome is struggling with his rule of having only two properties, either natural plus hard or natural plus soft, for each mode. The second mode is obviously resistant to this prescription, and for it Jerome needs to admit a third property *per accidens*, that is, without belying the whole rule, which remains substantial. Now, Jerome's omission of a third hexachord to cover the

licentialis f of the third mode has been interpreted by Berger, as already seen, as a proof that the later *fa-supra-la* rule was already in force.[38] However, as I have already pointed out, Jerome does not show enough consistency on this matter to allow us to take his words, in that particular case, as a definitive proof. As to the last observation, under 4, it seems significant that *b* flat is regarded as regular in the fifth and sixth modes, thus excluding *b* natural.

Similarly the related hexachords are shown for the other modal position, the one with the finals in the tetrachord of the *acutae*. Here, the link *G-d* is established again, as well as the double alternative final for the *E* modes, on a with *b* flat and on natural *b*. Before examining the hexachords involved, let us reconstruct the ranges on the basis of the same modes in their normal (*D, E, F, G*) position:

1-first mode on *a*: from *G, licentialis*, to *bb licentialis*;

2-second mode on *a*: from *E* to *f licentialis*;

3-third mode on *a* mi, with *b* flat: from *G licentialis* to *bb* flat *licentialis*;

4-fourth mode on *a* mi, with *b* flat: from *E* to *ff licentialis*;

5-third mode on *b*: from *a licentialis* to *cc licentialis*;

6-fourth mode on *b*: from *F* to *g licentialis*;

7-fifth mode on *c*: from *b* to *dd*, both *licentiales*;

8-sixth mode on *c*: from *G* to *aa licentialis*

9-seventh mode on *d*: from *c* to *ee* both *licentiales*

10-eighth mode on *d*: from *a* to *bb licentialis*.

Here follows Jerome's list of hexachords for the transposed modes:

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[38]See chapter one in the present study, pp. 32ff.

1-the first mode is covered by the second hard hexachord, the second natural one, and the second soft hexachord *licentialis*;
2-the second mode uses the first and second natural hexachords and the second hard one;
3-the third mode, when ending on *a* mi, is covered by the same hexachords as the first mode; if ending on *b* mi, uses the second and third hard hexachords and the second natural one;
4-the fourth mode, if ending on *a* mi, has the first soft hexachord plus the first and second natural ones; if ending on *b* mi, uses the first and the second natural hexachords and the second hard one;
5-the fifth mode needs the second and third hard hexachords and the second natural one;
6-the sixth mode is covered by the second hard and the second natural hexachords;
7-the seventh mode uses the second and the third hard hexachords, as well as the second natural one;
8-the eighth mode uses the second hard and the second natural hexachords, plus the second soft one *licentialis*.[39]

The following observations can be drawn from the hexachords associated with the modes ending on *affinales*:
1-in the first mode, the presence of the *bb* flat *licentialis* forces Jerome to admit, along with the second hard hexachord and the second natural one, the third property of the second soft hexachord, which is *licentialis* too. Thus, a similar situation occurs here as in the second mode on *D*, the only difference being that here the term *licentialis* is used instead of *per accidens*, likely with the same meaning;

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[39]Cserba, p. 170.

2-in the third mode, with the final on *a* mi, Jerome says that the same properties are used as in the first. As a matter of fact, the second hard hexachord on *G-e* needs to be replaced by the first soft one on *F-d* due to the presence of *b* flat. For the fourth mode this replacement of the hard hexachord with the soft one is explicitly stated;
3-for the seventh mode, whose range goes from *c* to *ee*, Jerome invokes three hexachords, two of the hard type and one of the natural: in reality, two hexachords are enough, since the second natural hexachord and the third hard one cover the whole range;
4-the eighth mode, which goes from *a* to *bb*, has three properties, the second hard hexachord, the second natural one, and the second soft one, but *licentialis*, that is, only for the *nota licentialis bb*, like in the first mode.

Aside from the inconsistencies, the description of the hexachords required for each mode, even in their subsidiary position, is extremely valuable. On the other hand, the very presence of such incongruities, especially in dealing with the last note of the melodic range, demonstrates that we cannot take one instance and derive a rule, since the analogous cases do not confirm this supposed rule.[40]

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[40]I'm referring again to the *fa-supra-la* rule. Here is a review of the cases which contradict Berger's thesis:
1-The second mode, with the final on *D*, has *b* flat as *nota licentialis* and would function with the *fa-supra-la* rule, yet it requires the soft hexachord;
2-The first mode, with the final on *a*, has *bb* flat as *nota licentialis* at the end of its range, yet requires the second soft hexachord;
3-The eighth mode, with the final on *d*, shows again the same situation, having the *nota licentialis bb* flat covered by the second soft hexachord.

5. *Musica falsa*

The question of the alternative of using either b natural or b flat in a mode is the focus of the rest of the chapter. After saying that there are three *melorum genera*, diatonic, chromatic, and enharmonic, Jerome discusses the division of the gamut according to the diatonic genus. This division, based on the unit of two whole tones and a semitone, generates eight tetrachords:

Γ-*C*/ *C-F* *F-b*flat/ *G-c* *c-f*/*f-bb* flat *g-cc*/*bb-ee*

The first two tetrachords are called *gravia*, the next two *acuta*, the fifth and sixth are the *superacuta*, while the last two are *excellentia*. These tetrachords can be read as ut re mi fa, except for the last one, which corresponds to a different species of fourth, that is, mi fa sol la, with the semitone at the beginning.

Even though, according to this analysis of the gamut, b flat appears to be completely legitimate in the diatonic genus, the treatment of the two b's requires some caution. First of all, Jerome warns against the simultaneous use of both of them in a song:

> It is to be noted therefore, that if the said tetrachords, especially those which are immediately adjacent to each other, like the two *acuta*, and also the sixth and seventh, are taking in songs not distinctly, but mixed together, the diatonic order, which we use, is completely removed, and from this the song, departing from its nature and falling into another genus, is subject to the major dissonances, which is reprehensible and to be avoided by all people who have some sense.[41]

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[41]"Hic igitur notandum, quod si dicta tetrachorda, praecipue sibi contigua, puta duo acuta, et etiam sextum et septimum non distincte sed confuse in cantibus sumerentur, ordo utiquediatonici generis tolleretur, quo utimur, ex quo cantus maximis dissonantiis subjaceret a sua natura discedens et in aliud genus incidens, quod quidem reprehensibile est et vitandum omnibus sensum habentibus." Cserba, p. 171.

As a matter of fact, the problem of a double *b* arises not with all adjacent tetrachords, but with the two *acuta* (*F-b* flat and *G-c*), and the sixth and the seventh (*f-bb* flat and *g-cc*). The question is, now, whether Jerome forbids to use the two tetrachords, and therefore *b* flat and *b* natural, in the same song, or if the prohibition refers only to the immediate succession of *b* flat and *b* natural. If the first hypothesis were true, then there would be no need for the mutations from the hard *b* to the soft *b* property and vice versa, which are well admitted by the system quoted by Jerome; moreover, it is only with the succession *b* natural-*b* flat (or vice versa) that the diatonic genus fails, since a major semitone is introduced. On the contrary, *b* flat by itself is part of the diatonic scale, as the previous tetrachordal division shows. This seems to be confirmed in the following discussion about *synemmena* tetrachords. First of all, Jerome provides the following definition:

> *Synemmenon* is the addition of abundance or the reduction of the proportions of the diatonic [genus], according to the established measure of harmony.[42]

The definition is far from being clear. I think one should emphasize, for the conjunction *sive*, the disjunctive character, so that we can interpret the definition as referring to two different things: a *synemmenon* can be regarded <u>either</u> as an addition, something that expands the system by virtue of including new pitches in the gamut, <u>or</u> as a diminution, in the sense of musical proportions, maybe because it introduces new semitones, in place of tones, thus changing the

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[42] "Synemmenon est addictio abundantiae sive diminutio proportionum diatonici per modum harmoniae sumptum." Cserba, p. 172.

proportions from the greater (8:9) to the lesser (243:256). Whatever the meaning of this definition, Jerome clarifies, a few lines later, that the *synemmenon* tetrachord is characterized by the succession of semitone-tone-tone, or better, using the solmization syllables, by the *voces* ut re mi fa. Of this kind of tetrachord, continues Jerome, the ancients recognized only four species, *protosynemmenon, deuterosynemmenon, tritosynemmenon, tetrasynemmenon*, while the "excellent practical musicians" actually find more of them in the monochord division.[43] The list provided by Jerome includes ten such *synemmena*:

1-From Γ to *C*, therefore with *A* and *B* flat

2-From *A* to *D*, with *B* flat

3-From *C* to *F*, with *D* and *E* flat

4-From *D* to *G*, implying the flattening of *E*

5-From *F* to *b* flat, with *G* and *a* flat as well

6-From *G* to *c*, with both *a* and *b* flattened

7-From *c* to *f*, with *d* and *e* flat, like the corresponding tetrachord in the lower octave

8-From *d* to *g*, implying the inflection of *e*

9-From *f* to *bb* flat, with both *g* and *aa* flattened

10-From *g* to *cc*, with *aa* and *bb* flat.

A first observation should regard the absence of the tetrachords *a b* flat *c d* and *aa bb* flat *c d*, which correspond to the second *synemmenon*

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[43]A similar terminology and treatment of *falsa musica* related to *synemmena* is found in the anonymous treatise *Sequitur de synemmenis*, published by Coussemaker at the end of Anonymous IV. See C. Meyer, "Le *De synemmenis* et sa tradition: Contribution à l'étude des mesures de monocorde vers la fin du XIIIe siècle," *Revue de Musicologie* 77 (1990): 83-94.

in the low octave, and which should be repeated just like the other low *synemmena* in the higher registers. It is evident that Jerome does not consider the *b* flat *acuta* and the *bb* flat *excellens* as parts of *synemmena*, because they already belong to the diatonic scale. To mark the difference, Jerome explains the presence of these two *b* flats with the tetrachord ut re mi fa, with the semitone at the end, while the *synemmena* tetrachords, with all the other flats implied, are described as mi fa sol la, with the semitone at the beginning. Thus, we can extrapolate that these other tetrachords are not part of the system, and may be referring to transpositions. Indeed, some musicologists have interpreted these *synemmena* tetrachords as the precedents of the fifteenth-century *coniunctae*.[44] The treatise which discusses *coniunctae* in more detail is the Berkeley Anonymous. Here two definitions of *coniuncta* are given: the first one links *coniuncta* with *musica falsa* (it is the substitution of a tone with a semitone and vice versa), while the second one states that it is the transposition of a hexachord and its property from its customary place to another location. Ellsworth sees the coniuncta as a mutation involving those two syllables that are usually never used together, mi and fa. This particular mutation, though, seems to leave open whether to imply a soft or a hard property: indeed, if the semitone has to occur, for instance, between *C* and *D*, this can happen either as a *C♯-D*, which implies the hard hexachord on *A*,

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[44]For a detailed discussion of coniuncta and its relationships with Jerome's *synemmena* see O. Ellswoth, "The Origin of the Coniuncta," and *The Berkeley Manuscript*; A. Seay, "The Beginnings of the Coniuncta," and "The 15th-c. Coniuncta;" Pesce, *The Affinities*, pp. 80-97.

or as a *C-D* flat, which gives as the result the soft hexachord on *A* flat. Furthermore, all the examples quoted by the Berkeley Anonymous refer to plainchant.

Now, as regards Jerome's *synemmena*, the following observations should be made:

1-his *synemmena* are tetrachords, and seem to stem from the Greek tradition rather than the hexachordal practice;

2-they only involve flats, confirming their origin from the Greek *synemmenon* tetrachord, made up by two whole tones and a semitone (mi fa sol la);

3-they are distinct from the tetrachords accepted in the system, since the latter are made up of two tones and a semitone (ut re mi fa);

4-they are said to be useful in polyphony, but should be avoided in chant.

However, there seems to be a substantial difference between *coniuncta* and *synemmenon*: in the first case the fundamental unit, on which the system is based, is transposed to other locations than those normally allowed by the system, so it is an expansion in the application of a unit which is inside the system; in the case of the *synemmena*, on the contrary, a different unit is introduced, with a different composition, and transposed to different levels to provide certain pitches which are useful in polyphony. It seems to be a sort of "other system" rather than an expansion of the normal one. It should also be noted that, even though *coniuncta* is the Latin translation for *synemmenon*, Jerome gives for the term *synemmenon* an etymology which stresses its being an "outsider:"

> It is called *synemmenon* from "syn," which is "with," and "mene," a defect, as if "with defect." They fail [to observe] the order of the first position of the first tetrachords.[45]

It seems not unlikely, therefore, that the two terms do refer to different views of a similar phenomenon, which arises from the need of having other pitches extraneous to the normal system. However, while in the case of the fifteenth-century *coniuncta*, theorists were working on the expansion of the hexachordal system in order to include these other pitches in a legitimate framework, Jerome's *synemmenon* seems to be an attempt at giving theoretical recognition to notes which are and remain outside the system. Therefore, even if we can suppose some kind of correlation betweeen the two positions, they cannot be seen in a consequential relationship.

6. Summary

Jerome's treatment is mostly concerned with theoretical issues, although some of his remarks are valuable for practical applications. In particular, his picture of the hand seems to propose a slightly different arrangement of *claves* in order to make a more clear distinction between the square *b* and the round *b*.

The treatment of mutation is very thorough, with a complete list of *claves* and mutations involved. As for *claves* with three syllables, which allow six mutations, Jerome is the only theorist to provide musical, mathematical, and philosophical explanations for the order of mutation. In classifying mutations according to their direction, Jerome

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[45]"Dicitur autem synemmenon a syn, quod est con, et mene, defectus, quasi cum defectu. Deficiunt enim ab ordine primae positionis primorum tetrachordorum." Cserba, p. 173.

follows the rule that mutations ending in ut re mi are always ascending, while mutations ending in fa sol la are always descending.

Two original contributions regard the discussion of accidentals, which Jerome defines as *synemmena*, and his view of the relationship between hexachords and modes. In the latter connection, Jerome defines the properties associated with each mode, both in the normal position and in the transposition on the *affinales*. The discussion of *synemmena*, as I have tried to prove, seems to be a theoretical attempt at justifying the use of foreign pitches by referring to Greek theory. These *synemmena* should not be regarded as antecedents of the fourteenth-century *coniunctae*, that is, hexachord transpositions.

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HEXACHORDAL THEORY IN THE LATE THIRTEENTH CENTURY

VOLUME II

By

Mariamichela Russo

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Chapter 6

THE TREATISE *SUMMA MUSICE*

1. Introduction

The treatise *Summa musice* has been recently re-edited, with an Introduction and an English translation, by Christopher Page.[1] The manuscript source is preserved in the Archiv des Benediktinerstiftes in St. Paul in Lavantthal, and is a later fifteenth-century copy of the original treatise. The manuscript source contains several works by Johannes de Muris, along with a few works by other theorists.[2] The fifteenth-century scribe attributed the *Summa* to Johannes de Muris also, although with some doubt, since he added the words "ut credo." These words, erased by a later hand, were dismissed by Martin Gerbert who, in 1794, edited the *Summa musice*, in the third volume of his collection, as a work by Johannes de Muris, an attribution which has not been questioned until the second half of this century. Most recent scholars have regarded the work as anonymous; however, Smits van

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[1] *The* Summa musice: *A Thirteenth-Century Manual for Singers*, ed. and trans. C. Page (Cambridge: Cambridge University Press, 1991). Abbreviated as Page in the present work.

[2] The manuscript contents are listed in *Johannes de Muris notitia artis musicae*, ed. U. Michels, Corpus Scriptorum de Musica 17 (N.p.: American Institute of Musicology, 1972), pp. 31-34. Michels also proposes as a possible date for the manuscript the early fifteenth century. Page agrees with this date, while he does not see enough evidence for Michels's additional hypothesis of a Parisian origin. See Page, p. 1.

Waesberghe believed he found a possible attribution to a certain Johannes, whose *Summa* is mentioned in a treatise in the British Museum.[3] Page believes that the author, or better the authors, are the two writers Perseus and Petrus who are named in the treatise--the former three times, the latter only once:

> A third and final reference to Perseus (2222-3) leaves little doubt that he is the author of the text and also demonstrates that the question of authorship in this treatise is resolved by a surprising answer. In the metrum that accompanies Chapter XXII there is a reference to the way in which some composers of chant put a distinctive stamp upon their compositions. "Sometimes," the text continues (and we must remember that this is a metrical section):
>
> writers of poems also fix a special, gracious mark in books. PERSEUS and PETRUS are taught to observe this, for they adorn their verses with their tokens (*signa*).[4]

In the last sentence, which is a direct quotation from the treatise, Page sees the equivalent of the two authors' signature, for he thinks that the mentioned tokens (*signa*) are the authors' names inserted in the poetry.[5]

Joseph Dyer is not persuaded by Page's attribution, especially because the passages in which Perseus is mentioned are not concerned with music, "a strange state of affairs if he wishes to present himself as an expert in musical matters."[6]

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[3]Smits van Waesberghe, "Some Music Treatises and their Interrelations: A School of Liège c. 1050-1200?," *Musica Disciplina* III (1949): 107. Among the scholars who speak of an anonymous author see H. Besseler, "Johannes de Muris," *Die Musik in Geschichte und Gegenwart* 7: 105-115, and H. Riemann, *History of music theory. Books I and II. Polyphonic Theory to the Sixteenth Century*, trans. R. Haggh (Lincoln: University of Nebraska Press, 1962), p. 389.

[4]Page, p. 4.

[5]Ibid.

[6]J. Dyer, review of *The* Summa Musice: *a Thirteenth-Century Manual for Singer*, by C. Page, in *Early Music History* 12 (Cambridge: Cambridge

As to the provenance of the treatise, Page provides new evidence for Wagner's and Michels's suggestion that the treatise was written in Germany.[7] Page's main argument for such an assumption is the passage, in *Summa musice*, about solmization syllables:

> The French, the English, the Germans, the *Hungarians, the Slavs, the Danes* and others on this side of the Alps use these names for the hexachord degrees. The Italians, however, are said to use other degrees and names; inquire of them if you wish to know what they may be.[8]

The passage seems to be drawn from John of Afflighem's similar statement in his *De musica*, and proves that the treatise was not written in Italy, which is not "on this side of the Alps."[9] It also seems to point to a German provenance, since it lists three populations, italicized in the quotation, who lived at the boundaries of the German empire. Page provides other reasons to place *Summa musice* in the German area, but none of them seems to be conclusive. On the other hand, Smits van Waesberghe has proposed a different provenance for the treatise, locating it in the region around Liège, where other treatises originated too, above all John of Afflighem's *De musica*, to which *Summa musice* is so much indebted.[10] However, the

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University Press, 1992), p. 209-210.

[7]However, Page proves that both Wagner's and Michels's arguments for such a suggestion are not tenable. See Page, p. 5, where both scholars are mentioned.

[8]Ibid., p. 6 (Italics in the quotation). The Latin text to which the quotation refers is found in Page, p. 155, and reads: "Hiis nominibus note, ut dictum est, appellantur a Gallicis, Anglicis, Teutonicis, Hungariis, Slavis et Dacis, et ceteris Cisalpinis. Itali autem alias notas et nomina dicuntur habere, quod qui scire voluerit querat ab ipsis." As we will see, the "alias notas et nomina" is better rendered with "other names of the hexachord degrees."

[9]*Hucbald, Guido, and John*, pp. 103-104.

[10]J. Smits van Waesberghe, "Some Music Treatises," p. 107.

existence of a Liège school as supposed by Smits van Waesberghe has been challenged, rather than confirmed, by more recent scholarship.[11]

As to the date of the treatise, scholars have favored, for a long time since Gerbert's edition, the fourteenth century. Only Riemann proposed an earlier date, on the basis of the content of the treatise, which seems to reflect twelfth-century theory. In his recent edition, Page agrees with Riemann and tries to provide some explanation for the passages in the treatise which seem to go against such an early dating.[12] His conclusion is that the treatise was likely written around 1200.

As to the character of the treatise, Page describes it as a schoolbook, which avoids technicalities (there are neither Greek terms, nor mathematical proportions), yet shows a demanding literary style which makes it also a "sustained exercise in Latin grammar."[13] The term *summa* designated, since the twelfth century, a compendium of the principal points of a discipline.[14] As pointed out by Dyer, it did not necessarily "imply philosophical content: it signified that a topic was to be treated comprehensively."[15] The subject of *Summa musice* is

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[11]See *Hucbald, Guido, and John*, pp. 90-91.

[12]The main problem with dating the treatise in the twelfth century is the reference, in the last chapter of *Summa musice*, to the Franciscan and Dominican orders, which were founded, respectively, in 1209 and 1216. Page believes that the chapter is a leter addition, also because it does not appear in the table of the chapters. See Page, pp. 9ff.

[13]Ibid., p. 14.

[14]See L. de Rijk, *Logica modernorum*, pp. 170-71.

[15]J. Dyer, "Chant Theory and Philosophy in the Late Thirteenth Century," *Cantus Planus: Papers read at the Fourth Meeting. Pecs, Hungary 3-8 September 1980* (Budapest: Hungarian Academy of Sciences, 1992), p. 109.

almost exclusively chant theory, except for the last chapter, which deals with polyphony.[16] The contents of the *Summa musice* are expressed first in prose and then in verses, according to the medieval tradition of using verses, more easily memorizable, for teaching. These verses are often quite hard to interpret and seem to be "designed to extend the pupils' Latinity and to enhance their ability to interpret the figurative language of poetry."[17]

2. Letters and syllables

The specific treatment of the hexachordal theory starts with the discussion of solmization syllables in chapter seven.[18] In the heading of the chapter, solmization syllables are called *voces notularum*, while at the beginning of the second paragraph the terms *syllabae*, *nomina notarum* and *notae* appear. Page translates the word *nota* as hexachord degree, and indeed *voces* or *nomina notarum* or *notularum*, refer to the names chosen to denote these hexachord degrees. The term *syllaba* is used in the sense of a linguistic unit:

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[16]As Page has noted, this last chapter describes five polyphonic techniques through a terminology which, with the only exception of the term *organum*, is quite different from the Notre-Dame terminology: the treatise mentions *diaphonia basilica* (a melody over a drone), *diaphonia organica* (a two-part polyphony using contrary motion), *triphonia basilica* (two voices, mostly moving by fourths over a drone), *triphonia organica* (two independent notes over a melody in sustained notes), *tetraphonia* (doubling of a chant at the fifth, octave and twelfth). Page, pp. 30-32.

[17]Ibid., p. 15.

[18]Ibid., pp. 67-71 in translation, and pp. 154-157 in Latin.

> The first preceptors therefore devised six syllables [*syllabas*], *ut, re, mi, fa, sol* and *la*, which are the names [*nomina*] of the six hexachord degrees [*notarum*] if they are considered without any shifting or mutation.[19]

The distinction between hexachord degrees (*notae*) and the syllables chosen to indicate them (*nomina notarum*) is important in the next passage--which was already quoted in the Introduction to this chapter--where the author refers to a different set of names used by Italians.[20] Here, the "alias notas et nomina" used by Italians could be interpreted as an endyad, meaning "other names of hexachord degrees" (rather than litterally "other degrees and names"), meaning that what Italians used differently were the syllables, not the hexachordal structure.[21] Otherwise, the quoted passage could be interpreted as evidence for a different type of solmization practiced by Italians, perhaps only based on the *g* and *c* hexachords.[22]

As to the term *notae*, sometime a more general rendition as notes, pitches, seems preferable, as in the following quotation, where the author asserts the sufficiency of six syllables to express all pitches:

> If necessity requires that they [the syllables] be shifted, then they signify all pitches [*notae*], both above and below, to infinity, and are [the notes'] names.[23]

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[19]"Adinvenerunt ergo primi doctores musici sex syllabas, *ut, re, mi, fa, sol, la* que sunt nomina sex notarum si considerantur absque alternatione et mutatione ipsarum." Page, p. 154. The translation is slightly different from the one proposed by Page (p. 68) since the verb "alternare," which he translate as "to reorder," is better rendered with "to shift," a translation both supported by Latin usage and better suited to the operation of shifting hexachords in the gamut. Unless otherwise specified, henceforth translations are mine.

[20]See above, p. 202.

[21]An endyad is a rhetorical figure to express one concept by means of two elements.

[22]See chapter one, pp. 56ff, in the present study.

To my knowledge, there are two other theorists, not too distant in time from the author of the *Summa musice*, who use the term *nota* in connection with the hexachordal theory, Amerus and Engelbert. The former makes a clear distinction between the term *vox*, i.e., sound, and the hexachord syllable, called either *vocabulum vocis, signum vocis, nomen vocis* or *nota*; the latter stresses the difference between the twenty-one pitches in the gamut, or *voces*, and the six hexachord syllables, or *notae*, which are so called because they d*enote* all the intervals between pitches.[24] Thus, the two theorists seem more interested in distinguishing between sounds and syllables or hexachord degrees, rather than between hexachord degrees and their names. As we will see, the author of *Summa musice* proves to be particularly attentive to the matter of naming.

The passage quoted above emphasizes the concept that the six hexachord degrees are enough to express all sounds, so that even in an infinite gamut we would still need no more than six entities to describe notes. However, the reasons the author of *Summa musice* proposes to explain the sufficiency of the number six are more abstract than practical. First of all, he recalls the importance of the number six, both as the first perfect number for Arithmeticians and as the number of the days of Creation.[25] The next argument is more

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[23]"Si cogente necessitate alternantur, supra et infra omnes notas usque in infinitum significant et nomina sunt earum." Page, p. 155.

[24]Ruini, p. 22 (Amerus), and GS II, p. 292 (Engelbert).

[25]Page, p. 155. In this regard, it is interesting to recall that the musicologist Walther Wiora set a similar argument to justify the preference for the number seven. See Wiora, "Zum Problem des Ursprungs," p. 266.

specifically musical:

> Necessity also, or convenience, precludes a greater number of hexachord degrees [*notae*] since superfluity in art is regarded as a fault, as may be proven this way. When, beginning with *ut*, one arrives in music up to *la* (which will be discussed later), if there was a further ascent then a semitone would be placed next, of which more later. But a semitone was placed earlier; thus the same thing would be put twice uselessly and would be deemed a fault in art.[26]

One can note, in the quoted passage, the use of the syllogistic reasoning:

1-superfluity is a fault in art;

2-if one moves beyond the last hexachord degree *la*, then another semitone is placed; but since a semitone was already placed earlier, the operation would result in a repetition;

3-therefore superfluity would occur in music and this would be regarded as a fault in art.

In modern times, the German musicologist Handschin inveighed against such a reasoning, criticizing the theorist's claim of superfluity for the semitone yet not for the two whole tones preceding

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[26]"Necessitas etiam sive opportunitas pluralitatem notarum avertit cum superfluitas in arte vicium reputetur, quod sic probatur. Cum ab *ut* in incipiendo perveniatur in musica, de qua postea dicetur, usque *la*, si ulterius ascensus fuerit ponetur semitonium, de quo postea dicetur. Sed smitonium habitum fuerit prius; sic ergo idem poneretur inutiliter et pro vicio reputatur in arte." Page, p. 155. His translation, on pp. 68-69, is some imprecise, especially as regards the rendition of the second sentence in the quoted passage: "When, beginning with *ut*, the melody moves (of which more must be said later) up to *la*, if there were any further ascent then a semitone would be placed next." In Page's rendition, it seems that any melody going beyond the last hexachord degree must have a semitone, as if the later rule *fa-supra-la* was already in force; on the contrary, I think the theorist is here dealing with the correspondence between hexachord and gamut. Since the first hexachord starts on Γ, after its *la* on *E* there is going to be another semitone, and that is why whoever devised the system did not add another hexachord degree.

it.[27] However, even though Handschin is right factually, his objection does not take into account the practical significance of the theorist's remark: from the singer's point of view, it is the semitone that represents the exception and needs to be highlighted; otherwise, all the notes on the staff are to be sung as whole tones. That is why the repetition of whole tones is not significant.

As for the positioning of the semitone in the middle of the hexachord the theorist refers to Aristotle, by first stating the philosopher's postulate that art imitates nature, and then applying this postulate to the case of the semitone:

> In natural phenomena it is this way, that soft organs are placed in the middle and enclosed inside, as the brain in the cranium, the intestines and the respiratory organs in the ribcage, the marrow in the bone, and since the semitone has a soft sound in comparison with the other notes, it is placed in the middle of them, rather than at an extremity.[28]

The explanation is interesting not only for the reference to the aesthetics of imitation, but especially because it seems to imply a specifically musical aesthetics which would require a "soft" interval, such as a semitone, to be enclosed within "hard" intervals of whole tones, in order to be more effective. The remark also rules out the possibility of having two semitones in a row, thus reinforcing the nature of the diatonic genus.

The author of *Summa musice* is also somewhat original in his explanation for the use of the particular syllables ut re mi fa sol la

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[27]Handschin, *Der Toncharakter*, p. 331.

[28]"In naturalibus autem sic est quod membra mollia in medio sunt locata et intra reclusa, ut cerebrum in craneo, intestina et spiritualia in crate costarum, medulla in osse, et cum semitonium mollem habeat sonum respectu aliarum notarum, in medio illarum potius quam in extremitate locatur." Page, p. 155. See also Page's translation on p. 69.

as names for hexachord degrees. Instead of relating the origin of the syllables to the hymn "Ut queant laxis," the theorist reflects on the musical quality of the syllables' vowels and consonants. The observation that all vowels are used and ordered according to their sonorousness seems to support the opinion expressed by several modern musicologists that the syllables predate the composition of the hymn and were expressely chosen for their musical character.[29] However, the passage in the *Summa musice* may also be regarded as an additional justification for the theorist's preference of those particular syllables over other sets, in which case, it would not necessarily represent a proof of the pre-existence of the ut re mi fa sol la syllables, but rather an a-posteriori accreditation. In fact, the reasoning provided by the *Summa musice* theorist is not entirely convincing. As regards the succession of the five vowels in the solmization syllables (u-e-i-a-o), which does not agree with the grammatical sequence (a-e-i-o-u), the theorist finds an alleged musical order from a vowel that has less sound to one that has more sound ("secundum quod minus et plus habent de sono") and from a vowel with a less open sound to a vowel with a more open one, since, he says, first comes the *cantus gravis*, then the *acutus* and last the *peracutus*.[30]

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[29]See the first chapter in the present study, section 4.1. As observed by Smits van Waesberghe, to assume that the ut re mi fa sol la syllables pre-existed as solmization syllables and were then inserted in the text of the "Ut queant" hymn would result in the unlikely conclusion that Guido did not devise solmization with six syllables and that the hexachordal system was already used some centuries before him. See Smits van Waesberghe, *Guidone Aretino*, pp. 96-97.

[30]"Et sic ut a minus aperto sono fiat processus ad magis apertum . . . quod prius est cantus gravis, post acutus, ultimo peracutus." Page, p. 156.

Now, as to the first point, the vowel *a*, regarded as the one with the most sound of all, which should be put at the end of the row, is also placed before the vowel *o*; furthermore, it is not self-evident why the vowel *u* should have less sound than the vowel *e*, the *e* less than *i* and so forth. As to the second point, the gradation from more closed to more open sounds would be better expressed by the succession *u-o-i-e-a*.[31] The justification for the choice of the consonants is not totally tenable either: the theorist says that among the mute consonants the more sonorous are used, that is, *t* and *f*, but *f* is usually not qualified as a mute consonant, and *t* is regarded as less sonorous in comparison with *d*.[32] In the *Metrum de eodem* section, which is usually a metrical rendition of the contents of the relative chapter, the consonants used are said to be either mute or liquid, thus excluding *s* and *f*. The metric section is also interesting for its reference to the staff--the quadruple line ("quadrupla regula") that specifies notes--and especially for the last sentence, which could be an early reference

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[31]In Latin grammar, vowels are classified according to the way of production: from *a*, gradually contracting the palate, we form *e* and *i*; then, from gradually contracting the lips, we form *o* and *u*, hence the series *a-e-i-o-u*, which the theorist says is used in grammar but not in music. His classification could refer then to another distinction of vowels into open (*a*), medial (*e,o*), and closed (*i,u*). However, in this case, the vowel-scale would be, from the most closed to the most open: *u, i, o, e, a*. See J. Allen and J. Greenough, *A Latin Grammar* (Boston: Ginn and Heath, 1877), p. 1. Smits van Waesberghe too emphasizes the fitting arrangement of vowels from *u* to *a* in the first four syllables. Waesberghe, *Guidone Aretino*, p. 98.

[32]Consonants were usually classified by Latin grammarians into two categories: *semivocales* (f, l, m, n, r, s, x) and *mutae* (b, c, d, g, h, k, p, q, t). Of the *semivocales*, l, m, n, and r were also defined *liquidae*. Cf. Priscian, *Institutionum Grammaticarum libri III*, p. 9.

to the concept of property:

> These names [=solmization syllables] require three fundamental species, for when wandering they recognize the limits of three hexachords [*triplicis cantus*].[33]

The passage is far from being completely clear, and lends itself to different interpretations. Christopher Page translates the expression "tres elementales species" as "three species of letters," relating the adjective "elementales" to the letters of the alphabet.[34] In this case, the quoted passage might result in the following interpretation: solmization syllables call for three types of letters (*tres elementales species*), namely capital, small and double, corresponding to the three ranges in the gamut (*triplicis cantus*)--the *gravis*, *acutus* and *superacutus cantus*.[35] However, if we do not relate the adjective "elementales" to alphabetical letters, another interpretation is possible, in which the word "cantus" comes to be used in the not uncommon meaning of hexachord. In this case, the passage would state that solmization syllables require three fundamental types of hexachord (*tres elementales species*), since when they move they run into, and therefore recognize, the limits of three different properties

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[33]"Tres elementales species hec nomina poscunt, nam triplicis cantus gades migrantia noscunt." Page, p. 157. On the meaning of *gades* from the city of Cadix see Page, p. 71.

[34]Such a meaning is recorded in Latin dictionaries especially in the plural form of the noun *elementum*, that is, *elementa*. See F. Calonghi, *Dizionario latino-italiano* (Torino: Rosenberg & Sellier, 1965), s. v. "elementum."

[35]Page's translation reads: "These solmization syllables require three species of letters, for in their wanderings they touch the extremes of a triple melody." (Page, p. 71). Page does not provide any further explanation, but it seems plausible to infer that the three species of letters are the three forms (capital, small, and double) related to the three different ranges. The meaning of the "triple melody" in Page's translation escapes me.

(*triplicis cantus*), namely natural, soft and hard. Yet another consideration needs to be made, which is the presence, at the end of the next chapter of *Summa musice*, of a paragraph related to the three ranges in the gamut (*gravis, acutus, superacutus*) and to the three types of letters (capital, small and double) used. Since the passage uses for each range the term *limes* (=limit), comparable to the term *gades* found in our previously quoted passage, it could well be that the metric passage at the end of chapter seven actually refers to the end of chapter eight.[36] However, since in the next chapter the combinations of letters and syllables, according to the three properties, are listed, it seems also sensible to have an early reference to properties at the end of the previous section.

3. The hand

Chapter eight of *Summa musice* introduces the musical hand, called *palma*, and the combinations of letters and syllables that define the

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[36]The passage reads as follows: "Furthermore, it should be considered that the *claves* pertinent to each are distinguished through three boundaries. The first boundary contains these *claves*: *Γ A B C D E F G*, and these are called *graves* because they make use of a low and thick sound. The second boundary contains *a b c d e f g*, and these are called high because they have the quality of delivering a high sound with respect to the previous ones. The third boundary contains these *claves aa bb cc dd*, and they are called superhigh because they are higher than the high ones." ("Amplius considerandum est quod claves dictis articulis appropriate per tres limites distinguuntur. Primus limes continet has claves Γ A B C D E F G, et hee graves dicuntur quia sono gravi et respectu aliarum obtuso utuntur. Secundus limes etiam continet a b c d e f g, et hee dicuntur acute quia sonum acutum respectu premissarum reddere consueverunt. Limes tertius continet has claves aa bb cc dd, et dicuntur peracute quia sunt acutiores acuti." Page, p. 160). The misplacement could be attributed to the scribe who always copied the metrical part first and then arranged, not always carefully, the prose around it.

notes in the gamut. The discussion opens with a statement about the lines and the spaces on which the six hexachord degrees are placed:

> We have discussed about the six hexachord degrees [*note*] which suffice to the expression of each single chant and why they have to be placed on lines or spaces. But which and how many are the names of the lines and of the interposed spaces has neither been mentioned nor expressed yet.[37]

This passage has puzzled Christopher Page, both for it speaks of lines and spaces without ever employing the concept of "staff," and for its "intrusive reference to names," found in other plainchant treatises as well, which seems to imply "that it is somehow important to keep the name and the thing named distinct in our minds but without ever indicating what that importance is."[38] As to the lack of the concept of staff, there are several references in theoretical descriptions and in graphic representations of the "Guidonian" hand where each step of the gamut is assigned to either a line or a space. Thus, it seems reasonable to infer that our concept of a separate staff where notes are placed according to a certain clef should be replaced by the idea of a complete system of lines and spaces, of which the four-line "staff" (*quadrupla regula*) used to notate a musical piece is just a portion, the *clavis* or *claves* placed at the beginning showing which portion is in use. However, the author of *Summa musice* does draw a terminological distinction between any of the lines, called *lineae*, and the four lines used as staff, which are called *quadrupla regula*. The

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[37]"Dictum est de sex notis que ad significationem cantus uniuscuiusque sufficiunt et quod in lineis et spaciis habent poni. Sed que et quot sint nomina linearum et spaciorum interpositorum nondum vel tactum est vel expressum." Page, p. 157. Page's translation, on p. 72, is once again not completely faithful to the text.

[38]Page p. 72, in note.

term *regula*, as in Salomon's discussion, recalls the idea of "ruling."[39]

The other puzzle is, in my opinion, even less justified. Rather than being intrusive, the reference to names is an integral part of the theorist's exposition. In the previous chapter the theorist has explained how all sounds can be expressed by means of six *note*, or hexachord degrees, which are defined by six special names. Each *nota*, through its name, defines a certain set of musical relationships which may be found around several different actual pitches. Indeed, the theorist specifies, the six possible sets of relationships expressed by the six *note*, could be applied to infinity.[40] Yet, the medieval musical system allows only a fixed number of pitches, which for notational reasons are referred to lines and spaces.[41] Now, it is extremely important to know which are the *names* of these pitches, in other words, which and how many solmization syllables are applicable to each note of the system; and that is exactly what the theorist clarifies in the course of the eighth chapter.

With a reference to the importance of practical tools in learning, the author of *Summa musice* moves from the exposition of "the names of the lines and of the interposed spaces" to the description of

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[39]Cf. GS III, p. 43 and 55, where the term *regula* is used to define the clef, and line, for each mode. See also chapter five, p. 144, in the present study.

[40]See above, p. 205.

[41]The *Summa musice*'s author seems to show a preference for practical references: he does not use an abstract term for the letter-syllable combinations which define the steps of the gamut, but rather calls them "lines and spaces," referring to notation, or *articuli*, that is, joints, with reference to the hand.

the musical hand.[42] The left hand, he states, was chosen by the ancient preceptors to locate the nineteen positions or seats of the hexachord degrees (*sedes notarum*). These preceptors made each position correspond to one of the nineteen joints (*articuli*) of the hand and assigned to each joint its own name; such a name is composed of a letter, which the theorist describes as the name of the *clavis*, and of the name or names of the hexachord degree or degrees (*note vel notularum*) involved.[43] While the term *nota*, as well as its diminutive *notula*, in this context seems to refer consistently to hexachord degree, not as evident is the meaning of the word *clavis*. In his English translation, Page at times leaves the term unchanged, but more often translates it as either "note" or, more often, as "letter."[44] Joseph Dyer, in his review of Page's translation and commentary, criticizes both translations:

> In the usage of the treatise *littera* means one of the seven letter names (A-G); *nota/notula* signifies one of the hexachord degrees symbolised by a solmisation syllable. *Clavis* is the conjunction of letter and hexachord degree, identified by a letter name, but by no means identical with it. The *articulus* is the physical location of the *clavis* combination on the hand . . . . *Clavis* has other meanings as well: the *Summa* uses it sometimes in the sense of "clef."[45]

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[42]The words between quotation marks are drawn from the last passage quoted above.

[43]"Dicti doctores decemnovem sedes notarum locaverunt in ipsis [articulis], unicuique nomen proprium assignantes compositum ex littera, que est nomen clavis, et nomine vel nominibus note vel notularum quam vel quas insinuat ipsa clavis." Page, p. 158.

[44]See Page, p. 73, in note, for his explanation of the word *clavis*.

[45]Dyer, review of *The Summa Musice*, p. 221.

Dyer's interpretation rightly maintains the distinction between *littera* and *clavis* found in this as in other thirteenth-century chant treatises. However, the concept of *clavis* as the combination of letter and hexachord degree, which is supported by other thirteenth-century theorists, does not seem to be the best rendition in the case of the *Summa*. Here *clavis* seems to be better defined as the term for a pitch location which is identified by a letter name. To this *clavis* one or more solmization syllables are ascribed, as the result of a further definition. Thus, rather than the "conjunction of letter and hexachord degree," *clavis* is, in the *Summa musice*, the location where such a conjunction occurs:

> Assigning each one of them [joint of the finger] its own name made by a letter, which is the name of the *clavis*, and the name or names of the hexachord degree or degrees which that *clavis* introduces.[46]

Such an interpretation is confirmed by the other occurrences of the term in the same chapter. For instance, when speaking of the two forms of *b*, the round *b* and the square *b*, the theorist says:

> On the tip or end of the little finger *b* fa *b* mi is placed; *b* and ♮ are the names of the *claves* [=pitches], although taken in different ways, . . . On the first joint of the third finger *bb* fa ♭♭ mi is placed; each one of the two, *bb* and ♭♭, is the name of one *clavis*, but with a difference. Indeed, if it is round *bb*, it will be said fa in that [joint]; yet, if square ♭♭, only mi.[47]

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[46]"Unicuique nomen proprium assignantes compositum ex littera, que est nomen clavis, et nomine vel nominibus note vel notularum quam vel quas insinuat ipsa clavis." Page, p. 158.

[47]"Item in pulpa vel in fronte minimi ponitur situm est b fa b mi; b et ♮ nomina sunt clavium, diversimode tamen accepte, . . . Item in gremio medici ponitur bbfa ♭♭ mi; utrumque bb nomen est clavius unius, sed differenter. Si enim fuerit bb rotundum, in eo dicitur fa; si vero ♭♭ quadratum, mi solum." Page, p. 159. Page's translation of the second sentence is not accurate and can be misleading: "Next, *bbfa mi* is placed on the first joint of the third [fourth?] finger; *bb* ♭♭ is one letter, but there is a distinction. If it is round *bb* then it will

The emphasis on the difference between the two *claves* round *b* and square *b* comes from the fact that they occupy the same joint in the hand. In the metrical version of this chapter, the concern shifts to the same position shared by the two *claves* in the staff:

> However, in *b* fa *b* mi it does not seem to be that way. Since there the double *b* is regarded as a double *clavis*, the soft round *b* requires to be next. If *b* is made square, thus also hard, it requires mi. A line shows every round or square *b*; music owes a space to every soft and hard *b*.[48]

The language is some obscure, especially in the last sentence, which corresponds to the verses 837-838. However, in the context of

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be solmised as *fa*; if it is square ♮♮ then it is just solmised as *mi*." Page, p. 75. The Latin text, however, has "utrumque," which means "each one of two things"; thus, the correct reading seems to be "each one of the two, *bb* and ♮♮, is the name of only one *clavis*, that is, pitch." Furthermore, Page's interpretation fails to show that the theorist's concern is with the presence of two *claves* on the same *articulus*, not with the use of the same letter. In fact, Page does not translate "in eo," in the last sentence, which in my opinion can only refer to the *articulus*.

[48]"In b fa b mi non sic tamen esse videtur/ Namque duplex ibi duplici pro clave tenetur./ Molle rotundum b fa precipit esse futurum/ b si quadratur, poscit mi, sic quoque durum./ Quodque rotundum sit vel quadrum linea prebet/ b molli spacium duro quoque musica debet." Page, p. 161. The passage is far from being clear. Page suggests this different translation: "It is clear that this is not so with bfabmi, for there the duplex b is regarded as a double letter. The soft, round b hastens to be the first; if b is made square it requires mi and it is thus also hard. The line [that is to say the staff] will show whether it be round or square; music must have a space for both the soft b and the hard." However, such a translation shows some imprecisions. First of all, the rendition of *clavis* with letter is unnecessary, since indeed the double *b* is regarded as a double pitch, not necessarily as a double letter, even by other theorists. Furthermore, the form "precipit" in the third verse comes from the verb "praecipio," literally "to get in advance" but, transferred, "to give precepts to, to admonish;" Page's rendition, "hastens," seems rather to come from the verb "praecipito," which indeed means "to hasten, to accelerate." Finally, the last two verses, which are followed by other verses dealing with musical lines and spaces, should be interpreted, in my opinion, as a reference to the fact that both round and square *b* occupy--obviously at different times--the same line or the same space, whether they are *bb* fa *bb* mi *superacutus* (on the line) or *b* fa *b* mi *acutus* (on the space).

what follows, which deals with notation on lines and spaces, it is reasonable to think that our sentence too refers to notational problems.[49] It may be interpreted as stating that both round *b* and square *b*, even though they correspond to two different *claves*, occupy the same space or the same line, depending on whether they belong to the *acutus* or *superacutus* range, that is, to the second or third octave of the gamut. The verses 837-838 also show the use of the poetic device of the *variatio*: the two *b claves* are defined round and square in the first verse, soft and hard in the second; the line is the subject in the first verse, the space is the object in the second verse, where the subject is music. However, notwithstanding the *variatio*, there is a clear formal parallelism between the two verses which points to an analogous parallelism of contents, namely, the alternative position of *b* on either a line or a space.

As to the other meaning of *clavis* as "clef," noted by both Page and Dyer, it should be stressed that our modern concept of clef has a more distinctive character than the word *clavis*, especially in the *Summa*, seems to imply. According to the *Summa*, the hand, which contains the locations of all pitches (*claves*) on its joints (*articuli*), shows also the lines and spaces which correspond to these *claves*. The *Summa* also seems to indicate that, since musical notation only uses a portion of this system of lines and spaces, the *quadrupla*

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[49]The next verses, which at times are even harder to translate, are concerned with notational issues, such as the position of even *articuli* on spaces and of odd ones on lines, the total number of lines and spaces normally used, the necessity for a space to be enclosed between two lines, and so forth. See Page, pp. 161-2.

regula, the identification of these four lines and three spaces rests upon the identification of their *claves*, presumably through the use of their names, the letters, even though the theorist never states that explicitly. In any case, it is the line or the space that is said to change, not the *clavis* as a clef, thus shifting the written music to another portion of the system of ten lines and nine spaces in the hand:

> *Clavis* of any joint is said to be on a line [*in linea*] in that it is the beginning of the line which keeps the name of that joint up to the end or to its [the line's] change [*mutatio*]. Similarly, it is said to be in a space [*in spacio*] the *clavis* which is the sign of the joint and the beginning of the space which takes its name from that joint up to the end of the space or to its perceived change . . . Therefore, they [Salomon, Odo, and Guido] posed at the beginning of the lines the *claves* that identify the joints themselves either up to the end or up to a change of the same [lines]. They posed other distinguishing signs, since they notated through colors: showing *c* sol fa ut through yellow, *a* la mi re through green, *F* fa ut through red.[50]

The term *mutatio*, in the first quotation, is used to denote the change of line or space. The word is never used in the *Summa* with its specific hexachordal meaning; this characteristic could point to a stage of development of the hexachordal theory slightly earlier than other thirteenth-century treatises.

The joints of the hand, the *articuli*, where all *claves* with their *note*, hexachordal degrees, are placed, are specifically defined. The

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[50]"Clavis autem cuiusque articuli dicitur esse in linea eo quod est principium linee que tota usque ad finem vel usque ad sui mutationem nomen illius articuli sibi observat. Similiter et clavis ista dicitur esse in spacio que signum est articuli et principium spacii quod ab ipso articulo denominatur usque ad finem spacii vel usque ad sensibilem mutationem eius . . . . Ponebant igitur in principio linearum claves ipsos articulos designantes vel usque ad finem vel usque ad mutationem ipsarum. Item alia discretiva signa ponebant, notificabant enim per colores: c sol fa ut per citrinum, a la mi re per viridem, F fa ut per rubeum ostendentes." Page, pp. 160 and 170. On the colored lines see also chapter five, in the present study, p. 144.

finger tip is called either *pulpa*, with reference to its fleshy texture (cf. the Italian "polpastrello"), or *frons*, the fore part of the finger, maybe with reference to the analogous position of the forehead (*frons*) at the top of the human figure. The inner parts of a finger are called, starting from the top, *sinus* and *gremium*, namely, breast and lap, maybe still referring to the human body. The lowest location is called *radix*, root. Finally, the use of the hand is praised over other devices as the most accessible to every singer and also because it visually shows all the possible intervals at once.

4. Syllables and intervals

The tenth chapter of *Summa musice* makes clear that the assignement of syllables to the nineteen *claves* of the gamut is done for the purpose of forming intervals. The author recognizes nine intervals: semitone, tone, minor and major third, fourth, fifth, minor and major sixth, and octave, thus adding the octave and minor and major sixth to the list of *consonantiae* found in Guido. All these intervals, except for tone, semitone and octave, are expressed in the treatise through solmization syllables: re-fa for the minor third, ut-mi for the major, ut-fa (re-sol, mi-la) for the fourth, re-la for the fifth, mi-fa (implying a mutation of hexachord) for the minor sixth, ut-la for the major sixth. Tone and semitone are not expressed by syllables here probably because their relationship with the hexachord degrees must have appeared self-evident to the theorist. As to the octave, the reference to letters surely demonstrates the similarity between sounds an octave apart much better than hexachordal syllables. It could also

be a sign that the octave is regarded as a little different from the other intervals, which are much more likely to be found in melodic contextes. In other words, the singer really needs to know only the syllable combinations for small intervals.

The theorist also demonstrates that the singable intervals can be only nine because any other combination of syllables would produce a hateful dissonance:

> Since [music] principally aims at pleasure, anything that seems to be contrary to that, it rejects and condemns. Combinations of hexachord degrees which do not constitute any one of the nine aforementioned intervals must be avoided by a musician, since they do not belong to melody genuinely but rather produce a hateful dissonance and are considered [against] the purpose of music.[51]

In the historical excursus about other ways to represent intervals, the theorist reaffirms the benefit, for the singer, of having the whole network of intervals directly on the hand. He also notes that this network can be transfered from the hand to the page, so that the signs used on the hand can also be used either to write a new melody or to read an existing one:

> However the singer has on the hand the joints [*articuli*] and the differences of sounds [*sonorum differentias*] as signs with which, on the page, he might wish to write a song or to learn and sing a written one.[52]

The previous passage may be interpreted as a remark about the

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[51]"Cum precipue delectationem intendat, quidquid eidem contrariari videtur abicit et condempnit. Iuncture autem notarum que non constituunt aliquod intervallorum quod sint unum ex novem predictis merito a musico debent vitari cum non sint de genuino melodie sed odiosam dissonantiam operantur que proposito musice [contraria] iudicantur." Page, pp. 166-7.

[52]"Sed qui cantat in manu ipsos articulos et sonorum differentias habet pro signis, quibus autem placuerit in pagina vel cantum scribere vel scriptum addiscere vel cantare." Page, p. 169.

double function of the hand in relation to notation: to show the succession of all the *claves* on either lines or spaces, and to identify, by means of syllables, all the types of intervals, which notation does not clarify.

In the same excursus, the author of *Summa musice* mentions three important musicians in the development of music notation: Odo, Guido, and a certain Salomo. The identification of the last theorist with the French Elias Salomon seems unlikely, especially on account of Elias Salomon's limited reputation compared to Odo or Guido.[53] However, the remark about the use of the hand to learn intervals puts the *Summa* in close connection with Elias Salomon's hexachordal theory. The two theorists also share a certain conservativism about the use of *musica falsa*; the author of *Summa musice*, in particular, mentions *musica falsa* in chapter twenty-three, when dealing with the faults that should be avoided in composing a new chant:

> Another fault should be avoided in a new chant in order not to find an irregular interval which is different from the nine mentioned above, as for instance when moving from E la mi to soft b and vice versa. And this fault is comparable to a false proposition which is absolutely avoided by the dialectician. This irregular music is rightly called *musica falsa* and is [to be] very much avoided.[54]

In the quotation above, *musica falsa* is identified with a wrong interval, rather than with the use of notes outside the gamut, mainly

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[53]See Page, pp. 46-47, in note.

[54]"Item aliud vicium in cantu novo debet caveri ne inveniatur in eo intervallum irregulare et aliud a novem superius assignatis, quemadmodum si transitus fieret ab E la mi ad b molle vel e contrario. Et assimilatur hoc vicium propositioni false que a dialectico multum vitatur. Musica irregularis et talis iure musica falsa vocatur et multum vitetur." Page, p. 199 (also see translation on p. 123).

accidentals, indeed to correct a wrong interval.[55]

The terminological reference of *musica falsa* to the *falsa propositio* in dialectics, rather than showing a possible origin for the expression "false music," seems to come from the theorist's wish to find some ground in other disciplines to prove the inadmissibility of *musica falsa*.

5. The hand and the mode

A last remark should be made about the use of the hand with respect to modes. In dealing with the modal classification of songs, and specifically with the problem of assigning a song to either the authentic or plagal mode, the author of the *Summa musice* introduces the concept of *claves discretivae*, that is, distinctive notes. A *clavis discretiva* is a note which operates like a boundary between the authentic and plagal ranges: if a song has more notes above a *clavis discretiva*, it belongs to the authentic range; if, on the contrary, it moves mostly below the *clavis discretiva*, the song belongs to the plagal mode. All these *claves discretivae*, the theorist notes, are found on the little finger of the musical hand and therefore are easily found. The *claves iniciales*, that is, the notes which can be used for the beginning of a mode, as well as the modal ranges, do not seem to have a relationship with the hand or with the hexachordal system.[56]

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[55]Salomon speaks of *falsa musica* for intervals greater than a fifth, when taken by leap. See GS III, p. 20.

[56]Henderson believes that the term *clavis* is here used in contradiction with the previous usage in the eighth chapter of the *Summa*, since there it stands for the name of a line and here for a combination of letter and syllables. (Henderson, "Solmization Syllables," p. 50.) However, I do not think there is really a contradiction if we regard *clavis* as a pitch location, corresponding to

6. Summary

The treatise *Summa musice* has a clear pedagogical intent, yet its most interesting and original contributions lie more in the realm of speculation. In explaining the hexachord, the author refers twice to aesthetic rationales: the precept to avoid superfluity in art determines the number six for syllables; the other precept, according to which art must imitate nature, explains the position of the semitone in the middle of the six-syllable unit.

As to the specifics of hexachordal theory, the treatise does not discuss property and mutation. On the contrary, as in Salomon's treatise, the emphasis lies on the Guidonian hand, which is described in great detail, and on its helpfulness in learning and memorizing intervals. These comprise not only the six melodic intervals recognized by Guido, but also the major and minor sixth, all expressed through solmization syllables.

A particularly interesting and original remark regards the explanation for the names of the hexachord degrees, which is based on phonetic reasons. The allusion to another set of syllables used by Italians could hint at a different, regional solmization practice.

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a particular line or space, expressed by a letter, and also secondarily associated with solmization syllables.

Chapter 7

GARLANDIA'S TREATISES

1. Introduction

The two treatises, attributed to Garlandia, which discuss hexachordal theory are *De plana musica* and *Introductio musice secundum magistrum de Garlandia*. As to the first one, it appears in three sources: the late thirteenth-century manuscript I-Rvat. lat. 5325, before Garlandia's *De mensurabili musica*; the manuscript F-Pn lat. 18514, again from the end of the thirteenth century, after a copy of Boethius; and I-Rvat. Barberini lat. 307, from the fourteenth century, as prefatory material to Vitry's *Ars nova*.[1] None of the three manuscripts carries Garlandia's name, yet Rudolf Rasch and Rebecca Baltzer support such an attribution for the presence, in the second chapter of the treatise, of the positioning and classification of thirteen consonant and dissonant intervals, "for which Garlandia was subsequentely most renowned."[2] According to Reaney, Gilles and Maillard, the opening chapters in the Vatican codex, corresponding to our *De plana musica*, are mainly a compendium of Lambertus and Boethius.[3]

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[1]The three sources are cited by E. Reimer, *Johannes de Garlandia: De mensurabili musica* (Wiesbaden: Franz Steiner Verlag, 1972), pp. 7-8.

[2]R. Baltzer, "Johannes de Garlandia," *The New Grove* 9: 662-64. See also R.A. Rasch, *Johannes de Garlandia. En de ontwikkeling van de voor-Franconische notatie*, Musicological Studies 20 (New York: Institute of Medieval Studies, 1969), pp. 43ff.

The *Introductio musice*, which was edited by Coussemaker, is found, entirely or partly, in at least eight extant manuscripts, dating from the end of the fourteenth to the beginning of the sixteenth century, mostly of Italian provenance.[4] All the manuscripts are incomplete, including the text used by Coussemaker, which lacks two internal pages; the only complete extant manuscript is held by the Biblioteca Nacional of Rio de Janeiro.[5] The locution *secundum magistrum Garlandia*, which appears in the incipit of three of the eight manuscripts, might indicate that the treatise follows Garlandia's teachings, without necessarily implying that this particular theoretical formulation was made by Garlandia himself, in an exemplar now lost.[6] For Baltzer, the reference is likely to be the *De plana musica* itself; on the opposite side, Waite, followed by Stevenson, regards the *Introductio* as an original treatise by Garlandia, as shown by the explicit of both the Washington and the Brazilian manuscripts.[7]

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[3]*Philippi de Vitriaco. Ars nova*, eds. G. Reaney, A. Gilles, and J. Maillard, Corpus Scriptorum de Musica 8 (N.p.: American Institute of Musicology, 1964), p. 5. Abbreviated here as Reaney-Gilles-Maillard.

[4]The *Introductio* is published in CS I, pp. 157-75. The extant sources are: Saint-Dié, Bibliothèque Municipale 42, f. 68r-82r, which was used by Coussemaker for his edition; Roma, Biblioteca Vaticana Capponi lat. 206, f. 39v-44v; Washington ML 171.J6; Barcelona, Biblioteca Catalana 883; Sevilla, Columbina 5-2-25; Rio de Janeiro, Biblioteca Nacional Secao de música, cofre 18; Lucca, Biblioteca Governativa, 359; Perugia, Biblioteca Comunale Augusta 1013. The manuscripts are cited and briefly discussed by F.A. Gallo, "Fra Giovanni di Garlandia e Filippo da Vitry," *Musica Disciplina* 23 (1969): 13-20.

[5]See R. Stevenson, "A Neglected Johannes de Garlandia Manuscript (1486) in South America," *Notes* 24 (1967): 9-17.

[6]The manuscripts bearing Garlandia's name are Saint-Diè, Washington, and Rio de Janeiro. See Gallo, "Fra Giovanni da Garlandia e Filippo da Vitry," pp. 16-17.

[7]See Baltzer, "Johannes de Garlandia," p. 662; W. Waite,

Part of the *Introductio* appears also in Vitry's *Ars contrapunctus*, published In CS III, 23-27.[8]

As to the author himself, the identifications proposed by several scholars, along with the postulation of the existence of two theorists bearing this name, have not found the necessary evidence.[9] In particular, William Waite has proposed the identification with the thirteenth-century grammarian Johannes de Garlandia, but such a hypothesis is rejected by Reimer and Rasch.[10] The most we can say is that Garlandia probably derived his name from the clos de Garlande in Paris, where part of the University was established. However, as has been pointed out, the attribute *magister* does not necessarily indicate that the theorist held a teaching position at the University, since the term *magister* was also used for students with teaching responsibilities.[11]

As to the treatment of hexachordal theory, the treatise *De plana musica* is very close to Lambertus's *Tractatus de musica* and the Lambertean *De plana musica breve compendium*. Aside from the beginning,

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"Johannes de Garlandia, Poet and Musician," *Speculum* 35 (1960), p. 180; Stevenson, "A Neglected Manuscript," p. 13.

[8]The *Optima Introductio in contrapunctum pro rudibus* (CS III, 12-3), attributed to Garlandia by Coussemaker is actually a compendium of Vitry's treatise. On the problems of attribution in relation with Vitry's and Garlandia's treatises see Gallo, "Fra Giovanni da Garlandia e Filippo da Vitry," p. 19.

[9]H. Hüschen, "Johannes de Garlandia," *Die Musik in Geschichte und Gegenwart* 7: 92-95.

[10]Waite, "Johannes de Garlandia," pp. 179ff; Rasch, "*Johannes de Garlandia*, pp. 88ff; Reimer, *Johannes de Garlandia*, pp. 7ff.

[11]See J. Dyer, "Chant theory and Philosophy," p. 107.

the matter is divided in the same way and expressed through almost the same wording. Therefore, only significant departures from Lambertus's doctrine will be discussed in the present chapter. On the contrary, the *Introductio* presents a quite different treatment of the subject, with some interesting new contributions and personal points of view. The more expanded and original character of this treatise makes one think indeed that it should perhaps be regarded as the most faithful survival of Garlandia's teaching.

The term *Introductio* is found in the thirteenth century with two main meanings: as a simple, but comprehensive discussion of the elements of a discipline, or as a "detailed exposition of the preliminary subjects of an art."[12] Some authors also emphasizes the demonstrative character of the "discussion" in the case of the first meaning.[13] Here, the author of the *Introductio* makes clear that the first meaning is intended, by providing a definition for the term *introductio* as the "transmission of certain elements which are necessary for the understanding of a discipline." He also stresses that the *introductio* is a brief, but appropriate demonstration. The definition explains the particular philosophical perspective evident in the treatise.

2. Letters and syllables

While the *Introductio* opens with a series of definitions and classifications of music, *De plana musica* begins with only a brief

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[12]Rijk, *Logica modernorum*, p. 168.

[13]Ibid.

specification of the subject (*musica instrumentalis* of the *genus diatonicum*), in order to move right into practical matters such as the number of intervals, their proportions, and the monochord division.[14] The monochord "operation" in *De plana musica* leads naturally into the discussion of letters, defined as *signa monochordi* and divided into the customary *graves*, *acutae*, and *superacutae*; in the *Introductio*, on the contrary, there is no reference to the monochord, and the subject of letters, called *litterae*, is introduced through an analogy with the seven days of the week:

> It should be noted that as seven are the days in a week, thus seven are the letters in music, that is, *A, B, C, D, E, F, G*. Of these, the first ones are called *graves*, other *acutae*, other *superacutae*.[15]

The following division of letters into *graves*, *acutae*, and *superacutae* is first referred to *sonus* and then to the human voice (*vox*), according to three alleged different ways of sound production--chest, throat and head.[16] After the definition of *vox*, Coussemaker's

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[14]The first section of the *Introductio* (CS I, p. 157-58) presents the definition of the word *introductio*, the definition and etymology of the word *musica* (from *moys*), its division into *musica plana*, *mensurabilis* and *instrumentabilis*, the etymology of the word *ars*, the definition of *cantus*, and finally the explanation of the *subjectum* and *predicatum* in music, which seem to correspond to the melodic and rhythmic arrangement of notes and rests.

For the first chapters in *De plana musica*, which precede the treatment of letters and syllables, see Reaney, Gilles, Maillard, p. 13-16.

[15]"Notandum est quod sicut sunt septem dies in hebdomade, ita sunt septem littere in musica, scilicet A, B, C, D, E, F, G." CS I, p. 158.

[16]The belief that chest, neck, and head are different resonators has been discredited recently, but the reference to these three parts of the body is still regarded as useful in singing as a fictitious way to direct the voice.

edition lacks the following section, which is found in the Washington and Brazilian manuscripts. In this section, Garlandia not only provides the derivation of the word *vox* from the verb *voco*, but also insists that twenty-two letters, now called *claves*, are sufficient to express any kind of music. Here we find again the subtle distinction betweeen *littera*, which refers specifically to the alphabetical character used to indicate one of the seven notes of the octave, and *clavis*, which refers more precisely to any sound admitted by the system, thus including the *b* flat. Indeed, the classification of *claves* into *graves*, *acutae*, and *superacutae*, which is restated at this point of the treatise, includes both *b* flat and *bb* flat.[17] After counting *claves*, the *Introductio* turns to the number of *voces*, by which now solmization syllables are meant; but instead of the expected number six, fourty-two syllables are enumerated, that is, the six syllables multiplied by the seven deductions.[18]

If we compare the preceding treatment of letters and voces with the corresponding section, at the end of chapter six, in *De plana musica*, some significant differences may be pointed out. First of all, in *De plana musica*, letters are called *signa monochordi*, and their division into *graves, acutae,* and *superacutae* does not take into consideration the *b* and *bb* flat, so that the *acutae* are said to be seven, not eight. This seems to support the identification of the term

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[17]Therefore, the first eight notes, from Γ to *G*, belong to *graves*, the next eight, from *a* to *g* with *b* flat, to *acutae*, and the remaining six, from *aa* to *ee*, with the inclusion of *bb* flat, are assigned to the *superacutae*.

[18]I have consulted the ms W. ML 171 .J6. See also Stevenson, "A Neglected Manuscript," p. 16, notes 21 and 22, where some portions of the text are quoted.

clavis with note, or pitch location in the scale, thus counting round *b* and square *b* as two separate entities, although the same *littera*.[19] Secondly, *De plana musica* stresses that the seven signs from Γ to *F* may be used, by replication, infinitely, while the *Introductio* emphasizes that twenty-two *claves* are enough for any kind of music. So, it seems that the two treatises are approaching the same subject from a different point of view: the virtually infinite divisibility of the monochord versus the fixity of the tonal system. A further dissimilarity is found with regard to *voces*: *De plana musica* clearly states the distinction between *vox* (sound) and *nomina vocum* (syllables), while the *Introductio* uses *vox* for both concepts.[20]

As stated above, the arrangement of the following material in *De plana musica* conforms with the Lambertean treatises.[21] The musical system, here as there, is divided into four principal parts: letters and syllables, staff notation, properties, and mutations. However, while in the Lambertean treatises, the statement of the fourfold division of music precedes the specific treatment of each part, in *De plana musica* the first subject, letters and syllables, is introduced by

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[19]Jerome too, when speaking of round *b* and square *b*, specifies that they are the same letter, but not the same *clavis*. See Cserba, p. 48.

[20]It should be noted that in the following discussion about mutation, the author of *De plana musica* simply uses *voces* to mean syllables, thus dropping the distinction. The same inconsistency may be found in Engelbert, who, after stating the difference between sounds (*voces*) and syllables (*notae*), then employs the term *vox* with both meanings. Cf. GS II, p. 292 and p. 323.

[21]By Lambertean treatises I intend the two treatises discussed in chapter two of the present study, the *De musica plana breve compendium*, and Lambertus's *Tractatus de musica*.

the operation of the monochord division, and the statement of the division of music, with the treatment of the remaining three parts, comes afterwards.[22] Another trait common to the three treatises is the representation of the gamut as an abstract diagram, rather than a hand. This gamut, showing all the letter-syllable combinations, is defined as the *compositio gammatis*.

3. *Proprietates* and *deductiones*

The definition of property in *De plana musica* is exactly the same as Lambertus's: "therefore property is nothing else than a difference."[23]

The *Introductio*, however, proposes a different explanation, based on the etymology of the word:

> The reason why they are called proprieties is this: because naturally [*naturaliter*] and properly [*proprie*] they introduce us into the knowledge of truly [*vere*] singing tones and legitimately [*legitime*] making semitones.[24]

In the quoted passage, the word *proprietas* seems better rendered with the English term "propriety," which refers to the quality of being proper, suitable, true to reality, rather than with the term "property," which stands for a peculiar feature, a characteristic quality, or, in medieval terms, a distinguishing "difference." The

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[22]Cf. Lambertus's *Tractatus de musica* , CS I, p. 254; *De musica plana breve compendium*, Gilles, p. 42, and *De plana musica*, Reaney-Gilles-Maillard, pp. 17-18.

[23]"Unde proprietas nil aliud est quam differentia." Reaney-Gilles-Maillard, p. 19.

[24]"Ratio quare proprietates dicuntur, talis est; quia naturaliter proprie in notitiam vere canendi tonos et semitonos agendi legitime nos introducant." CS I, p. 158 (Underlining mine).

meaning of *proprietas* as conforming to truth is also testified to in the philosophical vocabulary of the thirteenth century.[25] The preference for this specific meaning--which again focuses on the "properness" rather than on the "differentiating quality" of properties--and the emphasis placed on the adverbs "truly, properly, naturally and legitimately," seems to suggest, by contrast, a great concern for the unnatural, inappropriate, untrue, and illegitimate use of hexachords, that is, a placement of semitones which does not correspond with the three "proper" ones. Thus the notion of *falsa musica* seems to be implied, even terminologically by opposition, in the "notitiam vere canendi" (knowledge of true singing).

As to the three types of hexachord, that is, the three properties, *De plana musica* mentions *b quadratum*, *natura*, and *b molle* or *rotundum*. The passage is similar to the corresponding one in Lambertus's *Tractatus*; however, there are some significant differences which need a closer examination. Let us compare the two Latin versions:

Lambertus:	*De plana musica*:
Unde b durum dicitur esse tonus ante b quadratum; b molle esse semitonium ante b rotundum.[26]	Unde b quadratum dicitur esse tonus ante b rotundum et b molle dicitur esse semitonium ante b quadratum.[27]

The text in *De plana musica* has been emended by its editors by replacing the *b rotundum* and *b quadratum* (underlined in the previous

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[25]R. J. Deferrari, *A Lexicon of St. Thomas Aquinas Based on the Summa Theologica and Selected Passages of His other Works* (Washington: Catholic University of America Press, 1948), p. 906.

[26]CS I, p. 255. For the translation, see p. 74, in the second chapter of the present work.

[27]Reaney-Gilles-Maillard, p. 19, n. 4 (without the emendation).

citation) with the pitch letter A: "Unde b quadratum dicitur esse tonus ante A, a et aa, et b molle dicitur esse semitonium ante a et aa."[28] The emended excerpt is thus made to coincide with the passage on properties in Jacques de Liège's *Speculum musicae*: "Est autem b durum tonus ante A grave, a acutum et aa superacutum; sed b molle est semitonium ante a acutum et aa superacutum."[29]

Henderson explains the three different versions (Lambertus, *De plana musica*, Jacques) by interpreting the preposition "ante" in different senses: "formerly," "in place of," or "in the presence of." Henderson proposes the following translations:

[Lambertus]	[De plana musica (Vitry)]	[Jacques]
"B durum is the whole tone formerly called b quadratum. B molle is the semitone formerly called b rotundum.	B quadratum, rather than b molle, is the whole tone. B molle, rather than b quadratum, is the semitone.	B durum is the whole tone with low, middle and high a. B molle is the semitone with low, middle and high a.[30]

However ingenious, Henderson's interpretation of the passage in *De plana musica* nevertheless seems unconvincing, both because the usage of "ante" in the sense of "rather than" is very rare, almost neglegible, and in view of the closeness of the treatise to Lambertus's *Tractatus*, a fact that rather suggests a mistaken reading by the copyist. Also the translation of "ante" as "formerly," in Lambertus's text, seems unnecessary. In fact, as Henderson suggests, although without reaching a full conclusion, Lambertus seems to draw a

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[28]Ibid.

[29]Bragard, p. 177.

[30]Henderson, "Solmization Syllables," p. 74. Henderson attributes the chapters on *musica plana* which precede Vitry's treatise to Vitry himself. For the Latin versions see above.

distinction between the names of the properties (*b durum* and *b molle* properties) and the pitch names *b rotundum* and *b quadratum*. Thus, the hard-*b* property is indeed the one which has a tone before ("ante") *b* (square *b*), while the soft-*b* property is the one which has a semitone before *b* (round *b*). This distinction is lost in *De plana musica*'s and Jaques's versions, where the hard property is called either *b quadratum* (*De plana musica*) or both *b durum vel quadratum* (Jacques) and the soft one is called *b molle sive b rotundum* (*De plana musica*). In particular, Jacques seems to have been concerned about what he must have felt as an inconsistency in Lambertus's passage. Therefore, in the attempt to reconcile the double names (*durum-quadratum* and *molle-rotundum*) as referring to both properties and pitches, he corrects Lambertus's text by stating that the *b durum*, namely the pitch *b* natural of the hard property, is a tone in front of, with respect to ("ante") *A*, *a*, and *aa*, while the *b molle* is a semitone in front of *a* and *aa*.[31]

The *Introductio* lists the same three properties, but for the *natura* property also mentions another name, *proprius cantus*, then providing an etymological explanation which seems to express again an original view:

> Nature is named natural or proper hexachord [*cantus*], and vice versa, because it naturally obtains the middle, that is, holds the position between [the properties of] *b quadrum* and *b molle*. And it is called proper hexachord, because it is sung without any alteration of tones and semitones.[32]

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[31]As mentioned above, the same hypercorrectism is found in the emendation of *De plana musica* in Reaney's edition.

[32]"Natura dicitur naturalis cantus vel proprius, et e converso, quia naturaliter medium obtinere, id est, infra b quadrum et b molle, habet stare. Et dicitur proprius cantus, quia sine aliqua variatione

First of all, the argument that the natural hexachord derives its name from naturally holding the middle position is reminiscent of the Aristotelian concept of moral virtue resting in the middle.[33] This reference, as well as the presence of the adjectives *naturalis* and *proprius*, seems to imply the superiority of the natural property as the most regular form of hexachord.[34] The idea appears to be reinforced in the last statement, where the natural property is called "proper" due to its involving no alteration of tones and semitones. Now, diatonically speaking, of the three properties only the soft one produces a variation of tones and semitones with the introduction of *b* flat, so that the hard one too should be regarded as proper. An explanation may be that the "alteration of tones and semitones" in the sentence quoted above actually refers to the possibility for such an alteration to occur on the note *b*. In other words, as long as we sing in the natural property we do not have to worry about whether the *b* is going to be natural or flat, simply because it is not there; on the contrary, as soon as we move outside the natural hexachord we have to deal with the issue of the *b* being either natural or flat, and consequently define whether we are in the soft or hard hexachord. If

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tonorum et semitonorum cantatur." CS I, p. 158.

[33]Cfr. Aristotele. *Etica Nicomachea*, transl. A. Plebe (Bari: Laterza, 1985) II, 6: 1106.

[34]The concept of *naturalis* is so defined by Thomas Aquinas: "It is said to be natural to a [given] thing that which is suitable to the [given] thing according to its substance, and which is inherent to the thing by itself." ("Illud dicitur esse naturale rei, quod convenit ei secundum suam substantiam, et hoc est quod per se inest rei" (Deferrari, *A Lexicon of St. Thomas*, p. 724).

the interpretation is correct, it relates this definition to the one in *De plana musica* (and the Lambertean treatises), which stresses the natural property's quality of having "no difference," that is, no issue of two alternative pitches for the same letter.[35]

Both treatises define the starting points for each of the three properties, in other words, the seven deductions. However, *De plana musica* deals with the subject in an efficiently concise way, by offering the standard rule (*unde regula*) followed by a mnemonic verse (*unde versus*).[36] Both the rule and the verse are found in Lambertus's treatise. The concept of deduction is suggested, in the Lambertean treatises as in *De plana musica*, by the expression *voces sequentes* which conveys the idea of succession and derivation of the syllables from the initial ut.[37]

The *Introductio*, on the other hand, shows the seven deductions on the staff and then states:

> It should be noted that these above-mentioned properties must be arranged according to how pitch locations [*claves*] and syllables [*voces*], in the deductions [*deductionibus*] of the left hand, are suited [*appropriantur*] to each other in the following way.[38]

Once again the notion of properness, present in the root of the verb form *appropriantur*, is brought up in the discussion of deductions.

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[35]"Nature is the name for the property taken without *b*, that is, without difference." ("Natura dicitur cantus sumptus sine b, id est sine differentia." Reaney-Gilles-Maillard, p. 19)

[36]For the meaning of the expression "unde versus" see Pinegar, "Textual and Conceptual Relationships," pp. 23ff.

[37]See chapter two, p. 76, in the present work.

[38]"Notandum est quod iste proprietates predicte debent ordinari, secundum quod, in deductionibus artis manus sinistre, voces et claves appropriantur hoc modo." CS I, p. 159. For the meaning of *deductio* see the discussion below, in this same chapter.

They are arranged according to the regular or *proper* combination of letters and syllables and ascribed to the left hand, as that one, rather than the right hand, is commonly used as the support for the drawing of the gamut. As an example, the first five notes are treated, according to the following formula:

1-definition of the note position either on a line or in a space;
2-denomination of the *clavis* and determination of its syllable(s);
3-assignement of each syllable to one of the three properties;
4-definition of the *ut* to which each syllable may be referred, or, in other words, determination of the deduction to which each syllable belongs.

For instance, the note *C* fa ut is so described: it is on a space (1); *C* is the *clavis*, and fa and ut are its two syllables (2); fa is sung through the hard property (3) and descends to the ut of Γ ut (4), ut through the natural property (3), and descends to itself (4). This way of describing the gamut notes parallels the one found in Jerome's *Tractatus de musica*, where each syllable is referred to the ut of its deduction through the expression "ad usum," that is, for the use of a certain ut.[39] Even more interesting is the different way in which the two theorists justify this reference to the deduction-starting ut. In fact, Jerome explains the expression "for the use of a certain ut" in terms of the inability of any ut to constitute a hexachord by itself, and its consequent need to use the other syllables. In the *Introductio*, on the contrary, the syllable ut not only is not regarded

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[39]See Cserba, pp. 50ff, and pp. 175ff, in the present study.

as in need of other syllables, but is given a special fundamental status:

> And it should be noted [*Et notandum est*] that each of those three properties begins under this syllable *ut* on which it makes its foundation from its end, [and] that [syllable] does [so] in the *graves*, *acutae* and *superacutae*. And since [*Et sic*] each property contains and includes six letters and six syllables, therefore [*ideo*] this syllable [ut] is not led back to the other syllables, that is, re mi fa sol la; but the other syllables, that is, re mi fa sol la, are referred to this first ut, because of dignity. Because we must always start from the most proper, as the Philosopher says [*ut dicit Philosophus*]; because in all natural things, both integral and subjective, a foundation is established to which everything refers; therefore we say that it descends to itself and not to others, but the others to this one, as was said.[40]

The previous passage may be divided, for the purpose of analysis, into two parts. In the first one, the argument of the superiority of the syllable *ut* is carried out in the logical manner of a syllogism. First the general premise is stated with the expression "et notandum est": ut is the foundation, the starting point, of the three properties in all three ranges of the gamut. Then, the minor premise is introduced through the adverb "et sic[ut]": any property contains six syllables. Finally, the conclusion is reached through the locution "et ideo": the syllable ut cannot be lead back to the other syllables, but these other syllables, re mi fa sol la, are referred to this ut which

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[40]"Et notandum quod unaqueque illarum trium proprietatum incipiat sub hac voce, ut ubi suum fundamentum facit a terminatione sua, facit illa in gravibus et in acutis et in superacutis. Et sic quilibet proprietas sex litteras et sex voces continet et comprehendit; et ideo ista vox non ad alias voces, scilicet *re mi fa sol la*, reducitur; sed alie voces, scilicet *re mi fa sol la*, ad ipsam primam, scilicet *ut*, causa dignitatis, referuntur; quia a digniori inchoandum est perpetuo, ut dicit Philosophus, quia in omnibus rebus naturalibus, tam integralibus quam etiam subjectivis, constituitur fundamentum ad quod omnia referuntur, et propter hoc dicimus, quia ad semetipsum descendit et non ad alias; sed alie ad ipsum, sicut dictum est." CS I, p. 159.

is first, because of its dignity. The introduction in the last sentence of the complement "causa dignitatis" is the starting point for the second part of the demonstration, which is now based on authority, as the words "ut dicit Philosophus" indicate. The following argument comprises again three statements. The first sentence asserts, by referring to Aristotle's authority, that we must always begin from what is more suitable: "It is necessary to begin from the most suitable."[41] The next sentence affirms the absolute necessity to establish a "first," a foundation, for any natural thing, both as a whole and as a single individual. Finally, this foundation, the thing that is most suitable, cannot go beyond itself, further back, but all the others are derived from it. In other words, once the beginning, the principle has been established, and this is a necessary operation in knowledge, all the others can be referred to it, but it cannot refer to other than itself.

The previous passage certainly shows the desire to rationalize and justify musical matters on the ground of the predominant Aristotelian philosophy. However, the necessity of demonstrating the prominence of the syllable ut seems to be so compelling for the author of the *Introductio* that it is reasonable to assume the reference to a specific musical issue. I do not think, to quote Henderson's hypothesis, that the passage above may be "considered evidence of a tonic function for ut"; nor is it clear to me how it indicates "that the singer should remain within a given property until he has a definite reason to mutate into another one."[42] In any case, there

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[41]"A digniori inchoandum est perpetuo." CS I, p. 159.

[42]Henderson, "Solmization Syllables," p. 82.

seems to have been some sort of debate in the late thirteenth and early fourteenth century about the importance of the syllable ut. We already saw that for Salomon solmization could be just as efficient through five syllables instead of six, indeed by eliminating the redundant ut, which does not seem to have a character of itself.[43] Marchettus of Padua, on a different ground, strives to prove that re is really the first sound and the first syllable, not only because it is found on the first letter of the monochord division, namely the *proslambanomenos A*, but especially because no melody, which is motion, can arise from one single note, but requires at least a second sound. So it is from this second sound, or syllable, that music starts to come into being.[44] The emphasis on the syllable re shown by these two theorists could also be related to the necessity of having the hexachord begin on the same syllable as the first mode, although neither of them seems to explicitly establish such a connection. Another possible explanation might have to do with mutation: since in the later development of the

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[43]See chapter four, pp. 136ff, in the present work. As we have seen, in describing the nature of each syllable, the only remark Salomon provides for the syllable ut is this ambiguous recommendation: "you, friar minor, should measure yourself with the ut and the ut with yourself."

[44]See J. Herlinger, *The Lucidarium of Marchetto of Padua* (Chicago-London: The University of Chicago Press, 1985), pp. 332ff. The reference to the second syllable as the real starting point could also be regarded as analogous to numbers: as 1 is not a number, although a prerequisite for counting numbers, so the syllable ut is not music, but the prerequisite for realizing music. Grocheio too, in his treatise, takes as foundation or principle the interval, rather than the single sound. See E. Fladt, *Die Musikauffassung des Johannes de Grocheo im Kontext der hochmittelalterlichen Aristoteles-Rezeption*, Berliner Musikwissenschaftliche Arbeiten Band 26 (Munich-Salzburg: Musikverlag Emil Katzbichler, 1987), pp. 33ff.

hexachordal theory the syllable re came to be used almost exclusively for mutations in ascending direction, perhaps already in the thirteenth and fourteenth centuries there was a tendency to use the second syllable and dismiss the first one.[45] In any case, the author of the *Introductio* clearly takes position in favor of the primary position of the syllable ut, as the foundation for the other five.

The following paragraph in the *Introductio* deals with the *principales signa*, namely, clefs.[46] Two principal signs are recognized, *F grave* and *c acutum*. The sign or clef of *g acutum* is also aknowledged in some cases, in order to reach the highest notes, but this seems to be confined to polyphonic music.[47] *Litterae* and *deductiones* are then said to be placed alternately on lines and spaces. Now, if the term *littera* does not need any further explanation, the word *deductio* raises some problems of interpretation. The following definition of *deductio* appears in the *Introductio*, right after the statement about the positioning of *litterae et deductiones* on either

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[45]For this later tendency to use only the syllable re for ascending and la for descending see the evidence provided by Allaire, *The Theory of Hexachords*, pp. 50ff.

[46]Cf. Amerus's and Odington's *claves principales*, respectively in Ruini, p. 27, and Hammond, pp. 98-99.

[47]The matter is not completely clear. The theorist says that *g acutum* is used some times "in motets or in mensural, that is, organal song," but later he seems to include chant as well. He specifies that the use of *g* occurs out of necessity because there are not enough lines, four in the staff used for chant, which amounts to seven notes, and five in the staff used for polyphonic music, which amount to nine notes. Now, if one uses the *c acutum* clef, the impossibility to notate high notes regards the three pitches *cc*, *dd*, and *ee*, while in a five-line staff only the *ee* falls outside the highest line. The remark about polyphonic music for the use of the *g vacutum* clefs should be probably interpreted as evidence of a wider use of the higher range in mensural music than in chant. See CS I, pp. 159-60.

lines or spaces:

> If it is asked what a deduction is and after what it is named, this should be noted: a deduction is the complete expression [*dictio*], namely Γ ut, *A* re, *B* mi, *C* fa ut, *D* sol re, *E* la mi; and so forth for all the other coming [deductions] throughout the whole left hand, and it is named after the verb *deduco, deducis*, because each one and the next [deduction or syllable?] is derived as a consequence of the sign [letter or clef?] which is placed at the beginning of the expression.[48]

The passage quoted above lends itself to two alternative interpretations, according to the meaning assigned to the word *deductio*. If we assume that *deductio* means deduction, namely any of the seven hexachords in the gamut, then the "complete expression" *(totalis dictio)* should be intended as the spelling out of both the six letters and syllables of a hexachord at a particular position. The reference to the six notes Γ ut, *A* re, *B* mi, *C* fa ut, *D* sol re, *E* la mi seems to support such an interpretation. As to the second part of the definition, in order to maintain the identification of *deductio* with deduction, it is more convenient to interpret the term *signum* as clef, with the following resulting reading: "and it is named after the verb *deduco, deducis* because each and the other (deduction) is derived as a consequence of the clef which is placed at the beginning of the expression." To suppose a connection between clefs and deductions is not something inconceivable, especially because the passage uses the more general term *signum*, rather than the specific *signum principale*. In other words, the clefs taken into consideration could well be not

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[48]"Si queratur quid sit deductio et unde dicatur, notandum sic: deductio est totalis dictio, scilicet gamma ut, A re, B mi, C fa ut, D sol re, E la mi; et sic de aliis supervenientibus per totam sinistram manum, et dicitur ab hoc verbo deduco, deducis propter signum quod in principio dictionis apponitur." CS I, p. 160.

only the principal ones, *F*, *c*, and sometime *g*, but also the other two letters which appear in the musical examples with a similar function, namely round and square *b*. A quick examination of the musical examples seems also to support the previous interpretation, in as much as clefs are consistently used with particular deductions: *F* on a high line for the first hard and natural hexachords; *F* on a low line, with round or square *b*, for the first soft and second hard hexachords; *c* for the second natural and third hard hexachords; *c* with round *b* for the second soft hexachord.[49] Finally, the earlier statement that letters and deductions are alternately placed on lines and spaces is not in contradiction with the previous interpretation because the ut's of each deduction, and consequently the other five syllables as well, do occur alternately on line or space (Γ ut line, *C* ut space, *F* ut line, *G* ut space, *c* ut line, *f* ut space, *g* ut line).

If the interpretation of *deductio* as deduction is justified on the ground of the later usage of the term, another interpretation seems not only possible, but also, in some respects, better suited to this as to the other occurrences of the word in the *Introductio* treatise. In the context of the definition just discussed, in fact, the term *deductio* could simply refer to the combination of letter and syllable(s) to define a pitch: in this case, *littera* or *clavis* denotes the letter part of the *deductio*, *vox (voces)* the syllable part. The new reading of the previously quoted definition would then assert that a *deductio* is the complete name of a note, like in Γ ut, A re, B mi, C fa ut, D sol re, or E la mi. This reading already seems to fit better

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[49]CS I, pp. 158-9.

this part of the definition, since, if deduction was really meant, the *totalis dictio* should have been Γ ut, *A* re, *B* mi, *C* fa (not *C* fa ut), *D* sol (not sol re), *E* la (not la mi). It also agrees with Grocheio's definition of *dictio*.[50]

In the second part of the definition, the interpretation of *deductio* as letter-syllable combination gives a better reading for the reference to *signum*, but leaves some doubts about the expression "one and the other following." Here follows the new version: *deductio* is named after the verb *deduco* because one and the other following (syllable) are derived as a consequence of the sign [letter] which is placed at the beginning of the expression. The reason for the use of *signum* instead of letter in this case becomes evident in the following treatment of mutation, where the distinction between sign and letter acquires particular significance.[51]

4. Mutation

The treatment of mutation in *De plana musica* does not differ substantially from the one found in the Lambertean treatises. The definition of mutation follows that of *De plana musica breve compendium* by using the word "dimissio" in place of "divisio."[52] The *Introductio*, on the contrary, prefers "divisio," and offers the following definition:

> Mutation, according to Guido, [who was] very learned in music, is defined in this way: mutation is the separation

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[50]Rohloff, p. 48.

[51]See the discussion in the following section.

[52]See chapter two, p. 77, in the present work.

> [*divisio*] of one voice [*vox*] because of another one, under the same sign, the same voice [*vox*] and the same sound. Mutation is named after this verb: muto, mutas, because we change one property or syllable [*vox*] under the same sound into the next one.[53]

The quoted passage contains two definitions. The first one is clearly cast on the definition of mutation provided (and likely devised) by Lambertus, although in the *Introductio* it is attributed to Guido to imprint on it a mark of authority. The second definition, which is based on an etymological rationale rather than authority, seems to offer a new perspective, and, at least from the modern reader's point of view, is also more immediately understandable. Now, since the first definition deviates some from the original Lambertean one, while also raising some terminological difficulties, a closer examination is needed, which will take into account both the congruence with Lambertus's version and the relationship with the second definition. Let us compare the two Latin versions:

Lambertus	*Introductio*
Mutatio vero, ut hic sumitur, nihil aliud est quam divisio vocis unius *prope* aliam sub eodem signo et in eodem sono.[54]	Mutatio autem, secundum Guidonem sapientissimum musice, diffinitum sic: Mutatio est divisio unius vocis *propter* aliam sub eodem signo, eadem voce et etiam sono.[55]

Aside from the substitution of the preposition *prope* with *propter*, the most peculiar element in the *Introductio*'s version is the

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[53]"Mutatio autem, secundum Guidonem sapientissimum musice, diffinitum est: Mutatio est divisio unius vocis propter aliam sub eodem signo, eadem voce et etiam sono. Dicitur autem mutatio ab hoc verbo: muto, mutas, quoniam unam proprietatem vel vocem sub eodem sono in aliam subsequentem mutamus." CS I, p. 160.

[54]CS I, p. 256. For the translation see chapter two, p. 77, in the present study.

[55]CS I, p. 160. For the English translations, see above.

addition of the word *vox* in the Lambertean sentence "under the same sign and sound" (*sub eodem signo et in eodem sono*). Now, if the word *vox* is intended to mean solmization syllable as in the definition by Lambertus, the passage in the *Introductio* would lead to the absurd statement that a mutation is the separation of one solmization syllable from another under the same sign, sound, and the same syllable! However, maybe another interpretation is possible. First of all, it should be noticed that the *Introductio* uses the term *vox* with both the general meaning of vocal sound ("voice is exhaled air vibrated in the mouth") and the specific meaning of solmization syllable ("sol re are two syllables").[56] Therefore, at least the second occurrence of the word *vox* in the version provided by the *Introductio* should be intended in the general sense of a sound, susceptible of different determinations, that is, different syllables. But maybe even the first part of the definition refers the term *vox* to the concept of sound, rather than syllable. This could explain the substitution of the Lambertean *prope* with *propter*, resulting in the following possible translation: a mutation is the splitting of a sound (into its separate, different syllables) because of another intervening sound (which forces us to move into another hexachord), and this splitting occurs inside the same sound and letter. If this interpretation is accepted, then the term *vox* appears to refer to the broad meaning of sound in the first, authoritative definition attributed to Guido, and to the

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[56]"Vox est aer remissus in ore verberatus." CS I, p. 158. "Sol re sunt duae voces." CS I, p. 159. The first definition comes from Latin Grammarians, through Isidore. See *Isidori Hispalensis Episcopi. Etymologiarum sive originum libri XX*, ed. W.M. Lindsay (Oxford: Clarendon Press, 1911), III, 20. See also Duchez, "Description grammaticale et description arithmetique," p. 570.

specific meaning of syllable in the second, etymological definition. Another possible explanation is that the word *vox* does indicate a solmization syllable in the first part of the sentence, and then the more general concept of note in the second part. Therefore, a mutation would be defined as the separation of one solmization syllable because of another one (taking over), under the same letter, note, and sound. As our last resource, we can assume that the author or the copyist of the *Introductio* simply made a mistake.[57]

As to the relationship between the first (Lambertean) and the second definition in the *Introductio*, the latter seems to focus more on the interpretation of *mutatio* as the act of changing performed by a subject, by asserting that mutation is so called because we change syllables. The Lambertean definition, instead, seems to imply that mutation is not the act of a subject, or at least is not defined that way, but is rather the realization of the potentialities of the thing itself.[58] In other words, the emphasis is not on the practice of solmization, that is, of switching names on a given note, but instead on the changes of function in a sound, as expressed by mutation of syllables. That is why mutation is not defined by Lambertus as a syllables switch made by a subject (the singer), but rather as a separation, or withdrawing (*dimissio*) of one determination (syllable)

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[57]Until a critical edition is available, for both Lambertus and the *Introductio*, it is impossible to determine whether the addition of the word *vox* was intentional or a mistake.

[58]According to scholasticism, "to say that a being already constituted in its substantial determinations is changing, means that it is *actually realizing its potentialities*." M. De Wulf, *Philosophy and Civilization in the Middle Ages* (New York: Dover Publications Inc., 1953), p. 202.

because another one comes into realization.[59]

As to the actual doctrine of mutation, both the *Introductio* and the Garlandean *De plana musica* state the common notion that mutations ending on the syllables ut, re, or mi are used for ascending, while those ending on fa, sol, and la are for descending. However, while *De plana musica* gives the statement as an "Unde regula," for the author of the *Introductio* the sentence is introduced as an observation by "Nota quod." The latter also explicitly gives the instruction to avoid mutations as much as possible, and to use them only *causa necessitatis*, which could be interpreted as an instruction to mutate on the last possible syllable. A list of all the possible mutations occurring in the gamut is provided, comparable to the one in Jerome's treatise.[60] The first three notes, Γ *A B*, are declared void of any mutation because of their having only one syllable. The other notes of the gamut are amply discussed and illustrated with musical examples. The formula used to describe the mutations in each note includes the number of mutations (1); the type of each mutation, either ascending or descending (2); the property to which each mutation leads (3), and the limits for each mutation to occur. For instance, for the first note, *C* fa ut, it is said:

> In *C* fa ut there are two mutations, namely fa and ut; fa/ut ascending into the natural property by first leap to *F* and by last to *a*. Ut/fa descending from the natural to the *b quadrum* property, by first step to *B* and by last to *G* [Γ].[61]

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[59]As noted, the word dimissio is used in *De musica plana breve compendium* (Gilles, p. 45) and in the Garlandian *De musica plana* (Reaney-Gilles-Maillard, p. 19).

[60]See chapter five, pp. 175ff, in the present work.

[61]In C fa ut, sunt due mutationes, scilicet fa et ut; fa ut

The following items of information can be drawn:

1-there are two mutations, fa/ut and ut/fa;

2-the mutation fa/ut is for ascending, the inverse ut/fa for descending;

3-the mutation fa/ut moves to the natural property, the inverse ut/fa goes to the *b quadrum*;

4-the mutation fa/ut occurs on a leap from *C* to *F*, at least, or to *a*, at most. The mutation fa/ut occurs by step from *C* to *B* or to *G* at most (by either step or leap).

The point listed under 4 reinforces the above-stated rule that mutation should occur on the last possible note; in fact, the mutation from fa to ut on *C* should be made only if followed by a leap to *F*, that is, to the first note that does not belong to the starting property. On the other hand, the same mutation can be made only if the following note does not exceed the limits of the next property, namely, if it does not go beyond the note *a* la.

The musical examples provided for each mutation also show the melodic movements involved; or, to use the terminology of the *Introductio*, the first and the last step or leap ("de primo gradu" or "saltu," and "de ultimo gradu" or "saltu"). I have been able to trace only one exception, for the note *D* sol re: here the treatise states that the mutation from sol to re can be made by first leap to *F*, the first note outside the hard property, and by last leap to *G*, which is

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ascendendo in natura de primo saltu ad F, et D [de] ultimo ad A. Ut fa descendendo de natura in b quadro de primo gradu in b quadro, et de ultimo in G." CS I, p. 160.

not the last note of the natural property. It could be assumed that this is a mistake, as there occur some other imprecisions throughout the list of mutations, except that *G* occurs as upper limit also in the musical example.[62] By comparison with the other musical examples, I do not believe there is a compelling reason for such a deviation.

As to the other mutations, it should be noted that they always follow the aforementioned criterion according to which mutations ending on ut re mi are ascending and those ending on fa sol la are descending. As a consequence, mutations between hard and soft properties are in the same direction as their inverse: thus the mutations ut/re and re/ut on the pitch letter *G* are both ascending mutations. Since mutations from hard to soft property and vice versa occur not because of exceeding the limits of a deduction but as a result of using the flat or the natural *b*, the hexachordal limits for mutating are not specified.[63]

The last observation about the list of mutations concerns the impossibility of mutating on the note *b* fa *b* mi, which receives a careful demonstration. This demonstration is carried out by two syllogisms. The first one undergoes the following steps:

1-As stated (*sicut dictum est superius*) in the definition, mutation cannot be unless under only one sign;

2-*b* fa *b* mi are two different signs, namely soft or round *b*, and hard

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[62]These imprecisions include inconsistent use of upper/lower cases for pitch-letters, confusion between the round and the square forms of the pitch-letter *b*, and easily identifiable mistaken words. However, only a critical edition of all the sources will be able to establish the degree of unreliability of Coussemaker's edition.

[63]In other words, both expressions "by first leap/step" (*de primo saltu/gradu*) and "by last leap/step" (*de ultimo saltu/gradu*) are avoided because not pertinent.

or square *b*;

3-Therefore (*ergo*), in *b* fa *b* mi there cannot be a mutation.

The second syllogism is built in a similar way:

1-as stated above (*sicut supra dictum est*) mutation cannot occur unless under the same sound and voice;

2-those two voices *b* fa *b* mi are not under the same sound nor voice;

3-therefore (*ergo*) in *b* fa *b* mi there cannot be mutation.

Several considerations need to be made regarding the previous demonstration. As to the first syllogism, the matter of two signs refers not only to the earlier definition of mutation, but also to that of *deductio*. In fact, right after the *ergo*, that is, the conclusion, this brief explanation follows:

> Because the single sign placed at the beginning of the letter-syllable combination [*deductio*] indicates the equality [of sound] of the syllables of its own combination, in which it is placed, and as a consequence of the inequality [of sound] of those two syllables, two signs are given to *b* mi *b* fa *acutum* and *superacutum*.[64]

In the context of the above quotation it would be hard to still maintain the meaning of deduction for the word *deductio*. The previous explanation also helps clarify the meaning of the word *vox*, as both sound and syllable. It is because of this extended meaning that our theorist can affirm the equality of syllables in the same pitch: the syllables in any letter-syllable combination are obviously different in terms of their name, but they are equal in that they represent the same sound. Now, even the definition of mutation which troubled us at the

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[64]"Quia signum solum in principio dictionis appositum equalitatem vocum proprie deductionis, in qua apponitur, significat, et propter inequalitatem illarum duarum vocum de b fa b mi acuto et superacuto appropriantur duo signa." CS I, p. 161.

beginning of this section finds a better explanation: since *vox* is both the sound and its different denominations (syllables), a mutation is indeed the passage from one denomination (vox=syllable) to another, yet maintaining the same sound (vox=note).

5. Syllables and intervals

If both the *Introductio* and *De plana musica* state that there are thirteen types of intervals, the former also treats them in the context of the hexachordal system. Indeed, in the *Introductio* the first six intervals (tone, semitone, ditone, semiditone, diatessaron, and diapente) are expressed (*signantur*) by solmization syllables. The use of syllables also helps classify the intervals that can have the semitone in different positions into different species. Thus, the two species of the semiditone or minor third are indicated with the syllables re-fa, if the semitone is at the end, and mi-sol, if the semitone is at the beginning; the three species of diatessaron or fourth are expressed by the syllables ut-fa, re-sol, and mi-la, with the semitone respectively at the end, in the middle, and at the beginning; finally, the four species of diapente or fifth are indicated by ut-sol, re-la, mi-mi, and fa-fa, according to whether the semitone is in third, second, first, and fourth position. While minor and major sixths and sevenths produce a similar variety of species, these are not discussed by our author, nor does he try to express them by means of syllables. The musical examples provided for each interval show different locations, but not on all deductions. For instance, the ditone, which corresponds to the syllables ut-mi or fa-la, is shown as

ut-mi in six deductions out of seven, and as fa-la in four of them. In any case, this does not exclude the possibility that the musical examples are also exercises in the articulation of intervals, which maybe the singer has to complete. Another interesting characteristic is that the intervals of third, fourth, fifth, and octave are first shown filled in and then as leaps, while the compound intervals, namely the diapente with either a tone, a semitone, a ditone, or a semiditone, are first presented as a leap of a fifth followed by the remaining interval. This can be interpreted as evidence for regarding these examples as exercises in singing intervals.

6. *Falsa musica*

The reference to *falsa musica* comes in the *Introductio* right after the discussion of intervals. This placement could be related to the definition of *falsa musica*, which involves the intervals of tone and semitone. Indeed, we have already seen that, in the Lambertean treatises and in the Garlandean *De plana musica*, the treatment of *falsa musica* follows right after the definition of the semitone.

Three points are stated in the *Introductio* about *falsa musica*: its necessity, especially in instrumental music; its definition as the result of the following operation, "when we make a semitone in place of a tone and vice versa"; and the possibility of applying *falsa musica* to all notes.[65] The last statement seems particularly radical, especially since other theorists either deny altogether the use of accidentals in chant, or restrict such a use to a few accidentals (namely, *f♯* and *e* flat) in order to correct the tritone:

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[65]"Quando de tono facimus semitonium, et e converso." CS I, p.

> Every tone is divisible into two semitones and, consequently, the signs [*signa*] which designate the semitones may be extended to all tones.[66]

However, the statement in the *Introductio* really seems to be referring to instrumental music, and emphasizes the importance of *falsa musica* especially for organs (*organis*), which in this case must refer to the keyboard instruments.

The treatment of *falsa musica* in *De plana musica* is very close to the versions found in Lambertus's treatise, the Lambertean *De musica plana breve compendium*, and the anonymous *Tractatus de discantu* listed as Anonymous II in Coussemaker's first volume.[67] The placement of the discussion on *falsa musica* right after the treatment of the semitone agrees with the similar positioning in Lambertus's treatise and in *De musica plana breve compendium*.[68] However, *De plana musica* and the *Tractatus de discantu* seem to confine the use of *musica falsa* to secular music:

> *De plana musica*:
> Thus, it is that sometimes through *falsa musica* we make a semitone where it should not be. Indeed, we see in mensural music that the tenor of a motet or rondellus is in *b* fa *b* mi, saying it through hard *b*, then when taking its discant [*biscantus*] in a fifth, it is necessary to say mi in high *f*, and thus through *falsa musica*.[69]

166.

[66]"Omnis tonus divisibilis est in duo semitonia et per consequens signa semitonia designantia in omnibus tonis possunt amplificari." CS I, p. 166.

[67]Cf. CS I, p. 258 (Lambertus), Reaney-Gilles-Maillard, pp. 22-23 (Garlandia's *De plana musica*), Gilles, pp. 48-49 (*De musica plana breve compendium*), and Seay, *Anonymous II*, pp. 28-29 and 32-33.

[68]See chapter two, p. 82, in the present study.

[69]"Nam ita est quod aliquando per falsam musicam facimus semitonium ubi non debet esse. nam in mensurabili musica illud videmus

> Anonymous II:
> And it should be known that Boethius determined the semitone as the solution for a certain problem, for it is so, that sometimes we make a semitone through *ficta musica* where it should not be. Indeed in mensural music we see that the tenor of a motet, or organum, or conductus is in *b* fa *b* mi, saying it through hard *b*, then when taking in the fifth or discant, it is necessary to say mi either below or above, and thus through *falsa musica*.[70]

However, the section on *falsa musica* of *De plana musica* does not appear in all three sources, but only as the fourteenth chapter in Vitry's *Ars nova*.[71] Therefore it cannot be surely considered as part of the original teaching on plainsong by Garlandia.

7. Summary

The treatment of hexachordal theory in the *Introductio musice* follows the layout of Jerome's discussion, enumerating and describing letter-syllable combinations and mutations through lists. In particular, mutations are classified, as in Jerome, according to their direction, following the rule that mutations ending on ut, re, or mi are ascending, while those ending in fa, sol, or la are descending. An original remark about mutation regards the suggestion to perform it only *causa necessitatis*.

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quod tenor alicuius moteti vel rondelli stat in b fa b mi, dicendo per b durum, tunc accipientem in diapente superius suum biscantum, oportet dicere mi in f acuto, et sic per falsam musicam." Reaney-Gilles-Maillard, p. 22.

[70]"Et sciendum est quod Boetius determinavit de semitonio per solutionem cuiusdam quaestionis, nam ita est quod aliquando per fictam musicam facimus semitonium, ubi non debet esse. Nam in mensurabili musica illud videmus quod tenor moteti, vel organi, vel conducti, stat in b fa b mi, dicendo mi per b durum, tunc accipiendo in diapente sive discantu oportet dicere mi aut inferius aut superius et sic per falsam musicam." CS I, p. 310. See also Seay, *Anonymous II*, pp. 28-29.

[71]See Reaney-Gilles-Maillard, p. 2.

The treatise makes several references to Aristotelian philosophy, both to explain the primacy of the natural property, and to emphasize the importance of the syllable ut as the necessary principle and foundation. The latter remark seems to point to a debate around the syllable ut, which several theorists (Salomon, Grocheio, Marchettus) view differently.

A brief observation about *falsa musica* hints at the possibility to apply accidentals to all tones of the gamut. However, such a practice is confined to secular music.

Chapter 8

SOME THEORISTS AT THE TURN OF THE CENTURY

1. Introduction

This chapter will discuss the contributions of three theorists of the late thirteenth century: Walter Odington, Egidius of Zamora, and Johannes de Grocheio. Their musical treatises are all available in modern editions: Odington's *Summa de speculatione musicae* has been edited by Frederick Hammond, Egidius of Zamora's *Ars musice* by Michel Robert-Tissot, and Johannes de Grocheio's *De musica* by Ernst Rohloff.[1] For Grocheio, an English translation by Albert Seay, based on Rohloff's edition, is also available.[2]

Odington's musical treatise survives in its entirety in only one manuscript, Cambridge, Corpus Christi College ms 410, written by two

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[1] *Walteri Odington. Summa de speculatione musicae*, ed. F. Hammond, Corpus Scriptorum de Musica 14 (N.p.: American Institute of Musicology, 1970); *Johannes Aegidius de Zamora. Ars musica*, ed. M. Robert-Tissot, Corpus Scriptorum de Musica 20 (N.p.: American Institute of Musicology, 1974); E. Rohloff, *Der Musiktraktat des Johannes de Grocheo*, Media Latinitas Musica II, (Leipzig: Kommissionverlag Gebrüder Reinecke, 1943). The three editions are here abbreviated as Hammond, Robert-Tissot, and Rohloff. Of Grocheio there is also an older edition by Wolf; J. Wolf, "Die Musiklehre des Johannes de Grocheo," *Sammelbände der internationalen Musikgesellschaft* 1 (1899-1900): 65-130.

[2] *Johannes de Grocheo. Concerning Music*, trans. A. Seay (Colorado Springs: Colorado College Press, 1967). A partial translation is also found in C. Page, "Johannes de Grocheio on Secular Music: A Corrected Text and a New Translation," *Plainsong and Medieval Music* 2 (1993): 17-41.

fifteenth-century hands. Parts of the *Summa* can be found in an eighteenth-century copy (Br. Museum ms Add. 4909) of a fourteenth-century manuscript which was destroyed by fire, and in a fourteenth-century collection (Oxford, Bodley ms 842).[3] As to the author, Hammond suggests Ottington, in northern Oxfordshire, as Odington's birthplace, and the year 1278 as the *terminus a quo* for his birthdate.[4] From Odington's usual signature as "brother Walter, monk of Evesham," we know that he was a monk of the Benedictine abbey of Evesham, in Worcestershire, which was closely connected with the Benedictine Cathedral at Worcester. We also know that he studied at Oxford, probably at Gloucester college, and wrote a treatise on each subject of the quadrivium, a treatise on the multiplication of species in sight, and an alchemical work, plus a host of other writings which are lost.[5]

As Hammond points out, the *Summa de speculatione musicae* shows the principles and characteristics of medieval *summae*. These are collections of authoritative statements which are treated with some independence of thinking. They also observe three principles: sufficient enumeration, sufficient articulation, and sufficient interrelation.[6] Odington's *Summa* is divided into six sections, the fifth of which treats plainsong and provides a tonary which follows

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[3]Hammond, pp. 17-20.

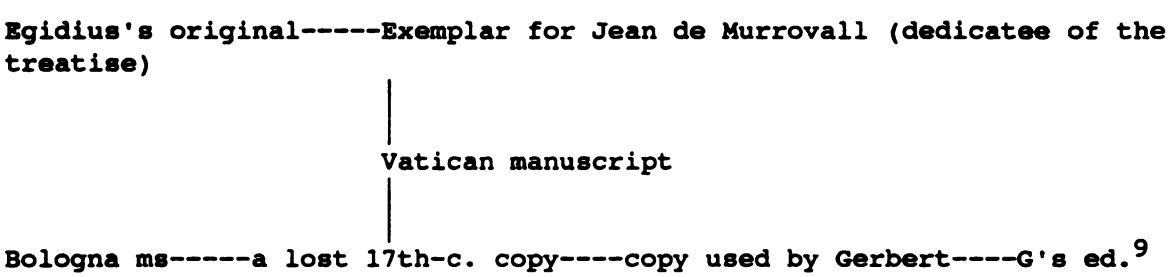
[4]Hammond provides as evidence for this hypothesis a document of the General Chapter of the Benedictines of Canterbury, held in Northampton in 1298, in which Odington seems to have participated. See Hammond, p. 26.

[5]For a complete list of Odington's authentic, doubtful and lost works see Hammond, pp. 32-35.

[6]See Hammond, p. 36, and also his reference to E. Panofsky, *Gothic Art and Scholasticism* (Paris: Latrobe, 1951), pp. 31-34.

very closely the thirteenth-century Sarum *Tonale*.[7] It is this fifth section which will be discussed for its reference to the hexachordal theory.

Egidius de Zamora's *Ars musice* survives in two manuscripts: Rome, Bibl. Vat. H 29 and Bologna, Civico Museo Bibl. A 31. The former is a fourteenth-century copy of unknown provenance, the latter a seventeenth-century copy of the Vatican manuscript requested by Giovan Battista Martini. The Bologna manuscript is closely related to Gerbert's edition of Egidius's work in the second volume of his collection.[8] On the basis of the divergences between the Vatican manuscript, the Bologna manuscript, and Gerbert's edition, Robert-Tissot posits the existence of other lost copies and proposes the following possible transmission of the text:



As to the author, all we know comes from his writings. Robert-Tissot, following the most comprehensive study on Egidius by Manuel Castro y Castro, places the theorist's date of birth in 1240. There is documentary evidence that, after entering the Franciscan order, likely

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[7]Hammond explains the reference to the Sarum *Tonale* as either a product of Odington's years in Oxford or Odington's choice to employ the chant repertory which was more common. Hammond, p. 41.

[8]GS II, pp. 370-393.

[9]Robert-Tissot, p. 19.

in 1269-70, Egidius left his convent in Zamora and was sent, by the Chapter of Santiago, to Paris, probably in 1273-74, where he studied and became a *Magister*.[10] Later he returned to Zamora, where he taught in the convent of San Francisco and wrote most of his works.

Robert-Tissot places the date of the *Ars musica*, dedicated to a certain "brother Johannes, general minister of the Order of Minor Friars," at the end of the thirteenth century or the very beginning of the fourteenth.[11]

The treatise, a work of maturity, is composed of two parts, one speculative and one practical. The former deals with theoretical questions, such as the definition of music and its benefits, and is based on Boethius, the Church Fathers, and the Biblical tradition; the latter, which deals only with plainsong, has John and Guido as its main sources. The section of the treatise devoted to hexachordal theory covers chapters five through eight, but, in my opinion, it cannot be judged "certainly, for this time, the most exhaustive exposition which one can find on this subject, along with the texts of Jerome de Morave and Johannes of Garland."[12]

Johannes de Grocheio's *Ars musica* is transmitted by two manuscripts, the late thirteenth-century Darmstadt DS 2663 and London, BM Harl. 281.[13]

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[10]Ibid., pp. 8ff.

[11]"Fratri Johannis Ordinis Fratrum Minorum generali ministro." Robert-Tissot, p. 30. Robert-Tissot identifies the dedicatee with Johannes Mincio de Murrovalle, who held the position of general minister from 1296 to 1304, and on this basis dates the treatise. Ibid., p. 7.

[12]Robert-Tissot, p. 25.

[13]G. Anderson, "Johannes de Grocheo," *The New Grove* 9: 664-65; G.

As to the author, Page supposes a Norman origin and appears "tempted" by the hypothesis that Grocheio belonged to the renowned family of de Grouchy.[14] The information provided in the treatise about Parisian musical practices establishes that the author spent some time there, although not that the treatise was necessarily written in Paris. Furthermore, the numerous references to Aristotle's philosophy indicate that the author studied in Paris, and perhaps that he received a degree at the University.[15]

The treatise is exceptional in its detailed description of secular music, whereas the topic of mensural music, which constitute the core of so many contemporary treatises, is only touched upon briefly. Grocheio provides a short section on plainsong, dealing also with hexachordal theory, right before the discussion of secular music. However, his treatment of hexachordal theory does not appear to be particularly substantive.

Reaney, "Johannes de Grocheo," *Die Musik in Geschichte und Gegenwart* 7: 95-100.

[14]Page, "Johannes de Grocheio on Secular Music," pp. 18-19.

[15]Ibid., pp. 17-18. On Grocheio's references to Aristotle see M. Wittmann, *Vox atque sonus. Studien zur Rezeption der Aristotelischen Schrift "De anima" und ihre Bedeutung für die Musiktheorie*, Musikwissenschaftliche Studien IV/2 (Pfaffenweiler: Centaurus-Verlagsgesellschaft, 1987); E. Fladt, *Die Musikauffassung des Johannes de Grocheo*; E. Fladt, "Die artifizielle Prozess in Hochmittelalter," *Die Musikforschung* 40 (1987): 203-228; M. Bielitz, "Materia und forma bei Johannes de Grocheo," *Die Musikforschung* 38 (1985): 257-277. See also P. de Witt, "A New Perspective on de Grocheo's "Ars musicae"," (Ph.D. diss., University of Michigan, 1973); and M. Bielitz, "Hat Johannes de Grocheo eigentlich auch über Musik geschrieben?," *Die Musikforschung* 41 (1988): 144-150.

2. Letters and syllables

Odington's terminology of the basic elements of music comprises five nouns, corresponding to as many concepts: *vox*, *littera*, *nota*, *clavis*, and *syllaba*. *Vox* is the general term for a sound, while *littera* refers both to a point of division in the monochord and to a pitch location in the gamut:

> For the sounds [*voces*] of the monochord are marked by the letters of the alphabet and expressed through them, and after the octave the same as before is sung internally, as it shows in the species of octave. The same [letter] comes forth after *G* up to *O* as before from Γ to *G*. Therefore, after *G*, which makes an octave with Γ, letters are repeated, as *a* makes an octave with *A*, *b* with *B*, and so forth with the others, in similarity with the days of the week.[16]

Referring to John of Afflighem, Odington is here showing how the alphabetical letters, chosen to identify the points of division of the monochord, were reduced to only seven to comply with octave repetition.[17]

He then divides letters into the three customary *ordines*: capital letters for the *graves*, small (*simplices*) letters for the *acutae*, and double letters for the *superacutae*.

Since letters cannot indicate a long or a breve, Odington adds, we need some *figurae*, which are called *notae*, to define the notational

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[16]"Quoniam voces monochordi litteris alphabeti signantur et per ipsas exprimuntur, et post diapason idem penitus cantatur quod prius sicut patet in speciebus diapason. Eadem oritur post G usque ad O quae prius a Γ ad G. Ideo post G, quae cum Γ facit diapason, reppetuntur litterae eodem ut a cum A, b cum B, et sic de aliis, facit diapason, ad similitudinem dierum hebdomadae." Hammond, p. 92.

[17]See J. Smits van Waesberghe, *Johannis Affligemensis De Musica cum Tonario*, Corpus Scriptorum de Musica 1 (N.p.: American Institute of musicology, 1950), pp. 72ff.

signs used in music writing, such as *punctum, apostropha, virga* and so forth.[18] However, *notae* need to be placed on lines and spaces in order to show pitches, and that is why now Odington is introducing the concept of *clavis*:

> The signs of sounds, that is, the letters previously described, they call *claves*, in that they introduce us to the knowledge of sounds, which [sounds] the *notae* represent, because without them [i.e., the *claves*] notes are not known.[19]

The previous definition, while stating a basic equivalence between *claves* and *litterae*, also asserts the fundamental function of *claves* to identify a *nota*, which now, along with the specification of the *figura*, has also the specification of pitch. If a *clavis* is indeed like a letter, because it refers to a certain pitch, it is also different because the term *littera* is used in the context of the monochord division and of the scale, while the term *clavis* is employed in the context of lines and spaces.[20] Later in the chapter, Odington also specifies that it is not necessary to apply all the *claves* to a notated song: one, chosen between the five *claves principales--D, F, c, g, cc*--is enough for the four or five lines which are used in music writing. Thus, a *clavis* is specifically related to the writing of notes on lines and spaces, as in the author of *Summa musice*.[21]

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[18]Hammond, p. 93.

[19]"Signa vocum, scilicet litteras prius descriptas, claves vocant, pro eo quod in cognitionem vocum nos introducunt, quas notae exprimunt quia sine illis notae non cognoscuntur." Hammond, p. 95.

[20]A similar distinction is found, for instance, in *Summa musice*. See above, chapter six, pp. 213ff.

[21]Tinctoris too relates *clavis* to the position on the staff: "Clavis is the sign of the pitch location [*locus*] on a line or on a space. Indeed, each of the locations of our hand has its own *clavis* as its name." ("Clavis est signum loci lineae vel spatii. Habet enim

Furthermore, the addition of the *claves* round b and square b which, as we will see in the section about *falsa musica*, are fundamental to discriminate the "movable" notes, brings the number of *claves principales* to seven, and constitutes another link with Amerus's theory.[22]

As we reconsider the relationship between the terms *littera*, *nota*, and *clavis*, the following summary may be helpful:

Littera, first used to indicate a point of division of the monochord, is the designation of sounds arranged according to octave repetition, that is, of pitch locations in the gamut---first type of correspondence to sound (*vox*);

Nota or *figura vocis* is a particular notational sign used to define duration and manner of delivery---second type of correspondence to sound;

Clavis is the location of a *nota* in the staff, on either a line or a space---third type of correspondence to sound.

Odington presents now the last concept related to sound: the *nomina vocum*, names of sounds, which are brought into the *notae* ("quae notis intimantur.")[23] The *nomina vocum* are the solmization syllables, and they identify *notae* even further:

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unusquisque locorum nostrae manus clavem propriam nomine." *Johannis Tinctoris Opera Theretica*, ed. A. Seay, Corpus Scriptorum de Musica 22 (N.p.: American Institute of Musicology, 1975), p. 37.

[22]*B* is explicitly called *clavis principalis* in the section on *musica falsa* (Hammond, p. 97). See discussion below, in section five of the present chapter. For Amerus's seven *claves principales* see chapter three, pp. 109ff, in the present study.

[23]The heading of the fourth chapter in Odington's fifth part of the *Summa* reads "De nominibus vocum quae notis intimantur." See Hammond, p. 95.

> It is consistent that, as the figures of sounds are changed into *notae*, they would be changed into the names of the same [*notae*], so that a *nota* would not maintain the name of the *clavis* on which it is placed, and *notae* would not be regarded as useless by the inexperienced. Therefore, since the letter would not be sufficient and the phrase [*dictio*], to be uttered as many times as is necessary, would be annoying, they attribute to notes as [their] names certain syllables, which they take from that hymn: Ut queant laxis.[24]

However clear the explanation of the previous terms is, the definition of the real function of syllables, to identify intervals, seems to escape Odington. He offers a quite weak explanation of this function, based on two arguments: first of all, since the shapes of sounds (punctum, virga, etc.) were changed into notes with a specific pitch, by putting them on a staff, thus it seems consistent to change the notes into their names, so that they are regarded as something different from the *clavis* on which they are placed; second, it is better to use short syllables because the letter by itself would not be enough, but the whole definition (*dictio*) would be too long. What Odington means by *dictio* is not altogether clear. In Grocheio's treatise, *dictio* is used for the letter-syllable combination that defines a note, but here such an interpretation seems incongruous: indeed, it would result in explaining the introduction of a new item (the syllable) as a way to overcome the prolixity of names made of letters *and syllables*! Perhaps *dictio* is the letter which identifies the *clavis* plus the name of the *nota*, the notational sign.

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[24]"Congruum est ut sicut figurae vocum mutantur in notis, earundem in nomina mutentur, ut nota non teneat nomen clavis super quam sita est, ne ab imperitis notae putentur otiosae. Ergo, cum littera sit insufficiens et dictio totiens recitanda sicut oportet foret taediosa, quasdam syllabas pro nominibus notis tribuunt, quas in hymno illo assumunt: Ut queant laxis." Hammond, p. 96.

The explanation for the number six of syllables, rather than relying on the hexachord's sufficiency to express all melodic intervals, is based on extramusical reasons, such as the perfection of the number six.[25] Even the syllables' names are justified on the basis not of a musical, but rather a moral function:

> The aforesaid syllables bring us a certain spiritual admonition, so that the singer's mind can harmonize the praises to God with his voice.[26]

Each syllable is thus intended to give a special admonishment by relating to a particular Biblical quotation which starts with that syllable:

UT abstineat vos a fornicatione qualicumque (I Thess. IV,3)

REddite prevaricatores ad cor vel fortitudinem in bono (Is. XLVI,8) or

REsistite diabolo et fugies a vobis (Jas. IV,7)

MIserere animae tuae placens Deo (Eccles. XXX,24)

FAcite vobis amicos de mammona iniquitate (Lk. XVI,9)

SOLlicitus ambula coram Deo tuo (Micah VI,8)

LAvamini, mundi estote (Isa. I,16).[27]

Before turning to the subject of mutation, Odington adds a last remark about syllables, which might be a clue for his seeming lack of understanding of the hexachord: syllables, he says, are adapted to the

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[25]The number six is the first perfect number in that all its factors, 1, 2, and 3, taken together make the same number, 6. Almost all the other numbers are either diminished or abundant. See Hammond, p. 96. Cf. A. M. S. Boethius, *De Institutione arithmetica*, ed. G. Friedlein (Leipzig: Teubner, 1867) I, 19-20.

[26]Hammond, p. 96.

[27]Hammond, pp. 96-97, where also all the Biblical references are provided in footnotes.

monochord in such a way that ut begins on the lowest note of each tetrachord.[28] The previous passage betrays the reliance of our theorist on the tetrachord, rather than the hexachord, as the measuring unit (*Massenheit*) for the gamut; on the other hand, as a speculative theorist, he is not interested in the matter of solmization, and that is probably why the six-note unit is explained only on arithmetical grounds.

In dealing with the basic elements of the gamut, Egidius of Zamora takes a more pragmatic approach and simply lists all the notes in the gamut, identifying their names (*nomina vocum*) with the conjunctions of letters and syllables: Γ ut, *A* re, *B* mi, *C* fa ut, *D* sol re, *E* la mi, *F* fa ut, and so forth.[29] He does not seem to be interested in the terminological distinctions made by Odington, and uses *vox* to mean both sound and syllable.[30] Even more pragmatic is Egidius's explanation for the six solmization syllables: even though notes are ninenteen, he says, just six syllables are enough to solmize ("ad solfandum"). Thus, there is no attempt, in Egidius's exposition, to justify the number six, nor does he try to reconcile the number of syllables with the number of letters, as other theorists do.[31] He does

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[28]"Sunt autem monochordo sic aptae ut per gravissimam chordam cuiuslibet tetrachordi incipiat Ut, et reliquae reliquis aptantur." Hammond, p. 97.

[29]See Robert-Tissot, p. 62.

[30]The term *vox* is used in the more general sense of sound in chapter five, as "litterae sive voces" are said to be nineteen, and in chapter six, where "litterae sive voces" are placed on different lines and spaces. See Robert-Tissot, pp. 62 and 64.

[31]Such as Lambertus and Salomon. See chapters two and four in the present work.

not even account for the origin of these syllables, but rather seems to briefly state the mere facts that we solmize and these are the syllables we use.

Johannes de Grocheio follows a semi-historical approach in describing the invention of notes, explaining that, after some first attempts at notating music, some people finally devised twenty-one phrases (*dictiones*) made from seven letters (*litterae*) and six syllables (*voces*).[32] Grocheio seems unable, like Odington, to find a musical justification for the number of syllables; thus, while stating that the seven letters correspond to the same number of concords (*consonantiae*), he relates the six syllables to the perfection of the number six. Grocheio seems to deal with *musica plana* just as an introduction, however necessary, to the main subject of his treatise, which focuses on secular music; thus, for him too, like for Odington, the matter of solmization is not as compelling as for other theorists mainly concerned with the practice of plainchant.

3. Properties

Odington introduces and explains the matter of property with the presence of the double B:

> It happens that from the conjunction and disjunction of tetrachords, some notes [*chordae*] have double sound as was shown before, and the aforementioned notes [*notae*] are adapted to these according to the beginning of tetrachords. It is evident that these two sounds occur on *b*, and a double sound cannot be expressed by one sign. Therefore, a round *b* designates the lower sound, a square *b* the higher. And thus

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[32]The term *vox* in the sense of solmization syllable is used consistently throughout this part of the treatise. In one instance Grocheio uses *syllaba* with the same meaning. See Rohloff, p.48.

> further they distinguish all sounds [*voces*] of the monochord according to these letters, namely square *b* and round or soft *b*, also adding a third difference, i.e., different from both. So that the whole hexachord [*cantus*] of six notes which has square *b* is called property [*cantus*] of square *b*. The one that has soft *b* is called [property] of soft *b*. That property which admits neither of them is called *proprius cantus* because its sounds are not movable as [those] of the remaining but stay stable.[33]

Several important considerations may be drawn from the previous quotation. First of all, the reference to the Greek Greater and Lesser Perfect Systems, where the diezeugmenon (disjunct) and synemmenon (conjunct) tetrachords determine the occurrence of two sounds in correspondence to the letter *b*, brings more evidence to Odington's speculative slant. His source is Boethius, as the use of the word *chorda* reveals: in the context of plana musica Odington employes terms like *voces*, *claves*, *notae*, but not *chordae*, which he uses in the third section of his *Summa*, in the chapter dealing with the Greek names of notes.[34] Furthermore, his statement that the previously described notes--and now he uses the term *notae*, likely to mean syllables--were conformed to the Greek notes (*chordae*) according to the beginnings of the tetrachords, shows his effort to amalgamate the Greek and the

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[33]"Accidit autem ut ex coniunctione et disiunctione tetrachordarum quaedam chordae duplicem habeant vocem sicut prius monstratum est, et secundum inchoationem tetrachordarum ipsis dictae notae aptatae sunt. Ipsas autem duplices voces super b accidere manifestum est, et duplex vox uno signo non potest exprimi. Ideo graviorem vocem b rotunda signat, acutiorem b quadrata. Et sicut ulterius distinguunt omnes voces monochordi secundum has litteras, scilicet b quadratam et b rotundam seu mollem, tertiam differentiam adicientes, scilicet neutram earum. Ut, scilicet totus cantus sex notarum qui b quadratam habuerit dicatur cantus b quadratae. Qui habet b mollem habuerit dicatur b mollis. Ille vero cantus qui neutram earum admiserit proprius cantus vocatur quia voces suae non moventur sicut reliquorum sed stabiles persistunt." Hammond, p. 97.

[34]*Summa*, part III, chapter 2: "De chordis et earum nominibus et notis." (Hammond, pp. 80-81)

medieval systems, although neither letters nor syllables can really agree with the tetrachordal division of the gamut.[35] Even more peculiar is Odington's explanation for the three properties. First he justifies the presence of two signs for the note *B* on account of the fact that two sounds cannot be expressed with the same sign; then he makes these two signs, square *b* and round *b*, the point of reference for distinguishing all the other sounds of the monochord, without explaining how this would actually work ("ulterius distinguunt omnes voces monochordi secundum has litteras"). Finally, he adds that there is a third *differentia* which does not include either of the two signs, and is called *proprius cantus* on account of its stability. Evidently, Odington presupposes to be speaking to an audience familiar with the concepts of properties, since his description cannot possibly enlighten the unexperienced singer. In summary, we may infer that Odington uses the terms *differentia* and *cantus* in dealing with property, possibly implying a subtle distinction between the property as a concept (*differentia*) and the property--or rather deduction--as a serie of six actual syllables (*cantus*), but he provides no definition for either term. He also distinguishes the customary three properties by naming them *b quadrata*, *b rotunda* or *mollis*, and *proprius cantus*; all three are referred to the state of *b*, whether round, square, or absent, as in

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[35]Hammond has pointed out Odington's misunderstanding of the Greater Perfect System, as shown in the third section of the *Summa*: "He first divides the monochord to produce a system of two octaves and a fourth, *A-dd*, lettered A-S. He then describes the addition of gamma at the bottom of the system and identifies this rather than *A* as proslambanomenos. In order to fit the Greek names he is forced to describe the lowest tetrachord, hypaton, as disjunct rather than conjunct, as it is in both Greek systems." (Hammond, p. 39)

Lambertus's definition of property.[36] The use of the term *proprius cantus*, as already pointed out, confirms the English theorists' preference for this designation rather than the other one, *natura*.[37] The matter is finally illustrated in a diagram showing the letters, first as points of division of the monochord (from Γ to *S*), then rearranged into two octaves and a fourth (from Γ to *dd*), and also the seven deductions with the specification of their properties. Also the other possible accidentals seem to be shown in this picture, as will be discussed in the specific section.[38]

For the treatment of properties, Egidius simply enumerates, in chapter seven, all the notes of the gamut, specifying for each one the number of syllables, the properties to which each syllable belongs and the starting point, the ut, of each property. So, for instance, *C* fa ut is described as having two syllables, fa and ut, of which fa is sung (*cantatur*) through square *b*, that is, through the ut of Γ ut, and ut is sung through nature, that is, through itself.[39] The treatment certainly recalls similar ones found in Jerome and the *Introductio*.[40] The concept of property does not receive a specific term in Egidius's exposition, although it can be inferred that the term *cantus* is

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[36]See chapter two, p. 74, in the present study.

[37]The term is found in Amerus (Ruini, p. 22), the *Metrologus* (Waesberghe, p. 71), the *Tractatus de musica plana et organica* (CS II, p. 485), and, along with *natura*, in the *Introductio* (CS I, p. 158).

[38]See below, section five.

[39]"C-fa-ut duas habet voces, Fa videlicet [et] Ut. Sed Fa cantatur per B quadratum, per Ut videlicet de Γ-ut. Et Ut cantatur per naturam, videlicet per seipsum." Robert-Tissot, p. 66.

[40]See chapters five, pp. 175ff, and seven, p. 238, in the present work.

implied. The three properties are called *b quadrata*, *b mollis*, and *natura*, but no reasons are offered to explain those names.

Grocheio is even more hasty in the treatment of properties. After a brief discussion on mutation, which we will examine shortly, he states that "voces similiter per triplicem differentiam distinxerunt," naming the three *differentiae* as *b quadratum*, *b molle* and *natura*. He further specifies that the first difference is found on the first ut, that is, Γ ut, the second on the second ut, the third on the third ut, and so forth. Yet, in Grocheio's treatise there is neither a definition of the term *differentia* nor an explanation of the concept of property.

4. Mutation

Odington's treatment of mutation is, compared to other parts of his treatise, quite succinct. Referring to the above-discussed *differentiae*, that is, properties, Odington explains mutation as the necessary operation we need to do when going beyond the limits of one hexachord:

> From the aforesaid differences, that is, square *b*, soft *b*, and *proprius cantus*, mutations occur in a melody [*cantilena*], so that, if the melody of one species goes up six notes, it is mutated into another species, that is, if it goes up more than six notes, as, for instance, low *G* has three syllables [*notae*], but on the same pitch.[41]

The term *differentia* is used again in the sense of property, while also the term *species* seems to bear the same meaning. The last

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[41]"Ex praedictis differentiis, scilicet b quadrata, b molli, et proprio cantu, accidunt mutationes in cantilenis, ut si cantilena unius speciei sex voces ascenderit, mutatur in aliam speciem, scilicet si ultra sex notas ascenderit, ut, verbi gratia, G gravis tres habet notas tamen unisonas." Hammond, p. 99.

remark about low *G* assumes the reader's knowledge of the whole process of mutation. Once again, Odington's treatise appears to be intended for an educated audience, rather than for the music student. All the examples provided afterwards refer to the necessity of mutating when the melody goes beyond the boundaries of one hexachord (property) or when there occurs a change from natural *b* to soft *b*, or vice versa. Odington's treatment ends with the statement of the common rule that *claves* with three syllables have six mutations, while *claves* with two syllables have two mutations. Here, as in the whole of chapter five of the *Summa*, the term *nota* is used to mean syllables.[42]

Egidius of Zamora follows a different approach, starting his chapter on mutation with the complete list of all the *claves* with their mutations. For each note, Egidius provides three pieces of information: the number of mutations (1), the direction of each mutation (2), and the property the mutation leads to (3). Thus, for instance, the note *C* fa ut has two mutations (1), fa/ut ascending (2) to *natura* (3), and ut/fa descending (2) to square *b* (3). As noted by Robert-Tissot, the list seems incongruous in three points: on the note *g* sol re ut, the mutations re/ut and ut/re are both *pro ascensu*, while in almost all the cases, when the syllables are reversed, also the direction is reversed; the same occurs on the note *a* la mi re (mutations mi/re and re/mi, both ascending) and on *dd* la sol (mutations la/sol and sol/la, both descending). Gerbert corrected the three instances to re-establish the symmetry; however, as already noticed,

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[42]See chapter five in Hammond's edition, p. 99.

the analogous lists in Jerome's treatise and in the Garlandean *Introductio* not only have the same three allegedly anomalous cases, but even extend the phenomenon to the lower octave, on the notes *G* sol re ut, *A* la mi re, and *d* la sol re, while also adding a new note, *c* sol fa. The anomaly is only apparent, though. All these mutations involve the change between the two *b* properties, square *b* and round *b*. Thus, in order to make this change necessary, the melody has to move towards the movable note sq.*b*/r.*b*. Therefore, if the melody raises the need for mutation on the notes *G, A, g,* or *a*, its direction must be upwards, toward the movable *b*; vice versa, if the melody produces the need for mutation on the notes *c, d, cc,* or *dd*, then it must be because it has to move downwards to *b*.[43]

Grocheio explains the presence of more than one syllable in a *dictio* with the need of continuation, that is, for a melody to go beyond the limited range of six notes. However, the only detail about the process of mutation is the observation that in a *dictio* with three syllables, six mutations are possible, while in a *dictio* with two syllables, only two mutations can occur. Finally, the theorist states that on *b* fa *b* mi there cannot be a mutation because mi and fa cannot fall on the same pitch. However, his remark seems, rather than an instruction, just a reference to what other theorists have already set.[44]

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[43]A similar reasoning seems to be implied by Robert-Tissot's somehow obscure remark in the footnote 6, p. 72 of his edition. A discussion of these supposed "incongruities" is found in chapter five of the present work, pp. 180f, in note.

[44]Seay, *Concerning Music*, p. 13. Rohloff, p. 48.

5. *Falsa musica* and other hexachordal references

Odington begins his discussion of *falsa musica* by noting that the double nature of the *b* note produces a series of other notes which do not belong to the regular gamut:

> High *b*, because it is movable and double, for modern [musicians] produces a double high *f* in order to have the fifth consonance with either, and *f* led down to the octave similarly produces a double low *F*. And since between *F* and *f* there is the middle proportion of *c*, as with *b*, therefore it makes a double *c* just as *b*. Likewise, high *b* led down to low *E* makes this [*E*] double, and this *E* led up to the octave makes a double high *e*. And thus there are seven movable notes, namely *E, F, b, c, e, f, b*. And this duplication is marked through the addition or the taking away of the *clavis principalis* double *b*, so that *E* with the addition of round *b* makes a whole tone with *F*, with the taking away of round *b* makes a semitone. Similarly *F* with the addition of square *b* makes a semitone with *E*, with the taking away of square *b* makes a tone. And so forth for the others. Two movable notes, namely *b acuta* and *bb superacuta*, belong to the notes of the monochord. They call the others *falsas musicas*, not because they are dissonant, but foreign, and unusual for the ancients.[45]

Thus, Odington recognizes five other notes, aside from the round *b*, which do not belong to the regular gamut: *E* flat, *F* sharp, *c* sharp, *e* flat, and *f* sharp. He uses the term *falsa musica* only to define these five notes, and not also the operation by which they are attained.[46]

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[45]"B autem acuta quia mobilis et duplex est apud modernos creat f acutam duplicem ut sit utrimque diapente consonantia, ac f remissa ad diapason facit similiter F gravem duplicem. Et quia inter F et f est c acuta media proportio sicut et b ideo facit c duplex sicut et b. Consimiliter b ipsa acuta remissa ad E gravem facit ipsam duplicem, et ipsa E intensa ad diapason facit e acutam duplicem. Et sic sunt septem voces mobiles, scilicet E, F, b, c, e, f, b. Et haec duplicitas figuratur per additionem vel ablationem b duplicis clavis principali, ut E adiecta b rotunda facit cum F tonum, remota b facit semitonium. Similiter F addita b quadrata facit cum E semitonium, remota b facit tonum. Et sic de ceteris. Duae autem voces mobiles, scilicet b acuta e bb superacuta, sunt propriae voces monochordi. Reliquas vero vocant falsas musicas, non quod dissonae sunt, sed extraneae et apud antiquos inusitate." Hammond, pp. 97-98.

[46]*Falsa musica* is often defined as the making of a tone into a

The five notes are obtained neither by extending the hexachord system through ficticious hexachords (the later *coniunctae*) nor by using a process similar to a mutation (the *falsa mutatio*), but rather through the consonances of fifth and octave. Once we find in the system a movable note like square and round *b*, Odington seems to say, we are forced to admit also other movable notes: first of all, *f* sharp along with *f* natural, in order to have the consonance of the upper fifth with both *b*'s; then also *e* flat along with *e* natural, to have the consonance of the lower fifth with both *b*'s. Furthermore, both *f* sharp and *e* flat require their octave equivalent, low *F* sharp and low *E* flat. Finally, *f* sharp also determines the addition of *c* sharp in order to have the consonance of the fifth. The process could have been extended to other pitches, but Odington stops here, likely because he has listed all the pitches that are actually used in the music of his time. However, he adds a very interesting remark that could shed some light also on the matter of *falsa mutatio*: these notes are called *falsa musica* not because they are dissonant, but because they lie outside the gamut (*extraneae=extra manus*) and are unusual (*inusitatae*) for the ancient preceptors. To find the word *inusitata* referred to *falsa musica* in a treatise that is not related to the transmission of Lambertus's treatise is good evidence for accepting the lection *inusitata* in the Lambertean treatises as well, without assuming a scribe's mistake.[47]

In dealing with *falsa musica*, Grocheio too starts from the double *b*:

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semitone or viceversa.

[47]See L. Cross, "Chromatic Alteration," p. 49.

> Modern musicians, because of the writing of consonances, stantipedes and ductiae, have added something which they have called *falsa musica*, since they make these two signs, that is, square *b* and round *b*, which in *b* fa *b* mi designate the whole tone and the semitone, to designate the same thing in all the other [notes] so that, where there was a semitone, through square *b* they extend it to a tone, in order to have a good interval [*concordantia*] or consonance, and likewise, where a tone is found, they diminish it to a semitone through *b*.[48]

Grocheio's reference to *falsa musica* does not show any connection with the hexachordal theory and seems to have been applied especially in secular music.

Egidius does not discuss the matter of *falsa musica*. However, there are still a couple of interesting references to the hexachordal system in his treatise. The first is found in chapter twelve, where, in dealing with intervals, Egidius uses syllables to describe the whole tone (ut-re, re-mi in ascending, mi-re, re-ut in descending), while all the other intervals are indicated by letters. The second, more significant reference, is in the chapter about the monochord, where Egidius, after stating the importance of the monochord to recognize the correctness of a song, mentions the hand as a substitute instrument:

> Those who do not have a monochord, use the hand in place of that instrument destined to the theory. And as there are different monochords, so there are different ways of using the hand. Indeed, some people start from the joints, some from the palm. Through the demonstration of this instrument, those who make mistakes in music do not dare to contradict the truth.[49]

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[48]"Moderni vero propter descriptionem consonantiarum et stantipedum et ductiarum aliud addiderunt, quod *falsam musicam* vocaverunt, quia illa duo signa scilicet b et *, quae in b fa b mi tonum et semitonum designabant, in omnibus aliis faciunt hoc designare, ita quod, ubi erat semitonus, per * illud ad tonum ampliant, ut bona concordantia vel consonantia fiat, et similiter, ubi tonus inveniebatur, illum per b ad semitonum restringunt." Rohloff, p. 49. See also the English translation in Seay, *Concerning Music*, p. 14.

The reference is interesting not only because it hints at different arrangements of notes on the hand, but also because it seems to imply the avoidance of *falsa musica* since the hand is regarded as a way to demonstrate the truth of a song.

6. Summary

Of the three treatises analyzed in this chapter, Odington's *Summa de speculatione musicae* presents the most original treatment of hexachordal theory. Egidius's treatment, with his detailed list of letter-syllable combinations and of mutations, recalls those of Jerome and the *Introductio*. On the other hand, Grocheio's treatment of hexachordal theory is quite succint, since the main focus of his treatise is secular music. Grocheio does make an interesting reference to *falsa musica*, confining it to secular music.

As to Odington's treatment, it stands apart from other hexachordal discussions in that it seems to be purely speculative. Odington's reference to seven clefs, as well as his use of the term *proprius cantus* for the natural property, puts him in line with Amerus and the other English theorists. However, his reliance on the Greek systems to explain the gamut show his speculative, rather than practical, perspective. Even Odington's admission of accidentals derives from mathematical reasons, rather than from the desire to justify a musical practice.

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[49]"Et sicut diversa sunt monochorda, ita diversimode in manu fit usus. Quia quorundam inceptio ab articulis manus fit, quorundam vero fit a superficie. Huiusque vero monstratione instrumenti errantes in arte musicae, veritati contradicere non sunt ausi." Robert-Tissot, p. 78.

A particularly original aspect is Odington's explanation of the names of solmization syllables as the initials of moral precepts.

Chapter 9

REFERENCES TO HEXACHORDAL THEORY IN SOME ANONYMOUS TREATISES FROM THE THIRTEENTH CENTURY

1. Introduction

The aim of the present chapter is to extend the survey of hexachordal theory in the thirteenth century to several significant anonymous treatises. While certain of these show a complete treatment of the topic, others make reference to only a few aspects of the theory. I have analyzed mostly treatises on *musica plana*, since hexachordal theory was part of the theory of chant. However, references to syllables are found in discant treatises as well, and for this reason some significant ones have been included here. In any case, the discussion offered in the present chapter does not claim, nor intend to be, exhaustive, but simply to offer an overview of a number of important texts which are not ascribed to any renowned theorist.[1]

The following anonymous treatises dated from the thirteenth century have proven to be of interest in the context of my research: 1*Tractatus de musica plana et organica*, also known as Louvain treatise: the original manuscript (Louvain Vu, ff. 186ff.) was burned in 1914.

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[1]Several anonymous treatises have been deliberately omitted because they likely date from later than the thirteenth century. In particular, the anonymous Spanish and Catalan plainchant treatises edited by Gümpel, which deal extensively with hexachordal theory, were not included in the present chapter because they both refer to terms, such as *coniuncta* and *disiuncta*, for which I did not find any evidence in thirteenth-century theory. See W. Gümpel, *Zur Frühgeschichte der*

However, it had been edited by Coussemaker in the second volume of his *Scriptores de musica*.[2]

2-*Ratisbonensis cuiusdam ars musica*, also known as Mettenleiter Anonymous 3: the original manuscript, from the thirteenth century, is in D-Mbs clm 5539. It was edited by D. Mettenleiter in 1866.[3]

3-*Regulae de musica*, also known as Mettenleiter Anonymous 2: apparently written by two monks in 1295, no manuscript source survives for the edition by Mettenleiter.[4]

4-*Tractatus de discantu* 2, also known as Coussemaker I, Anonymous 2: the surviving manuscript Saint-Dié, Bibliothèque Municipale 42, ff. 34*r*-43*r* is a fifteenth-century copy of Italian provenance. The text was edited by Coussemaker, in the first volume of his collection.[5]

5-*Tractatus de discantu* 2, also known as Coussemaker III, Anonymous 13: the manuscript is in Paris, Bibliothèque nationale lat. 14741, ff. viii*v*-ix*v*, and was edited by Coussemaker in vol. III, pp. 496-8.

6-*Tractatus de consonantiis musicalibus*, also known as Coussemaker I, Anonymous 1: the manuscript in B-Br 10162/66, ff. 1*r*-3*v* is from the fifteenth century, but very likely dating back to the thirteenth

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vulgärsprachlichen spanischen und katalanischen Musiktheorie, pp. 257-334.

[2]CS II, pp. 484-98. All the informations about these anonymous treatises have been drawn from the valuable article by L. Gushee, "Anonymous Theoretical Writings," *The New Grove* 1: 441-446.

[3]D. Mettenleiter, *Musikgeschichte der Stadt Regensburg* (Regensburg: Bossenecker, 1866), pp. 70-78.

[4]Ibid., pp. 60-70.

[5]CS I, pp. 303-319. A modern edition and English translation is found in A. Seay, ed. *Anonymous II (13th Century): Tractatus de discantu [Concerning Discant* (Colorado Springs: Colorado College Music Press, 1978).

century. The treatise was published by Coussemaker as anonymous, but Bragard believes that it is an early work by Jacques de Liège.[6]

7-*Metrologus*: the text has been edited by Smits van Waesberghe, who also provided the complete list of the extant manuscripts.[7]

2. The elements of the system: *littera, vox, clavis* and related terms

The *Tractatus de musica plana et organica* offers a quite detailed discussion of the elements of the system. The locations of pitches in the gamut are called *loci* and are said to be identified by a *littera*; a Greek letter, Γ, is used to define the first *locus*, which is the origin and foundation of all the other locations designated by Latin letters. The isolation of Γ as "origo et fundamentum" of the other locations could be put in relation with the analogous isolation of the first number, one, which in medieval arithmetics was not regarded as a number, but as the origin and foundation of numbers. Moreover, the observation that follows in the treatise, that music was invented by Greeks and perfected by Latins, recalls a similar statement in other contemporary treatises, which is used to justify the presence of a Greek letter in a gamut described by Latin letters.[8]

The term *locus* appears to be very close to, if not identical

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[6]CS I, pp. 296-302. See R. Bragard, "Le Speculum Musicae du compilateur Jacques de Liege," *Musica Disciplina* 8 (1954), pp. 7ff.

[7]J. Smits van Waesberghe, *Expositiones in Micrologum Guidonis Aretini*, pp. 61-92.

[8]However, in the *Tractatus de musica plana et organica* the sentence is not explicitly related to the justification for the presence of Γ. See CS II, p. 484.

with, the more commonly used *clavis*: it refers to a particular position in the gamut, is expressed by letters, and also relates to a particular position on the staff, or better, on the system of lines and spaces. *Loci*, like *claves*, are divided into *spatialia* and *linealia*: *linealia*, or on the line, are the odd positions, from Γ to *dd*; *spatialia*, or in the space, are the even positions from low *A* to *cc*. Thus the gamut in the *Tractatus* ends on *dd*, containing ninenteen *loci*. These *loci* and the sounds corresponding to them are then divided into the customary eight *graves*, from Γ to *G*, seven *acutae*, from *a* to *g*, and four *superacutae*, from *aa* to *dd*, without listing the double *b*.

A new terminology is used for the concept of syllable as well. The six syllables ut, re, mi, fa, sol, la are called, respectively, *prima*, *secunda*, *tertia*, *quarta*, *quinta* and *sexta species*. The terminological choice seems to point to a concept of syllable as a classification of sounds; in other words, it could signify that the syllable is regarded as a type of sound, defined not in terms of pitch, but of interval relationships. The importance of syllables in determining intervals is foreshadowed by the following remark that sounds, or *voces*, are divided into *simplices*, namely the aforementioned syllables, and *compositae*, that is, in conjunctions like the unison, the tone, the semitone, and so forth. The remark is also interesting for the inclusion of the unison in the conjunctions that make up a *vox composita*: it seems to point to the occurrence of more than one syllable, or species of sound, in the same *locus*, and to indicate that in such an instance the *vox*, even though unison, has to be regarded as *composita* by virtue of its having multiple species.

Indeed, the inclusion of the unison in the medieval classification of intervals may have had also the practical significance of showing that the joining of different syllables, in certain cases, brings about the same sound, or, vice versa, that the same sound can actually be the union of different species of sound.[9]

The definition of unison found in another anonymous treatise, the *Tractatus de consonantiis musicalibus*, stresses the unison's lack of progression, in either ascending or descending direction, but still regards it as a *consonantia* which can be found "in vocibus cujuscunque clavis, exceptis b fa b mi vocibus." ("in the syllables of any *clavis*, except for the syllables of *b* fa *b* mi.)[10] Here, we see the customary terms *vox* and *clavis* used to define, respectively, syllables and locations in the gamut. The term *vox* is previously used in the treatise with its more general meaning of sound, but in the quoted passage it certainly refers to syllables, as more than one *vox* is attributed to one *clavis*. In another passage, the anonymous author further clarifies the concept of *clavis*: as to *b* fa *b* mi, it should not properly be called one *clavis*, because it has different *signa* for its different *voces*.[11] Here it becomes clear that, even though *b* fa and *b* mi share the same letter, they ought to be regarded as different *claves*, that is, different locations in the system, as the two forms of the *b*, the two "signs," refer to different sounds.

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[9]Likewise, in our system, the unison is melodically significant when changing the tonal function of a pitch, like, enharmonically, *g♯* to *a* flat.

[10]CS I, p. 298.

[11]"Sicut in b fa b mi; que proprie non dicitur una clavis; habet enim pro suis diversis vocibus signa diversa." CS I, p. 300.

The anonymous commentary to Guido's *Micrologus* which bears the title of *Metrologus* deals with the basic elements of the system in a slightly different way. The seven *notae*, from Guido's quotation, are renamed *litterae* or *figurae*, since the anonymous theorist reserves *nota* for solmization syllable.[12] The *litterae vel figurae* are said to be positioned on either a line or a space, and a picture in the manuscript actually shows that not only the letters, but also their syllables are located on a grid of ten lines and nine spaces.[13] Thus, the author seems to use the terms *littera* and *figura* in a quite ambiguous way, since not only in the picture of the ten lines, but also in the following portion of the text, the two terms are inclusive of solmization syllables as well: "In istis duabus litteris G sol re ut gravi et g sol re ut acuta." ("In these two letters low *G* sol re ut and high *g* sol re ut.")[14] The term *clavis* seems to be used in the specific sense of clef: in the chapter *De clavibus*, the theorist refers to only a few letters which, if located on a line of the staff, function as clefs. These letters-clefs are almost the same as the ones listed by Amerus: *D, F, b, c, g,* and *bb*, with the omission of *e*.[15]

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[12]"Notes or figures, that is, letters in the gamut, according to Guido of St. Maurus, in the second chapter, are these: First...." ("*Notae autem* vel figurae, id est litterae, in gamma secundum Guidonem de Sancto Mauro capitulo IIo *hae sunt: In primis* . . .." Smits van Waesberghe, p. 69. The italicized words are from Guido's quotation.) The author of *Metrologus* calls solmization syllables either *notae* or *syllabae*. See Smits van Waesberghe, p. 71.

[13]Ibid., p. 70 and plate.

[14]Ibid., p. 71. Underlining mine.

[15]See Amerus's list of clefs in chapter three, p. 111, of the present study.

This instance seems to put the two theorists in close connection and to confirm Smits van Waesberghe's hypothesis of an English origin for the Metrologus.[16]

In the anonymous *Ratisbonensis cujusdam Ars musica*, commonly known as anonymous Mettenleiter 3, the term *clavis* appears to be consistently used in the meaning of pitch location characterized by a letter. In speaking of letters, the theorist distinguishes them into capital (*capitales*) and small (*minute*), and then adds that they are differentiated in writing so that a *clavis* designated (*signata*) by a capital letter would not be regarded as small (*minuta*). Now, unless this is a mere tautology, I think what the theorist means is that if the capital letter is used, then the corresponding low *clavis* (pitch location) is intended. Later, in discussing mutation, the theorist again uses the term *clavis* to mean a location when stating that *claves* with one *vox*, that is, syllable, have no mutation, and *claves* with two or three syllables have two or six mutations. The last significant reference to *clavis* comes right before the treatment of intervals. Approaching the new topic, the author dismiss the previous one with the following formula: "having discussed letters placed in the picture of the hand which are also said *claves*," which leaves no further doubt about *clavis* being a location, this time placed in the hand, and represented by a letter.[17] The term *vox* is mostly used to mean syllable; however, a last remark in the treatise refers to Guido's syllables as *articuli*.

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[16]Smits van Waesberghe, pp. 61-62.

[17]See Mettenleiter, pp. 72-73.

In Mettenleiter Anonymous 2, the only reference to the elements of music is found near the end, where the author draws an analogy between grammar and music which recalls the one found in Salomon's treatise.[18] The similitude states that, as the grammar student has to know the letters, then combine them into syllables, then make words from syllables, and finally arrange words in sentences, so the music student has to memorize the alphabetic letters (*litterae*) which are the signs of sounds (*signa sonorum*), then combine them with the appropriate syllables (*sillabas, sic*), then arrange sounds in intervals (*consonancias*), and finally sing a chant of any mode regularly.[19]

3. Property and deductions

The *Tractatus de musica plana et organica* offers the following definition: "property is the distinction of simple sounds."[20] Since, as we saw before, the treatise distinguishes between *vox simplex*, any sound, and *vox composita*, any interval, property is introduced as a way

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[18]Thus Salomon: "And as letter is to syllable, syllable to phrase, phrase to speech, thus letter or *punctus* [is] to *clavis*, *clavis* to mode, mode to song." ("Et quemadmodum se habet littera ad syllabam, syllaba ad dictionem, dictio ad orationem, ita littera sive punctus ad clavem, clavis ad tonum, tonus ad cantum." GS III, p. 20.) For the explanation of the terms *clavis* and *punctus* see chapter four in the present study.

[19]"Quemadmodum puerulus rudimenta grammatice recepturus docetur primo literas cognoscere. S[ecun]do easdem in sillabas compingere. Tercio sill[ab]as in dicciones formare. Q[ua]rto ex d[ic]c[i]onibus oracionem ordinare. Sic in proposita. qui se ad musice disciplinam aptare desiderat oportet primo literae alphabeti quae quasi quaedam signa sonorum ymaginacioni inp[ri]me[re]. S[e]c[un]do hiis lit[er]is quasdam sill[ab]as ad quaedam vocum sustentamenta conjungere. Tercio sonos ex hiis dicitos in consonancias distinquere. Quarto et ultimo cantum cuiuslibet toni ordinabiliter resonare." Mettenleiter, p. 67.

[20]"Est autem proprietas vocum simplicium distinctio." CS II, p. 484.

to establish a classification among simple sounds, which is based on a distinguishing characteristic. The three properties are called square *b* (*quadratum*), round *b* (*rotundum*), and *propriae voces* or *propria nota*, a terminology which recalls the *proprius cantus* found in Amerus and Odington. The explanation provided for the first two names is different from what we have seen so far: the adjectives *quadratus* and *rotundus* are referred to the shapes of the two types of *b*, the square shape indicating something stable and firm, while the round shape is the mark for something weak and sick:

> These [*voces*] are in the first *b quadratus*; it is called *quadratus* for the property [*proprietas*] of this square shape, as appears in the above said figure, because something square is, in a certain way, firm and stable. Thus the sound in *b quadratus* is firm and stable. Similarly, the *b rotundum* is said to demonstrate the property of this way through the roundness of the shape. Indeed, whichever sound is in round *b*, it reveals instability [*infirmitas*] and weakness, because anything that is round, is in motion.[21]

In the quoted passage *proprietas* is indeed the feature which characterizes and distinguishes the square *b* from the round *b*; by extension, the specific characteristic of either square *b* or round *b* is implicitly applied, at least in terms of the name, to the whole series of six notes. As to the third property, no explanation is provided for the terms *propriae voces* or *propria nota*, but the property itself is

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[21]"He vero sunt in primo b quadrato; dicitur enim quadratum per quadre forme hujus proprietatem retinentis, sicut in predicta figura apparet, quia quidquid quadratum est quodam modo firmum et solidum. Sic sonus in b quadro firmus et solidus est. Rotundum b similiter dicitur a rotunditate figre hujus modi proprietatem demonstrans. Quecunque enim est vox in b rotundum, infirmitatem et debilitatem demonstrat, quia quidquid rotundum est, mobile est." Ibid. Note that the next sentence in the treatise, "sic aliquo modo debile indicatur propria nota," clearly contains a mistake, since it attributes the "weak way" to *propria nota* rather than to round *b*.

defined as the one that "claims its own sounds separate from either property of the afore-mentioned."[22] In other words, the third property has sounds which do not exhibit either of the above-mentioned features, of being either stable or movable, firm or weak. It is quite interesting that the characters of two sounds, square *b* and round *b*, are seen affecting the whole series of six notes, so that any given sound belonging to more than one property can acquire different connotations according to the property it happens to be in at a certain moment. This phenomenon could also explain the medieval rule of changing property at the last possible moment, meaning that indeed the sound that has to shift property can acquire the new connotation only by virtue of its proximity to either square *b* or round *b*. The treatise ends the discussion on properties by showing all the positions in the gamut in which they occur, in other words, by showing their deductions. Indeed, not only the beginnings of each property are provided, but also the positions of the following syllables.[23]

The Mettenleiter Anonymous 3 does not provide a definition of property, although he mentions the three properties of *natura*, *b molle* and *b durum* in dealing with mutation.[24]

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[22]"Tertia proprietas dicitur quia proprias voces vindicat ab utraque predictarum proprietate separatas." CS II, p. 485. I do not agree with Henderson's translation of "propria nota" as constant, unchanging, nor with the following rendition of the quoted passage: "because it appropriates the individual unchanging notes from both of the other proprieties." Also he translates the "distinctio," in the definition of *proprietas*, as "a separation of the voces." See Henderson, p. 73.

[23]CS II, p. 485.

[24]See Mettenleiter, p. 72.

The *Metrologus* too mentions the three properties as a *fait accompli*, without feeling it necessary to explain what they are and why they have their names:

> In this first figure Γ, that is, gamma, and in these two letters *G* sol re ut *gravis* and *g* sol re ut *acuta* the property [*cantus*] through *b quadrata* begins, and it climbs from those up to these three letters, namely to *E* la mi *gravis*, and to *e* la mi *acuta* and to *d* la sol *superacuta*, in the above said way. In these two letters, *C* fa ut *gravis* and *c* sol fa ut *acuta* the property through *propria vox* begins, and from those it ascends to these two letters, namely to *a* la mi re *acuta* and to *a* la mi re *superacuta*, as was noted before. In these two letters *F* fa ut *gravis* and *f* fa ut *acuta* the property through *b rotunda* which we call *b mollis* begins, and from those it ascends to these two letters, namely to *d* la sol re *acuta* and to *d* la sol *superacuta*, as we wrote in the previous picture. Whence the verse: Thrice *g* square *b* [*b quarre*], twice *c proprius cantus* [*properchant*] *f* two soft *b* [*b mol*].[25]

Smits van Waesberghe deduces the *Metrologus*' English origin from the appearance, in the *Unde versus*, of the English words "quarre" and "properchant."[26] We also already saw that, even in the Latin versions, English theorists seem to prefer the name *proprius cantus* for the *C* property, in place of the otherwise commonly found *natura*. As we show

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[25]"In ista figura prima Γ, id est gamma, et in istis duabus litteris G. sol re ut gravi et g. sol re ut acuta incipit cantus per b quadratam, et ab his usque ad istas tres litteras ascendit, scilicet ad E la mi gravem, et ad e. la mi acutam et ad d la sol superacutam supradicto modo. Item in his duabus litteris C. fa ut gravi et c. sol fa ut acuta incipit cantus per propriam vocem, et ab his usque ad has duas litteras ascendit, scilicet ad a. la mi re acutam et ad a. la mi re superacutam, ut supra notatum est. Item in his duabus litteris F. fa ut gravi et f. fa ut acuta incipit cantus per b rotundam quam b. mollem vocamus, et ex istis usque ad has duas litteras ascendit, scilicet ad d. la sol re acutam et ad d.d. la sol superacutam, sicut praenotavimus in praedicta figura. Unde versus: Ter g. b quarre bis c. properchant f. duo b. mol." Smits van Waesberghe, p. 71.

[26]Smits van Waesberghe, p. 62. Smits van Waesberghe also notes that the verse appears in two out of the five manuscripts transmitting the treatise; however, he points out that, among the manuscripts lacking the verse, the Siena manuscript leaves room for it.

above, in the quoted passage, the author of the *Metrologus* repeatedly refers to the picture of the gamut which is found on the fol. 122*r* of the manuscript. In this picture, all letters, from Γ to *dd*, are written on the left side, in vertical alignment; right after each letter, the related syllable(s) is (are) shown, with the specification of the property for each letter beginning a new hexachord (Γ, *C*, *F*, *G*, *c*, *f*, *g*).[27] The picture also shows five deductions, on Γ, *C*, *F*, *c*, and *f*, as black notes in ascending (*elevatio*) and descending (*thesis*) position. The omission of the two *g*-deductions could have been the scribe's choice in order to avoid the clustering of too many notes around the *f* and *g* properties. In any case, the emphasis with which the theorist always refers back to this picture could also explain the lack of a section about mutations: all the mutations, and the relative changes of properties, may be easily extrapolated from the diagram.

A brief mention of *deductio* is found in the *Tractatus de discantu*, where the diapason is defined as "containing four *voces*:"

> Note that when it says [that it] contains two *voces*, or three, or four, you must understand brought forth in a series, as are, in the deduction from ut, [the *voces*] re, mi, fa, sol, la.[28]

The anonymous theorist is explaining the interval of an octave as composed of four syllables (*voces*) taken twice, like in the octave *C*-*c*:

C D E F G a b c

ut re mi fa

ut re mi fa

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[27]Reproduced in Smits van Waesberghe, p. 70.

[28]"Nota quod quando dicit continet duas voces, vel tres, vel quatuor, debes intelligere seriatim prolatus, sicut sunt in deductione de ut re, mi, fa, sol, la." CS I, p. 309.

However, aside from the characteristic of showing intervals by means of syllables, which will be discussed in the relevant section of this chapter, it is important to clarify the concept of *deductio* in the quotation above. Two readings are possible for the last clause "sicut sunt in deductione de ut re, mi, fa, sol, la:" 1) as they [*voces*] are in the deduction of ut, re, mi, fa, sol, la; 2) as, in the deduction from ut, re mi fa sol la are [brought forward]. The second reading seems preferable to me, especially because the preposition *de* should be translated as "from" rather than "of," thus reinforcing the origin of the noun *deductio* from the preposition *de* and the verb *duco*. In any case, the term *deductio* is not strictly used in the meaning of anyone of the positions of the hexachord in the gamut. However, the concept of deduction is somehow implied in the whole treatment of intervals, since showing an interval by means of syllables involves the possibility to apply or find that interval in different positions in the gamut.

4. Mutation

As already said, there is no mention of mutation in the *Metrologus*, although that is implicit in the diagram of the gamut.

On the contrary, the *Tractatus de musica plana et organica* devotes an interesting section to the subject of mutation. The first sentence states that there are seven principal mutations, deriving from the fact that a melody cannot ascend above la or descend below ut without a mutation. The treatise does not explain which are the seven principal mutations, and from the previous remark they would seem to

correspond to the points in the gamut in which the shift from one hexachord to the next will necessarily occur, namely, on every la: *E* la/mi, from the hard to the natural property (from the first to the second deduction); *A* la/mi, from the natural to the soft property (from the second to the third deduction); *A* la/re, from the natural to the hard property (from the second to fourth deduction); *d* la/re, from the soft to the natural property (third to fifth deduction); *e* la/mi, from the hard to the natural property (fourth to fifth); *aa* la/mi from the natural to the soft property (fifth to sixth); *aa* la/re, from the natural to the hard property (fifth to seventh).[29] As can be noted, mutations between the two *b*-properties, hard and soft, are excluded, indeed because they do not occur in the course of going beyond the limits of one hexachord.[30] Remarkably, these seven principal mutations are found in Amerus's treatise as well, in the two gamuts which show, respectively, the interlocking of natural and hard properties, and the interlocking of natural and soft.[31] Thus, another trait seems to connect the *Tractatus de musica plana et organica* with Amerus's treatise, which may both stem from the same tradition of hexachordal theory.

The *Tractatus* also defines mutation as the passage from one property to another, rather than from one syllable to another, as other

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[29]Naturally, seven mutations are found in descending too, but on the syllable ut rather than la: *g* ut-sol, from the hard to the natural property; *f* ut-fa, from the soft to the natural property; *c* ut-sol, from the natural to the soft; *c* ut-fa, from the natural to the hard; *G* ut-sol, from the hard to the natural; *F* ut-fa, from the soft to the natural; *C* ut-fa, from the natural to the hard property.

[30]The distinction between mutation *ratio vocis* and mutation *ratio signi* in *De musica plana* naturally comes to mind. See Gilles, p. 46.

[31]See chapter three, pp. 106ff, in the present study.

thirteenth-century definitions recite. Mutation is then subdivided into six species, that is, from the natural property to the hard and vice versa, from the natural to the soft and vice versa, and from the hard to the soft and vice versa. These six mutations, which are found in any gamut location which allows three syllables, bring forth the general rule that "wherever there are three syllables, there are six mutations; where two, there are that many mutations."[32]

In Mettenleiter Anonymous 3, the matter of mutation is treated in a hasty way: no definitions are offered, no classifications, but just the straightforward rule that *claves* with one syllable do not have mutation, *claves* with two syllables have two mutations, and *claves* with three have six mutations.[33] However, in the brief list of mutations provided by the theorist, which includes the notes *G* sol re ut, *A* la mi re, *c* sol fa ut, and *d* la sol re, mutations are symmetrically divided between three ascending and three descending, without taking into account the passage from the hard to the soft hexachord, or vice versa, where the direction of the melody is not supposed to change.[34] The theorist also refers to the note *ee*, which is placed *extra manu*.[35]

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[32]"Hec est regula generalis: ubicunque fuerit tres voces, ibi sunt sex mutationes; ubi vero due, ibi tot mutationes." CS II, p. 486.

[33]Mettenleiter, p. 72.

[34]See the discussion in chapter five, pp. 180f, and chapter eight, pp. 274f, in the present study.

[35]The text shows several mistakes in the handling of notes. In particular, the last sentence reads "Ea vox per b durum secundum modernos et fit extra manu." However, the sentence makes sense only if the "Ea" is changed into "ee," the last pitch added by modern musicians and placed on the back of the hand.

The *Tractatus de consonantiis musicalibus* makes a quick reference to mutation when, describing the major semitone occurring between *b* flat and *b* natural, it says that *b* fa *b* mi is not properly said to be one *clavis*, because it has for its different syllables different signs; and, among other reasons, that is why there is no mutation in *b* fa *b* mi.[36]

5. Syllables and Intervals

The *Tractatus de consonantiis musicalibus* uses syllables to describe most intervals. These are classified into *concordantiae* and *discordantiae*: the former include perfect, medium, and imperfect intervals, the latter only perfect and imperfect ones. The total number of intervals amounts to thirteen, as in Garlandia's theory. Among the *concordantiae*, the imperfect ditone and semiditone, as well as the medium diatessaron and diapente, are described by means of syllables: ut-mi and fa-la for the ditone; re-fa and mi-sol for the semiditone; ut-fa, re-sol, mi-la for the diatessaron; ut-sol and re-la for the diapente. Thus, the theorist is only describing species of fifth which fit within one hexachord; however, the musical example provided right after the description of diatessaron and diapente contains also the two other species of fifth, which are solmized mi-mi (*E-b*) and fa-fa (*F-c*).[37] The *discordantiae* include the perfect

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[36]"Which properly is not said [to be] one *clavis*, since it has two different signs for its different sounds. And among the other reasons there is this: because in *b* fa *b* mi there is no mutation." ("Que proprie non dicitur una clavis; habet enim pro suis diversis vocibus signa diversa. Et inter alias rationes hecest [*sic*] una, quare in b fa b mi non est mutatio." CS I, p. 300).

[37]See CS I, p. 299.

semitone, tritone, semitone with diapente and ditone with diapente; and the imperfect tone, tone with diapente, and semiditone with diapente. Of these, only the tone, semitone, and major sixth (tone with diapente) are described by a pair of syllables, since they do not exceed a hexachord; in particular, the interval of the semitone is discussed as either ascending mi-fa, which expresses the minor semitone, or ascending fa-mi, which corresponds to the major semitone, like the one in the *clavis b* fa *b* mi.[38]

The *Metrologus* too calls intervals *consonantiae*, as the *Tractatus de consonantiis musicalibus*. Syllables are used to describe all intervals inside the sixth, except for the tone. The diapente is described in its four species, as ut-sol, re-la, mi-mi, and fa-fa, thus also using syllables which involve mutation. However, mutation is not used to describe the other extra-hexachord intervals, like minor sixth (semitone with diapente), minor seventh (semiditone with diapente), and the octave. The *Metrologus* lists ten intervals altogether, omitting the unison, tritone, and major seventh. The term *vox* is always used in defining them.[39]

The *Tractatus de discantu* offers a different application of syllables in describing intervals (*species*). First of all, its classification starts from the smallest interval (the unison) and proceeds up to the largest one, without subdividing intervals into

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[38]We already saw the theorist's discussion on *b* fa *b* mi, which properly should not be regarded as one *clavis* because of the different signs (types of *b*). See above, the section on mutation.

[39]"Tonus est quaedam vox . . . Semitonus est quaedam vox." See Smits van Waesberghe, pp. 73ff.

different categories, like the *Tractatus de consonantiis musicalibus* does. Furthermore, after defining the semitone as the conjunction of any mi and fa, and the tone as made of two voices, like ut-re, re-mi, fa-sol, sol-la, the anonymous theorist explains all the other intervals as made up of three or more *voces* which either do or do not include the semitone. Thus, the ditone is composed of three *voces* without the insertion of mi-fa, while the diapente is composed of five *voces* with the interpolation of mi-fa only once.[40]

The Mettenleiter Anonymous 3 distinguishes twelve *modi*, his term for intervals. The semitone is expressed by the syllables mi-fa and is referred, terminologically, to "semi" as half, an etymology which is usually rejected by contemporary theorists on account of the division of the tone into a major and a minor semitone. The tone is said to have four species, ut-re, re-mi, fa-sol, sol-la, so that in this case the species are made to correspond to the positions inside the hexachord. However, in the case of the semiditone, diatessaron, and diapente, the species of *modi* also correspond to the intervals' species, determined on the basis of the position of the semitone: the semiditone has two species (re-fa and mi-sol), the diatessaron three (ut-fa, re-sol, mi-la), and the diapente four (re-la, mi-mi, fa-fa, ut-sol). The species of fifth are arranged in order according to the modes, first re-la, second mi-mi, third fa-fa, and fourth ut-sol, a fact that seems to confirm the theorist's intention to relate to the theory of interval species, rather than just to the position of

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[40]See above the description of the octave, in the second section of the present chapter.

intervals in the hexachord. As to the remaining intervals, the semitone with diapente, the tone with diapente, and the diapason are not categorized into species, while the semiditone with diapente is said to have the same two species as the semiditone, that is, re-fa and mi-sol, as if the position of the semitone inside the diapente did not matter for the classification of the seventh. This might be the reason why the major and minor sixth are not subdivided into species.[41]

Still a slightly different approach is found in the *Tractatus de musica plana et organica*. Here, eleven *consonantiae* are listed: unison, semitone, tone, ditone, semiditone, tritone, diatessaron, diapente, semitone with diapente, tone with diapente, diatessaron. All the intervals are subdivided into species, which are counted twice, both in ascending and descending direction. The unison is said to have six species, that is, six positions in the hexachord: ut-ut, re-re, mi-mi, fa-fa, sol-sol, la-la, and likewise in descending motion.[42] The tone, as in the Mettenleiter Anonymous 3, has eight species, that is, eight locations in the hexachord, four ascending and four descending (ut-re, re-mi, fa-sol, and sol-la, and vice versa). The semitone has only the two species mi-fa and fa-mi. The semiditone and the ditone are divided into four species each: re-fa, fa-re, mi-sol, sol-mi for the semiditone, and ut-mi, mi-ut, fa-la, la-fa for the ditone. The tritone, like the semitone, has only two species, namely fa-mi ascending and mi-fa descending. It should be noted that this treatise

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[41]See Mettenleiter, p. 73.

[42]The use of the same syllable to describe the unison rules out, in this treatise, the idea that unison can express the change of syllable in the the same *clavis*. See above, p. 284.

does not distinguish between minor and major semitone, so that it can use the reverse syllables fa-mi to show the tritone without ambiguities.

As expected, the diatessaron has six species, three in ascending and three in descending. For the diapente eight species are listed, but for the two which need mutation, mi-mi and fa-fa, the theorist does specify that they need to occur in different properties.[43] Also, the theorist warns against the impossibility of having a fifth from *B* to *F*, and from *E* to round *b*, in *graves* and *acutae*.[44] As to the tone with diapente, since the complete enumeration of its species would be annoying, the theorist simply states that they may be easily reconstructed by adding to any species of fifth the interval of a tone. In the case of the semitone with diapente, the theorist gives four species which, he adds, are found in odd properties: re-fa, fa-re, mi-fa, fa-mi. Now, the minor sixth can be found in the gamut between *A* and *F*, *B* and *G*, *D* and *b* flat, *E* and *c*, as well as in the upper octave. The first pair would be spelled with the syllables re-fa (hard and natural properties), the second with mi-sol (hard and natural), the third with re-fa (natural and soft properties), the fourth with mi-fa (natural and hard) or mi-sol (natural and soft). Thus, the species mentioned by the theorist do not cover the sixth from *B* to *G* (mi-sol), perhaps because of the diminished fifth from *B* to *F*.

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[43]"Hujus autem species octo, scilicet: ut-sol, re-la, et la-re, sol-ut; item mi-mi, fa-fa, debent fieri in diversis proprietatibus." CS II, p. 487.

[44]The text actually shows from *B* to *F*, and from *b* to round *b*, but the latter is clearly a mistake, since the diminished fifth occurs between *E* and round *b*. Ibid.

The *Tractatus de discantu* which appears in Coussemaker's third volume as Anonymous XIII, dated between the end of the thirteenth and the beginning of the fourteenth century, lists thirteen "species" of chant, by which it means intervals: unison, semitone, tone, minor third, major third, fourth, tritone, fifth, minor sixth, major sixth, minor seventh, major seventh, and octave.[45] The theorist does not subdivide intervals according to species, even though he uses syllables to describe them. The use of syllables is not always correct, and could be the result of the scribe's, or Coussemaker's, inaccuracy.[46] However, the most interesting characteristic of this interval classification is the treatment of the semitone, which introduces us to the subject of *falsa musica*, which will be treated in the next section.

6. *Musica falsa*

Resuming the discussion in the *Tractatus de discantu*, here follows the quotation about the semitone:

> A semitone is between mi and fa simply to sing, or when one decreases a tone by dividing it, like: la sol la or sol fa sol. The middle note is elevated by a semitone in force of a square *b*, which is placed in front and we pronounce it as fa mi fa. Because in certain places where

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[45]The treatise is in old French and names the intervals as follows: *unisson, demi-ton, ton, ton et demi, deux tons, deux tons et demi, trois tons, trois ton et demi, demi-ton avec quinte, ton avec quinte, ton et demi avec quinte, deux ton avec quinte, deux ton et demi avec quinte* (or *double*). See CS III, p. 496.

[46]As when the theorist states that "two tones are between re fa and fa la" ("deux tones sont entre re fa et fa la, et converso"), without distinguishing between the minor third (re-fa) and the major third (fa-la), or that "a tone and a half with the fifth is between the ut of *C* fa ut and the mi of *b* fa *b* mi" ("Ton et demi avec quinte est entre le ut de C fa ut et le mi de b fa b mi"), an example which actually refers to the major seventh (two tones and a fifth). CS III, p. 496.

> round *b* is placed, we need to say fa, both in plainchant and in descant, and where the square *b* is placed, we need to say mi or a sound which is equivalent; because round *b* and square *b* are done to make a semitone from a tone and a tone from a semitone.[47]

The quoted passage is significant for several reasons. First of all, it refers to the practice of inflecting the middle note, by means of a square *b* sign, in melodic passages labeled as la sol la and sol fa sol. These occur in the gamut, according to the different properties, on the following degrees: *D-C-D* (sol-fa-sol of the hard property), *E-D-E* (la-sol-la of the hard property), *G-F-G* (sol-fa-sol of the natural property), *a-G-a* (la-sol-la of the natural property), *c-b-c* (sol-fa-sol of the soft property), *d-c-d* (la-sol-la of the soft property), as well as the corresponding places in the upper octave. Thus, the following accidentals result: *C♯, D♯, F♯, G♯, c♯, d♯, f♯, g♯, cc♯*. Furthermore, the passage has suggested to some scholars that in the la-sol-la and sol-fa-sol passages, with the inflection of the middle note, singers do not mutate syllables on account of the semitone, but still use the original syllables and inflect the middle note as if it was fa-mi-fa. In my opinion, such a reading is not necessary. In discussing the interval of a semitone, which is always mi-fa, the theorist distinguishes between the mi-fa which is normally found in chant, according to the standard gamut, and the mi-fa which can occur by virtue of the square *b*/round *b* signs. The theorist also shows the

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[47] "Demi-ton est entre mi et fa simplement à chanter, ou quant on restreint ung ton par manière divisée si comme: la sol la ou sol fa sol. la note moyenne est soutenue de demie ton par la force d'ung b quare, qui est assis par devant et le prononchon comme fa mi fa. Car en quelque lieu que b ront est assis, il convient de dire fa, tant en plainc chant comme en deschant, et où b quare soit assis, il convient de dire mi ou son qui le vaille; car b ront et b quare sont fais pour faire d'un ton demi-ton et d'un demi-ton un ton." Ibid.

places where this unconventional semitone may occur by using the syllables, just as he uses syllables to describe intervals: la-sol-la and sol-fa-sol determine a range of possibilities in the gamut, without necessarily implying the actual singing of those syllables.

The last important point to be drawn from the quoted passage is the reference to *musica falsa*, even though the author does not use this term, in the middle of the discussion of intervals. A similar arrangement of topics was already found in Lambertus's treatise and in the Lambertean *De musica plana*, thus proving that such an arrangement is not uncommon in thirteenth-century treatises and should not be regarded as evidence of interpolations.[48]

Another important treatment of *falsa musica* is found in the *Tractatus de discantu* in CS I. The subject is introduced in the context of discant rules as a way to correct imperfect fifths. The text becomes then very close to Lambertus's discussion:

> And thus the question arises from this, namely what necessity was in music to contemplate *falsa musica* or *falsa mutatio*, since according to rules it should accept nothing false, but rather the true. To which it is to be answered that *falsa mutatio*, or *falsa musica*, is not useless, but highly necessary to find a good consonance and avoid a bad one. Indeed it was said: if we want to have a fifth, necessarily we ought to have three tones and one semitones; so that if a note is in *b* fa *b* mi, and another in *f* fa ut *acutum*, in the natural property, then there is no consonance, but dissonance with a double semitone. Nevertheless, it can be done through the music which we call *falsa*, namely when we make a tone out of a semitone, and vice versa; however it is not *falsa* but unusual. For which

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[48]Pinegar supposes that Lambertus's discussion of *falsa musica* in the section about intervals is a clear mispositioning and should be regarded as an interpolation. This alleged misplacement is also one of her arguments against Lambertus's authorship for the first two sections of the treatise. See Pinegar, "Textual and Conceptual Relationships," pp. 133-134.

> it should be noted that *b molle* does not belong to other *claves* by origin. This [*falsa musica*] is recognized through the sign of square *b*, or round *b* placed in an unusual place; so that we would say mi *durum* in *f acutum*, with the sign of square *b*, or if we put round *b* in *b* fa *b* mi, or in similar places, so that it would be in the proportion of a tone, and then will be a consonance with the fifth. And therefore *falsa musica* is some times necessary. And also in order to make any consonance or melody perfect in any note.[49]

In Seay's translation, the sentence "quod b molle non est de origine aliarum clavium" becomes, as in Brother's translation of Lambertus, "that soft *b* is not at the foundation of another hexachord."[50] However, unless we attribute to *clavis* the meaning of hexachord, which seems to be pretty unlikely, since such a meaning appears to be Elias Salomon's idiosyncratic usage, there is really no reference to hexachord in the quoted sentence. What the passage really stresses is that, since this sign is not found in other *claves*, when it is used it has a particular meaning, to highlight *musica falsa*. The reference to *falsa mutatio* suggests that indeed the singer is supposed

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[49]"Et ideo oritur questio ex hoc quod videlicet que fuit necessitas in musica considerari de falsa musica sive de falsa mutatione, cum nullum regulare debeat accipere falsum, sed potius verum. Ad quod est dicendum quod mutatio falsa, sive falsa musica, non est inutilis, imo est necessaria propter bonam consonantiam inveniendam et malam vitandam. Nam sic dictum est: si velimus habere diapente, de necessitate oportet quod habeamus tres tonos cum semitonio; ita quod si aliqua figura sit in b fa b mi, et alia in fa ut acuto per naturam, tunc non est ibi consonantia, sed dissonantia cum semitonio duplici. Verumtamen potest fieri ibidem per falsam musicam quam appellamus, scilicet quando facimus de semitonio tonum, vel e converso; non tamen falsa musica, sed inusitata. Unde notandum est quod b molle non est de origine aliarum clavium. Hec autem cognoscitur per signum b quadrati, vel rotundi in loco inusitato locatum; ita quod dicamus mi durum in f acutum, cum signo b quadrati, vel si b rotundum ponamus in b fa b mi, vel in consimilibus, ita quod sit in toni proportione, et tunc erit cum diapente consonantia. Et idea falsa musica est necessaria quandoque. Et etiam ut omnis consonantia seu melodia in quolibet signo perficiatur." CS I, p. 310. Cf. also Seay, *Anonymous II*, pp. 28-29.

[50]See chapter two of the present study, p. 75.

to mutate, to sing mi-fa, but whether that operation should also involve a new hexachord, or set of hexachords, cannot be demonstrated. Seay translates the last sentence with "in order that every consonance or melody be perfected by either sign." Such a reading does not agree with the Latin meaning of the adjective "quilibet," which really refers to any among several, not to either between two. The presence of the term *signum* should not necessarily imply the two shapes of *b*'s: sign in this sentence is any note, any letter, including the two forms of *b*'s, since those are mostly troublesome in making consonances. Thus the term sign seems more appropriate to include all notes.

Another reference to *falsa musica*, in the same treatise, comes a few lines later, with the heading "sequitur de falsa musica." The new passage stresses again that *falsa musica* occurs when the signs of square *b* or round *b* are placed in an unusual place. With this treatise, we found quite a few sources that have *inusitato* where Lambertus has *mutato*, thus making Cross's hypothesis of a scribal corruption of the word somewhat unlikely.[51] The *Tractatus de discantu* also adds a very interesting remark about two orders of reasons for using *falsa musica*: *causa necessitatis*, to correct intervals, and *causa pulchritudinis*, that is, for the sake of beauty, as it happens in some secular music (*cantinellis coronatis*).

7. Syllables and modes

Syllables are used in connection with modes in the *Tractatus de musica plana et organica*, both to define and to classify antiphons. As

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[51]Cross, "Chromatic Alteration," p. 49. For a discussion of the problem see chapter two, p. 85.

the treatise introduces the topic of modes, it states that "of these there are eight, and they are ended in re mi fa sol."[52] The reference to syllables suggests the possibility of ending the modes on *affinales*, but the subject is not treated. Syllables are also used to classify antiphons; the treatise states, for example, that "all antiphons ending in re, if their *Seculorum* begins in la, belong to the first mode," establishing the other relations, up to the sixth mode, as follows:

ending in re, *seculorum* beginning in fa: second mode;

ending in mi, *seculorum* beginning in fa: third mode;

ending in mi, *seculorum* beginning in la: fourth mode;

ending in ut, *seculorum* beginning in fa: fifth mode;

ending in ut, *seculorum* beginning in la: sixth mode.[53]

Syllables are used again at the end of the treatise to show the psalm intonations according to the common mnemonic verse "Primus cum sexto," which groups modes with the same intonation:

> First with sixth, chant [psalm] will hold fa sol la
> Third with eighth, ut re fa, as the second.
> Seventh starts mi fa sol, fourth la sol la.
> To these add the fifth, which you sing well fa la re fa.[54]

A short reference to syllables in connection with modes is found in Mettenleiter Anonymous 3, regarding the transposition of the fourth

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[52]"Ex his sunt octo, clauduntur et in re mi fa sol." CS II, p. 491.

[53]"Omnes enim antiphone queque desinunt in re, si Seculorum illarum incipiat in la, primi toni sunt." CS II, p. 493.

[54]"Primum cum sexto cantu fa sol la teneto/Tertius octavus ut re fa, sicque secundus./Septimus incipitur mi fa sol, quartusque la sol la./His quintum jungas quem fa la re fa bene cantas." CS II, p. 497. See also Huglo, *Les tonaires*, p. 425, where the verse is quoted with some slight defferences. Huglo notes that this mnemonic verse replaced the old formulation "Pater in filio" and became very common in France, Germany, England, Italy, and Spain starting from the thirteenth century.

mode, either a fifth up (the regular *affinalis*) or a fourth up in a with mi through soft *b*.[55]

8. Syllables and discant rules

Some thirteenth-century treatises offer discant rules by means of solmization syllables, like the *Tractatus de musica plana et organica* and the Vatican organ treatise. By using syllables, such rules may be made to apply to similar patterns, without referring to specific pitches. As an example, I will quote the first rule from the *Tractatus de musica plana et organica*:

> If the chant melody [*cantus*] goes up by two syllables, and the organ [*organum*] starts at the octave, the organ goes down three syllables and will be at the fifth above the chant, that is: ut re, fa re; contra re mi, sol mi, contra mi fa, la fa; fa [sol] sol, fa [la] re; contra sol la, sol mi.[56]

9. Summary

The anonymous treatises analyzed in this chapter make some interesting remarks related to hexachordal theory. The *Tractatus de musica plana et organica* seems to stem from the same tradition of hexachordal theory as Amerus's treatise, since it establishes seven principal mutations which could very well correspond to the seven

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[55]See Mettenleiter, p. 75.

[56]"Si cantus ascendat duas voces, et organum incipiat in dyapason, organum descendet tres voces et erit in dyapente super cantum, verbi gratia: ut re, fa re; contra re mi, mi sol; contra mi fa, la fa; sol [*sic*] sol, la [*sic*] re; contra sol la, sol mi." CS II, p. 493.

mutations shown by Amerus in his stepwise gamut. Moreover, its use of the term *proprius cantus* represents another indication of such a connection. The most original contribution of this treatise lies in the realm of terminology, since the anonymous theorist uses the term *species* to define syllables, and *loci* to define *claves*.

The English origin of the *Metrologus* is attested by the presence of the term *proprius cantus*--even in its English form "properchant"--and by the use of several clefs. Its treatment of hexachordal theory relies largely on a diagram showing the places of mutation.

The two treatises entitled *Tractatus de discantu* (CS Anonymous II and Anonymous XIII) are both interesting especially for their references to *falsa musica*. In Anonymous II *falsa musica* is described as *falsa mutatio*, thus betraying its derivation from Lambertus, and is justified either *causa necessitatis* or *causa pulchritudinis*. Anonymous XIII seems to point to a "false solmization," that is, the singing of semitones on syllables other than mi-fa. However, I have tried to show that such an interpretation is not absolutely necessary.

Finally, the Mettenleiter Anonymous 3 has the classification of mutations according to their direction, as in Jerome, Egidius and the *Introductio*. However, the anonymous theorist prefers to symmetrically subdivide mutations into an equal number of ascending and descending ones, rather than always comply with the rule of the ascending/descending ending syllables.

Chapter 10

TWO EARLY FOURTEENTH-CENTURY SYNTHESES

1. Introduction

In this chapter I will survey two treatises which, although probably written well into the fourteenth century, still belong to the thirteenth-century tradition of hexachordal theory. The sixth book of the *Speculum musice*, by Jacques de Liège, and the third treatise in the *De musica*, by Engelbert of Admont, contain two of the most complete and enlightening syntheses of the hexachordal theory at the stage of development examined in this study. Therefore, an examination of these syntheses will provide an introduction to the major aspects related to such a theory.

Engelbert's *De musica* was published by Gerbert in the second volume of his *Scriptores*.[1] The author was a novice at Admont before 1297, then studied in Padua and Prague. In 1288 he became abbot of St. Peter's, in Salzburg, then in 1297 abbot of Admont, where he died in 1331.[2] The treatise was written in Admont before 1325.

The *Speculum musice* is a voluminous treatise in seven books. The last two books were first published in modern times by E. de Coussemaker, in the second volume of his collection. More recently,

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[1]GS II, pp. 287-369.

[2]A. Hughes, "Edmont of Engelbert," *The New Grove* 6: 169.

the whole treatise was published in the third volume of the Corpus Scriptorum de Musica, edited by Roger Bragard.[3] The original manuscripts trasmitting the treatise are all of Italian origin: Paris, Bibliothèque Nationale lat. 7207, and lat. 7207a, F-Bl Plut. XXIX 16. Of these, only the first contains the whole work.[4] As to the author, partly following and partly rectifying the suggestions of previous musicologists, Roger Bragard has shown that Jacques must have been born around 1260, either in Liège or nearby, where he spent the first part of his life.[5] Smits van Waesberghe identified Jacques with a "Iacobus de Oudenaerde, canonicus majoris ecclesiae Leodiensis," who was professor at the University of Paris in 1313.[6] According to Bragard, Jacques must have studied at the University in Paris, where he wrote the first five books of his *Speculum*, as several passages from the first five books demonstrate.[7]

The last two books were probably written in Liège, since the sixth book mentions several times the *Quaestiones in musica*, found in two Liègeois manuscripts, and the seventh book cites two motets by Pierre de la Rue in another Liègeois source.[8]

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[3]*Jacobi Leodiensis. Speculum musicae*, ed. R. Bragard, *CSM* 3 (American Institute of Musicology, 1955). Abbreviated here as Bragard.

[4]Bragard, p. V.

[5]R. Bragard, "Le 'Speculum musicae' du compilateur Jacques de Liège," *Musica Disciplina* 7 (1953): 59-104, and 8 (1954): 1-17. See also F. Hammond, "Jacques de Liège," *The New Grove* 9: 453-455.

[6]J. Smits van Waesberghe, "Some Music Treatises and Their Interrelations," pp. 107-8.

[7]Bragard, "Le 'Speculum musicae,'" pp. 13-14.

[8]Ibid., pp. 3ff.

The sixth book of the *Speculum*, which contains an important section on hexachordal theory, is divided, as noted by Joseph Smith, into three sections, all dealing with the species of consonances.[9] The first part, from chapter one to chapter fourteen, refers to the ancient past through the testimony of Boethius; the second part, from chapter fifteen to chapter fifty-nine, discusses Guido's view of intervals and modes; the third part, from chapter sixty to the end, deals again with modes and intervals, but from Jacques's own practical point of view.[10] It is in this last section that we find valuable information about hexachordal theory.

2. The elements of the system

Engelbert's explanation of the gamut, or *manus*, is found in the first of his four treatises, in the ninth chapter. The matter is presented in a straightforward way: there are twenty-one sounds (*voces*), yet only ninenteen letters (*litterae*), which are located in ninenteen joints (*articuli*) of the hand. The discrepancy between the number of sounds and that of letters is immediately explained by the fact that in both *b* fa *b* mi, *acutum* and *grave*, under one letter there are two sounds. Last Engelbert introduces the six solmization syllables, immediately clarifying that they ought to be called *notae vocum*, not *voces*, as some musicians do: indeed, to each letter only one *vox* (sound) can correspond--with the exception of *b* fa *b* mi--while two

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[9]F. J. Smith, *Jacobi Leodiensis Speculum Musicae. A Commentary*, Musicological Studies 42 (Henryville-Ottawa-Binningen: Institute of Medieval Music, 1983).

[10]Ibid., pp. 11ff.

or three *notae* (syllables) can be linked to one and the same letter.[11] Thus, Engelbert shows the same concern about terminology as Amerus does, maintaining the distinction between *vox*, a sound, and *nota vocum*, some sort of a label to denote sounds in the context of intervals. The distinction seems particularly significant in comparison with other theorists' descriptions seen so far. Engelbert does not state, as others do, that all sounds are expressed by means of the six syllables, almost implying the equivalence of sounds and syllables; he rather emphasizes that sounds are twenty-one, and that syllables are a useful way to denote intervals among these sounds. The last remark in Engelbert's description of the basic elements regards letters again: they are really only seven, but reiterated to reach the stated number of ninenteen.

It takes Engelbert some effort to explain why the assessed twenty-one sounds are expressed by only six syllables and seven letters. The whole of chapter fourteen, still in the first treatise, tries to provide a logical support by basically working on the ground of interval relationships. As to syllables, Engelbert first notes that the lowest pitches (*Γ*, *A*, *B*) can only have one *nota*, namely, one interval label, because they cannot form a fourth or a fifth below themselves; then, in looking at the highest ones, he says that two *notae* are enough because the highest pitches cannot form a fourth or a fifth above themselves. Now, as for the middle pitches, they can actually form fourths and fifths above and below:

> The intermediate [pitches] between the lowest and the highest ones needed three syllables, because of the triple

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[11]GS II, p. 292.

> mutation of ascent and descent, which starts and ends in them: of which [mutations], one is the mutation of syllable ascending and descending stepwise. The second [mutation] is ascending and descending through semitones, major thirds, and minor thirds in the same octave. The third [mutation] is ascending and descending through fourth and fifth, either in the same octave, or from one octave to another, since all species of fifth and fourth are formed in the middle [pitches], what does not happen in the lowest and highest sounds, as was said.[12]

In order to understand the quoted demonstration, we need to keep in mind that its focal point is the reference to the fourth, the diatessaron, which can be of three different *modi*, or species: tone-tone-semitone, semitone-tone-tone, and tone-semitone-tone. Thus, when Engelbert says that the lowest pitches can only bear one *nota*, he means that each one of them can produce only one type of fourth, in ascending: from Γ to *C*, the first type; from *A* to *D*, the second; from *B* to *E*, the third. On the other hand, the highest pitches need to have two syllables because each one of them can produce two types of fourth in descending: *dd-aa* can either be *dd-cc-bb-aa*, third type, or *dd-cc-bb* flat-*aa*, first type; *cc-g* can either be *cc-bb-aa-g*, second type, or *cc-bb* flat-*aa-g*, third type. As we come to the other pitches, the *mediae*, most of them form fourths of all three types, either ascending or descending: thus, *c* sol fa ut makes the fourth *c-d-e-f* (first type, *c* is ut), *c-b-a-g* (second type, *c* is fa), and *c-b* flat-*a-g* (third type, *c* is sol). I have specified that most but not all middle pitches have

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[12] "Mediae vero gravissimarum et acutissimarum indigebant tribus notis, propter triplicem mutationem ascensus et descensus, qui incipit et terminat in ipsis: quarum una est mutatio notae in ascendendo et descendendo immediate de tono ad tonum. Secunda ascendendo et descendendo per semitonia et ditonos et semiditonos in eodem diapason. Tertia ascendendo et descendendo per diapente et diatessaron, sive in eodem diapason, sive de una diapason in aliud, quia omnes species diapente et diatessaron formantur in mediis, quod non contingit in infimis et in supremis vocibus, ut praedictum est." GS II, p. 296.

three syllables because Engelbert himself excludes *E*, *F* and *b* for the presence of the semitone, which limits the types of fourth for these pitches to two only. Engelbert concludes his reasoning by saying that the adding of one syllable in the lowest pitches, plus the two syllables in the highest ones, plus the three of the middle ones, amounts to six, and thus he has demonstrated the reason why there are six syllables. As a matter of fact, the demonstration is based on the argument that six syllables make it possible to describe the three types of fourth; however, Engelbert likes to provide a pseudo-arithmetical explanation for the syllables' number. Now, the six syllables that arise from Engelbert's calculation would be ut (or re, or mi) for the lowest pitches (Γ ut, *A* re, *B* mi); la and sol (or sol and fa) for the highest (*dd* la sol, *cc* sol fa); and for the middle ones we can choose between four possibilities: sol fa ut, la sol re, sol re ut, or la mi re. The only combination which actually brings about the six syllables ut-re-mi-fa-sol-la is: ut (Γ ut) from the lowest pitches, sol and fa (*cc* sol fa) from the highest, and la mi re (*a* la mi re) from the middle. However, this seems to be hardly significant, given the range of possibilities.

The number of letters is explained by its correspondence to the number of *consonantiae*: as there are seven melodic intervals (tone, semitone, ditone, semiditone, diatessaron, diapente, and diapason) so seven letters are necessary to express them. In other words, the intervals that have been established in the system, and especially the inclusion of the octave among them, make it necessary to have seven distinct pitch definers. At this point of the treatise Engelbert

simply notes that Guido did not recognize the octave among the intervals, without supporting his own view; in the second treatise, when dealing directly with intervals, he justifies the inclusion of the octave among the intervals on a mathematical basis, referring to Boethius and Aristotle as his authorities.[13]

Jacques's approach to describing the hexachordal system is closer to the Lambertean tradition. He subdivides the subject matter into parts, just as Lambertus; yet, by splitting the section on the elements of the system (letters and syllables) he comes to a fivefold, rather than fourfold, division.[14] However, if he devotes a large discussion to letters, syllables, properties, and mutations, the section on the positioning of notes on either lines or spaces is kept to a minimum.[15]

As to letters (*litterae* or *signa monochordi*), Jacques includes the high ee in the gamut, which he justifies as an addition by modern musicians in order to have seven complete *solfationes*, that is, deductions.[16] The twenty-two letters, counting both square and round *b* as two different letters, are first compared in their shape to show the octave equivalence; then, Jacques divides them, excluding Γ and the high *ee*, into five tetrachords according to the pattern tone-semitone-tone (the tetrachord of finals). Finally, he quotes Guido's subdivision into *graves*, *acutae*, and *superacutae*, including the high *ee*

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[13]See chapter three of the second treatise (GS II, p. 300).

[14]In Lambertus the four parts were letters and syllables, lines and spaces, properties, and mutations. See chapter two in the present study.

[15]See Bragard, pp. 163-64.

[16]Bragard, p. 162.

in the last division and counting again both square b and round b as two separate letters.[17] Before heading to the next topic, Jacques adds the following remark:

> However it is to be observed that the mentioned letters designate the steps and positions of the sounds (*voces*) which form intervals and their proportion in a more perfect way in the artificial instrument of the monochord rather than in the joints of the hand, or in the throat's windpipe, that is, in the human voice.[18]

The remark recalls an analogous one in Egidius, and indicates a greater concern for scientific precision over practice.[19]

Chapter sixty-two in Jacques's sixth treatise explores and analyzes the matter of solmization syllables in great detail. *Voces*, which some people call *syllabae*, Jacques says, because they are expressed through syllables rather than just letters, need to be analyzed under four aspects: by themselves (*per se*), in connection with letters, as they mutate, and as they are represented in songs.[20] As John of Afflighem and the author of *Summa musice*, Jacques states that different people use different syllables. Frenchmen, Englishmen, and Germans use ut, re, mi, fa, sol, la, which seems to be the most common set; yet Jacques refers to another set which he spells out as pro, to,

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[17]Thus, there are eight *graves* from Γ to G, eight *acutae* from a to g, and six *superacutae* from aa to ee. See Bragard p. 163.

[18]"Advertendum tamen quod tactae litterae in artificiali instrumento ipsius monochordi perfectius designant gradus et passus vocum consonantias facientium et proportionem ipsarum quam in manuum iuncturis, et quam in gutturis arteriis, id est in voce humana." Bragard, p. 164.

[19]As to Egidius's remark, see chapter eighth, p. 278, in the present study.

[20]Bragard, p. 165.

do, no, ni, a.[21]

When taken by themselves, syllables are called *simplices* and do not form any intervals nor, consequently, any song. As to their relationship with letters, Jacques says that syllables can be joined to letters because both letters and syllables are denominations of sounds.[22] However, letters and syllables, Jacques remarks, are greatly different. The first difference is found in the old practice to use letters as both sounds (*voces*) and notation forms: "voices or sounds, in that they are naturally uttered by the mouth, notes (*notae*) because of the songs in books notated through them, as musicians pleased. Yet we do not use syllables as notes. Not indeed!"[23] The shift from a past practice--to use letters as notational signs--to a contemporary usage--*not* to use syllables as notational signs,--as well as the emphasis put on the latter statement, might hint to a polemical criticism against those theorists who indeed used the word *notae* to describe syllables.[24] As to the other differences between letters and syllables, they can be summarized in the following points:

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[21]This set is not documented in the early sources, yet could be related to the tri pro de nos series which is found in some manuscripts transmitting Guido's *Epistula*.

[22]"The mentioned syllables join the signs or letters of monochord, of which it was spoken above, because both these and those are said *voces*." ("Conveniunt autem tactae voces cum monochordi signis vel litteris de quibus dictum est, quia tam haec quam illae voces dicuntur." Bragard, p. 166).

[23]"Voces vel soni cum naturaliter ab ore proferebantur notae propter cantus per illas in libris sic figuratis ad placitum musicorum. Sed syllabis illis pro notis non utimur. Quin potius!" Bragard, p. 166.

[24]Such as Engelbert, Amerus, and the author of *Summa musice*. See chapters three, p. 98, and six, p. 204, in the present study.

1-syllables can be combined in the same pitch location (*clavis*), but not letters;

2-syllables are six, letters are seven;

3-syllables recur through the gamut more times than letters.

Jacques is now clearly striving to justify the coexistence of two sets of pitch definers. First, he quotes Lambertus to explain why letters are more than syllables; then, in doing the reverse demonstration, namely why syllables are less than letters, he admits that "not easily can it be demonstrated."[25] Then, his demonstration basically follows the rationale that the six syllables, as they are arranged in the hexachord, can express all three species of fourth.[26] Further justifications include the perfection of number six and the correspondence of the six syllables with the six *consonantiae* which are contained in the hexachord, excluding the already mentioned diatessaron: semitone, tone, ditone, semiditone, diapente, and tone with diapente. Jacques does not refer here explicitly to the Guidonian six *consonantiae* (though they might be another reason to justify the number six for syllables), perhapes because his list of intervals includes the major sixth. However, more than about showing a numerical correspondence, Jacques seems to be concerned about the possibility of expressing the major melodic intervals with just six notes, and therefore he only mentions intervals within the sixth, including the

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[25]"Sed quare tantum sex sint voces, illae quae dictae sunt, non facile potest demonstrari." Bragard, p. 167. As to Lambertus's quotation see CS I, p. 254, and the related discussion in the second chapter of the present study.

[26]See Bragard, pp. 167-68, where also a diagram visually exemplifies the arrangement of the three species of fourth in the hexachord.

major sixth, which can be expressed with ut-la, but not the minor one.

In this same chapter there is also a puzzling historical, or rather pseudo-historical digression about a type of solmization with the six syllables in which there was no semitone, but only a succession of two tones, which could be expressed by either ut-re-mi or fa-sol-la. Yet, since not even the first consonance, the fourth, could be achieved with that solmization, at some point musicians decided to place the three syllables fa-sol-la above the other three, and established the distance of a semitone between mi and fa. It is not easy to imagine the theorist's reasons for such a digression, whether he is actually referring to, and criticizing, other forms of solmization or is providing a pseudo-historical foundation for the arrangement of the six syllables, along with the already mentioned logical observations. The narration could even be symptomatic of a certain uneasiness with a system which was probably undergoing some important developments at the beginning of the fourteenth century, as Jacques's reference to irregular mutations suggests.

3. Engelbert's *ars solfandi* and Jacques's *solfatio*

The practice of solmizing becomes the focal point of Engelbert's third treatise. As he states at the beginning of the first chapter:

> Having already explained, in the two parts of this treatise, some things which are more necessary to the theoretical side of the discipline [*scientia*] of music, we move, in this third part, to those things which are more pertinent to the practice of music, and to the principles and rules of practice, because in this discipline the technique (*ars*) is sought for application [*usus*], so that we

> can practice knowledgeably, and use the technique more easily.[27]

Thus, Engelbert's intention is to provide the practical musician, the singer, with the appropriate knowledge (*ars*), that is, the technical principles and rules to practice music proficiently and readily. That is why most of the third treatise of Engelbert's *De musica* is devoted to the technique of solmizing, or *ars solfandi*.[28] After refreshing the reader's knowledge of the gamut, Engelbert states the three main points related to the practice of solmization:

> About the technical knowledge [*ars*] and practice [*usus*] of solmizing, that is, to figure out a chant through the syllables ascribed to the letters and to sing with those syllables as with the words of that chant, these things need to be considered and learned. First, what syllables are to be used in ascending and descending; second, the mutations of syllables, in ascending and descending, in any natural song; third, the magnitude of a leap from one note to another.[29]

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[27]"Modo iam in duabus partibus huius tractatus praehabitis et praedeclaratis aliquibus magis necessariis ad theoricam partem musicae scientiae, transeamus in hac tertia parte ad ea, quae magis pertinent ad practicam musicae, et ad principia et regulas practicae, quoniam in hac scientia maxime ars quaeritur propter usum, ut possimus usum artificialiter exercitare, et artem promptius usitare." GS II, p. 320.

[28]The fourth chapter's heading reads: "That three things need to be considered about the art of practicing, that is, solmizing in music." ("Quod tria sunt consideranda circa artem practicandi, i.e. solfandi in Musica." GS II, p. 322).

[29]"Circa ipsam artem et usum solfandi, id est, per voces adscriptas litteris cantum inveniendi et cantandi in vocibus illis ut in verbis ipsius cantus, ista sunt consideranda et scienda; primo quibus vocibus sit utendum ascendendo et descendendo; secundo de mutationibus vocum in ascendendo vel descendendo in quolibet cantu naturali; tertio de quantitate saltus de voce ad vocem." GS II, p. 322. In chapters two and three Engelbert describes two types of gamut: *secundum abundantiam*, which corresponds to Guido's gamut with twenty-one pitches and nineteen letters; *secundum sufficientiam*, that is, enough to express all eight modes, which corresponds to either Aribo's or Odo's gamut, respectively with either fourteen (from *A* to *g*) or sixteen (from Γ to *a*) pitches and letters. See GS II, pp. 321-322.

Engelbert's exposition indeed focuses on three aspects: what syllables are associated with the letters of the gamut, according to their stepwise succession; what mutations are involved in a natural song (*cantus naturalis*), still in a stepwise melodic motion; and which syllables are to be used in leaps. However, before treating each single aspect, Engelbert defines what a natural song (*cantus naturalis*) is:

> We ought to know that we say natural song in three ways. First, when in a song a sound neither goes up by leap above an octave, nor goes down by leap below an octave. Second, when in a song a leap below the octave does not go beyond the tone plus diapente, either in ascending or descending direction. Third, when [a song] does not exceed in its beginnings, middle cadences [*distinctiones*], and endings, the beginnings, middle cadences, and endings of the eight modes, as is said below, when dealing with the eight music modes.[30]

Engelbert's notion of natural song relates both to the intervals which can be used in a song and to modal procedures.[31] Engelbert explains the importance of recognizing a natural song in order to avoid confusion with the rules and principle of the other type of song, which he calls *cantus innaturalis* or *artificialis*. At this point, we can only speculate what this *cantus innaturalis* is: it might be a song that makes use of notes not found in the standard gamut (*musica falsa*); or, it could be a song in which either hexachordal rules do not apply or different types of hexachords are involved (*coniunctae*); also, it could

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[30]"Sciendum autem, quod cantum naturalem dicimus tribus modis. Uno modo quando in cantu ultra diapason per saltum vox vocem non transcendit, nec per saltum infra diapason cadit. Secundo quando infra diapason saltus in cantu tonum cum diapente non transcendit, nec infra cadit. Tertio quando octo tonorum distinctiones et fines et principia non excedit in suis principiis et distinctionibus et finibus, ut infra dicetur, cum de VIII. tonis musicis tractabitur." GS II, ibidem.

[31]See the section on mutation, from p. 330, in this same chapter.

be a non modal song or a song in which modality is used in a somewhat free way; thus, it could even refer to a secular type of monody, or to a polyphonic line.[32] In any event, it should be noted that Engelbert's treatise does not mention *musica falsa*, and is concerned only with plainsong. Therefore, it is reasonable to suppose that the theorist is keeping the practice of plainsong, based on the strict hexachordal and modal theory, separated from any other type of song which would not comply with the rules and principles he states.

In turning back to *ars solfandi* and to the association of syllables and letters in the standard gamut, first of all Engelbert warns the reader that now he is using the term *vox* to mean *nota vocis*, that is, syllable.[33] Letters are then grouped according to the number of syllables they can bear, either one, two, or three; the syllables associated with each letter are explained in terms of ascending or descending movement, without referring explicitly to properties. Thus, for instance, the letter *A* la mi re, is said to have the syllable la for the ascent from other notes to the note A, and the syllables mi and

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[32]In the thirty-eighth chapter of the fourth treatise Engelbert distinguishes between a *cantus naturalis*, which is a song in the normal modal positions, and a *cantus transpositus* or *transformatus*, in which the modes are transposed and their species are not maintained completely. However, the context in which the term *cantus naturalis* is used seems to be different from what we have here. See GS II, p. 365.

[33]"By *vox* I do not mean here anything else but a denotation (*nota*) of a sound (*vox*); that is, these six syllables ut re mi fa sol la, which we use as the sounds which are the limits of distances like tones and other musical intervals." ("Vocem autem hic non intelligo nisi notam vocis; scilicet istas vi syllabas, *ut, re, mi, fa, sol, la*, quibus utimur, ut vocibus, quae sunt extremae distantiae tonorum et aliarum consonantiarum musicalium." GS II, p. 323). In other words, since now we are about to deal with singing intervals, syllables will be equivalent to sounds.

re to either ascend or descend, depending on whether the ascent goes through round *b* or flat *b*.[34]

A reference to solmization is found in chapter sixty-nine of the *Speculum*. After a detailed explanation about the way melodic intervals can be joined, Jacques refers to the practice of singing and design the student's curriculum in three steps. First of all, the music student needs to learn the gamut and its representation on the hand, thus becoming familiar with letters and syllables, properties, mutations, and intervals. After becoming expert at this level, he can learn chants notated in books, by first "ruminating" on the notes and *solfaciendo*, that is, solmizing without text, and then applying the text to the learned chant. The third step, once the student has acquired a high level of expertise, is the singing of chants "sine solfatione," directly with their text. Thus, Jacques regards solmization as an instrument to learn sight-singing which is to be abandoned once the technique has obtained its purpose.

4. Deductions and Properties

Engelbert does not talk explicitly about the three different properties, but rather discusses the seven positions in which the *ordo vocum*, that is, the series of six syllables ut re mi fa sol la, may occur in the musical hand.[35] Terminologically, not even the deduction appears in Engelbert's discussion, since he speaks of seven starting

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[34]See chapters seven and eight, GS II, pp. 323-24.

[35]His exposition appears close to Salomon's, who never talks about properties, but uses *clavis* to indicate both the beginning of a deduction and the deduction itself. See chapter four, pp. 139ff, in the present study.

points (*inceptiones*) of the hexachordal series; however, in listing the seven beginnings, he does add that these seven *inceptiones* on Γ, *C*, *F*, *G*, *c*, *f*, and *g*, end in their corresponding la on *E*, *A*, *d*, *e*, *a*, *dd*, except for the last one, which lacks the la and ends on the same *dd* as the sixth *inceptio*. Thus, it seems that the word *inceptio*, unmistakably referring to the beginning of a hexachord, also implies the whole hexachord, in a way similar to the term *deductio*, used to mean both the derivation of the series of syllables from a certain ut and the series itself. Engelbert also stresses that the knowledge of the seven positions of the hexachord--and this time he uses both *inceptiones* and *terminationes*--is very important:

> For as the aforementioned sylables and their beginnings and endings are varied in the abovesaid seven ways (*modi*) from one letter and location, to another letter and location, as was already apparent, and this both ascending and descending; thus, in as many ways the beginnings and endings of the intervals are varied; and consequently, the beginnings and endings of the seven modes.[36]

The reduction in the number of church modes from the customary eight to seven is immediately explained in terms of octave species and supported by the authority of Aribo.[37] Thus, Engelbert is probably the only theorist at this time that relates deductions to the theory of intervallic and modal species. He finally adds one last remark about the importance of knowing the abovementioned *inceptiones* to determine

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[36]"Quia secundum quod praedictae voces et earum inceptiones et terminationes praedictis VII modis variantur de una littera et loco ad aliam litteram et locum, ut iam patuit, et hoc ascendendo et descendendo: sic etiam et tot modis variantur inceptiones et terminationes consonantiarum: et per consequens inceptiones et terminationes VII tonorum musicalium." GS II, p. 327.

[37]Ibid.

the order and the number of keys (*claves*) on the keyboards of organs; he also seems to justify the starting of the keyboard from the letter *C*--rather, we might infer, than Γ or *A*--because *C* corresponds to one of those *inceptiones*.[38]

Jacques devotes two chapters to the discussion of deductions and properties. The aim of chapter sixty-three is to show the combinations of letters and syllables in the hand and, specifically, to explain why certain syllables cannot be combined in the same pitch location. The next chapter introduces the three hexachordal properties, while also disproving a contemporary alternative view, which contemplated only two properties.

As to the combination of syllables and letters in the gamut, after stating that four letters have only one syllable, ten have two, and six have three, Jacques explains:

> The gamut [*gamma*] is the appropriate and orderly conjunction of syllables with the monochord letters or signs and between themselves. "Appropriate" [*conveniens*] is said because not just any syllable is joinable with any [other] one.[39]

The syllables which cannot be joined are those which lie a third apart, such as ut and mi, re and fa, mi and sol, fa and la. The demonstration for such a principle amounts to two main reasons: firstly, the third, either ditone or semiditone, does not belong to the established monochord division; secondly, and even more significantly,

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[38]Here Engelbert uses the term *clavis* simply to mean key in a keyboard instrument. See Reckow, "Clavis," p. 3.

[39]"Gamma est conveniens ordinataque vocum cum monochordi litteris vel signis et inter se coniunctio. "Conveniens" dicitur, quia non quaelibet vox cum qualibet iungibilis est ibidem." Bragard, p. 172.

syllables are joined in a single letter in order to mutate, but no mutation is possible between syllables which are a third apart, unless we use *falsa musica*. This second reason is explained in more detail, showing how syllables a third apart cannot mutate one into another. For instance, if we mutated from ut to mi in order to ascend, we would not find the same arrangement of tones and semitones, since after ut there are two tones, and after mi a semitone and a tone; the same is true in reverse, since below ut there are a semitone and a tone, while under mi, two tones.[40] In both cases we would run into four tones in a row, which is never found in the gamut, unless through *falsa musica*. The last remark seems to concede the possibility of having a different arrangement of tones and semitones, different from the one found in the standard gamut, as the result of employing *falsa musica*; however, a few lines later, Jacques adds another remark in a less tolerant tone:

> Whoever acts against the aforesaid conjunctions of syllables, [both] between themselves and also with letters, by placing syllables where they are not supposed to be placed and joining the not joinable ones, disrupts the regular disposition of syllables in the gamut and does *falsa musica* in plainchant.[41]

The arrangement of syllables and letters is exemplified by both a diagram of the gamut [*constitutio, dispositio, vel ordinatio gammatis*] and the picture of the hand [*manus vel palma*]: the diagram shows the seven deductions, which Jacques calls *solfationes*:

> Since in the disposition of the gamut, as can appear

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[40]Jacques demonstrates in a similar way the impossibility of combining ut and la, while also showing the necessity to combine syllables a tone apart, such as ut and re, re and mi, fa and sol, and sol and la, because of the soft b property.

[41]Bragard, p. 173. The matter will be discussed in more detail in the present chapter, in the section specifically on *falsa musica*.

> from what was said above, the first and lowest of the six distinct syllables, which is ut, is contained seven times, along with its appended syllables [*sibi appendentibus*], and consequently deductions [*solfationes*] here are seven, in the gamut there will be forty-two syllables; since seven times six or six seven times is forty-two."[42]

As far as I know, Jacques is the only theorist to use the term *solfationes* to refer to deductions; it is also clear that by *solfatio* he intends the whole series of six syllables, not just the beginning ut, since he refers to the syllable ut along with the syllables which follow it.

The diagram showing the seven *solfationes* also distinguishes them according to the three properties, which, at this point of the treatise, Jacques defines as three ways of singing (*modi cantandi*); however, in the following chapter, the terms *proprietas* and *differentia* are also used.[43] As we saw, Jacques quotes Lambertus's definition of property, although with some deviations.[44] Aside from the differences already pointed out, in the explanation of the three species of *differentiae* Jacques changes Lambertus's definition of the natural property, by omitting the last remark: "nature is the hexachord taken without any *b*, <u>that is, without the difference</u>."[45] Thus, Jacques

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[42]"Cum autem in gammatis dispositione, ut ex dictis apparere potest, prima et gravissima sex distinctarum vocum, quae est ut, septies contineatur cum vocibus sibi appendentibus et per consequens septem sint ibi solfationes, erunt in gammate XLII voces; septies enim sex vel sex septies sunt XLII." Bragard, p. 174.

[43]"Let us discuss now about properties or ways of singing syllables." ("Dicamus nunc de vocum proprietatibus sive modis cantandi." Bragard, p. 175).

[44]For the discussion of the relationship between Lambertus's, the *Introductio*'s, and Jacques's versions see chapter seven, pp. 233-34.

[45]CS I, p. 256. See also chapter two, p. 74, in the present study.

eliminates the inconsistency between Lambertus's previous statement that there are three types of property or difference ("and there are three species of difference") and the definition of the third property, *natura*, as a hexachord without the difference. In his effort to be as complete as he can, Jacques mentions that someone distinguishes the property of *natura* into *bassa natura* (low nature), for the deduction on *C* fa ut *gravis*, and *altera natura*, for the deduction on *c* sol fa ut *acuta*, and that other people call the natural property *proprius cantus*.[46] The observation that the three properties, or ways of singing, were created for aesthetic reasons seems to be Jacques's own, since we did not find a similar explanation in any other thirteenth-century theorist:

> These different ways of singing were found in order not to produce fastidiousness, [as it would be] if there was only one and the same way of singing in the whole gamut.[47]

Also the number of properties is justified against those who believe that there are seven or two properties. To the notion of seven properties, Jacques easily replies that the seven alleged properties, corresponding to the seven deductions, are really only three because of the octave replication; as for the notion of only two properties, *b*

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[46]"Someone calls *bassa natura* the hexachord which begins in low *C*, and *altera natura* the one that starts in high *c* . . . . This property some people call also *proprius cantus*, because this name, as they say, was first placed on it by the author." ("Vocat autem quidam bassam naturam cantum qui oritur a C. gravi, alteram vero naturam eum qui incipit in c. acuto . . . . Hunc etiam modum cantandi vocant aliqui proprium cantum, quia tale nomen, ut dicunt, primo sibi fuit ab auctore impositum." Bragard, pp. 176 and 179).

[47]"Inventi sunt autem hi distincti modi cantandi ne, si esset unus et idem cantandi modus in totius gammatis dispositione, fastidium nobis generaret." Bragard, p. 176.

durum and *b molle*, the theorist engages in a more complex explanation, as this view must have been more common.[48] Jacques proposes four reasons:

1-nothing can change (mutate) into itself: but this would happen on *C*, which needs to mutate from fa to ut in order to go beyond the limits of the first deduction;

2-no *clavis* could have three syllables, if we admitted only two ways of singing; and those which have two, should only have one;

3-the syllables of the hexachords starting on *C* and *c* could not be sung by either square *b* or round *b*, because no *b* occurs;

4-two similar ways of singing would occur one after the other, which is not appropriate.

The emphasis placed by Jacques upon the necessity of the natural property makes one wonder whether it was becoming an endangered species already in the early fourteenth century. The theorist also explains that it is called natural not because the other two are not, but because it contains the tetrachord of the finals, where all songs more regularly and naturally end.

5. Mutation

The subject of mutation is discussed by Engelbert according to the two ways in which mutations occur, either in stepwise motion, or by

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[48]The same concern is shown by Elias Salomon, who inveighs against those who believe that round *b* or square *b* rule songs. "Indeed, in the theoryof French people, it is maintained that . . . a certain part of the same chant is ruled by *b quadratum*, a certain part by *b molle*, and more of such fantasies." ("Nam in doctrina Gallicorum de huius arte continetur quod . . . quaedam pars eiusdem cantus regitur per B quadratum, quaedam pars regitur per B molle et plura similia phantasmata." GS III, p. 41).

leaps. A similar treatment was found in Amerus's treatise, although with some significant differences which will become readily evident in the analysis of Engelbert's exposition.

The eighth chapter in Engelbert's *De musica* is devoted to stepwise mutations (*in ascensu et descensu gradato*), of which there are four principal mutations (*mutationes principales*). Let us take a look at these principal mutations, first in ascending, then in descending direction, according to Engelbert's instructions:

Ascending:

Γ *A B C D E F G a b c d e f g aa bb cc dd*

ut re mi fa sol la/

1st M. mi fa sol la/

2nd M. re mi fa sol la/

3rd M. mi fa sol la/

4th M. mi fa sol la *or*

re mi fa sol

Descending:

dd cc bb aa g f e d c b a G F E D C B A Γ

sol fa mi re ut/

1st M. (la) sol fa mi re ut/

2nd M. (la) sol fa mi re ut/

3rd M. fa mi re ut/

4th M. fa mi re ut

Thus, in ascending, mainly hard and natural hexachords are interlocked, although after the last mutation, Engelbert proposes to continue either with mi fa sol la, through round *b*, or re mi fa sol,

through square *b*. In descending, the first and the fourth mutations are between hard and natural hexachords, while the second and the third involve soft and natural hexachords. Then Engelbert adds that the reason and the need for such mutations is the occurrence of semitones, either right at the mutation point or nearby.[49]

Even more interesting is the part about mutation when leaps occur. First of all, Engelbert restates that a leap cannot, or should not, go beyond the octave, as he already stressed in the definition of *cantus naturalis*, because a leap can only occur according to one of the six *consonantiae*. We saw earlier that Engelbert, in discussing the number of letters, had recognized seven, rather than six, *consonantiae* by adding the octave to the six Guidonian melodic intervals of tone, semitone, ditone, semiditone, diatessaron, and diapente.[50] Yet, in the list provided at this point of the treatise we do not find the tone nor semitone, which are obviously excluded since they are not leaps, and instead we find the semitone with diapente and the tone with diapente listed among the *consonantiae*. The explanation for the inclusion of these two intervals is found in the twenty-ninth chapter of the second treatise, where Engelbert states that modern musicians added two more *consonantiae* to Guido's, namely the major and the minor sixth, so that,

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[49]"And it should be noticed that the cause and the need of the aforesaid mutations is the running into the coming semitones, either in the boundaries themselves, or by the boundaries of mutations, which change the syllables just as they change the hexachord itself." ("Et notandum, quod causa et necessitas predictarum mutationum est occursus semitoniorum occurrentium, vel in ipsis terminis, vel iuxta terminos mutationum, quae mutant voces sicut mutant ipsum cantum." GS II, p. 324).

[50]See above, in the section about the elements of the system. Also cf. GS II, p. 296.

with the inclusion of the octave as well, the *consonantiae* we use now are actually nine.[51] Now, there is still the problem of Engelbert mentioning six *consonantiae* and than listing seven (ditone, semiditone, diatessaron, diapente, tone with diapente, semitone with diapente, and octave). We might simply think that Engelbert is trying to support his list of leaps with the authority of Guido's <u>six</u> *consonantiae*; or rather, since he also uses the terms *tertia, quarta, quinta* and so forth, his counting of *consonantiae* does not include the two forms, major and minor, of an interval, so that *consonantiae* are indeed six if counted this way: second, third, fourth, fifth, sixth, and octave. Yet, this argument fails, for it includes tone and semitone among leaps, which is not possible.

The explanantion comes with Engelbert's second rule about permitted leaps. After excluding all the leaps beyond the octave, as well as leaps that involve two mutations, Engelbert states that, within the octave, only the six *consonantiae* may be used. Thus, it can be inferred that here he is referring to leaps inside the octave, such as ditone, semiditone, diatessaron, diapente, semitone with diapente, and tone with diapente, which amount to six.[52]

In dealing with mutation in leaps, the first point Engelbert makes is that we are supposed to use the same mutating syllables as in stepwise mutation:

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[51]See GS II, pp. 318-319.

[52]See GS II, p. 325. A leap involving two mutations is, for instance, the one from *b* mi to *bb* fa:

b c d e f g aa bb.
mi fa sol la
mi fa sol la
mi fa

> Therefore, the syllables which we use stepwise, ascending or descending, depending either on the different ways of encountering a semitone, or on the different beginnings of a hexachord between the boundaries of mutation, the same [syllables], similarly, we use in a leap, ascending or descending, according to the same different ways of encountering a semitone or to the different beginnings of a hexachord between the boundaries of a natural mutation.[53]

However, for Engelbert there are some significant differences in the use of syllables between stepwise motion and leap. First of all, in an ascending leap we should use a descending syllable for the first note (*in thesi*): for instance, in going from *F* fa ut to *a* la mi re, instead of using fa and la, or fa and re, we should use ut (a descending syllable) and mi.[54] As a matter of fact, Engelbert explains, there are two types of syllable progression, a natural one and an artificial one. The natural progression (*consequentia, positio*) is the one we found in the stepwise succession of syllables according to the four natural mutations; the artificial progression occurs in three ways:

1-because of a semitone: when going down stepwise from *d* la sol re to *a* la mi re through *b* natural, we cannot use the syllable la for *d*, as in the natural mutation, because we need to sing fa in *c*, and it would not be advisable to sing la fa on two tones next to each other;

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[53]"Unde voces, quibus gradatim utimur ascendendo et descendendo secundum diversitatem variationis occursus semitonii, vel inceptionis cantus inter terminos mutationis, eisdem consimiliter utimur in saltu ascendendo et descendendo secundum eandem diversitatem occursus semitonii, vel inceptionis cantus inter terminos naturalis mutationis." GS II, p. 325.

[54]Cf. the diagram about the four natural mutations, on p. 328. Engelbert uses the expression *in thesi* to mean the starting point of a leap.

2-because of a leap: for instance, when going from *C* fa ut to *E* la mi, which in the natural succession are solmized fa-la, we should use ut-mi instead, because that is the natural way to spell that interval, as from Γ ut to *B* mi.

3-because of the variation through round *b* or square *b*: for instance, when ascending from *G* sol re ut, if the leap reaches square *b*, we ought to use the syllables ut-mi, and if it reaches round *b*, we need to use the syllables re-fa. However, in the natural progression of syllables *G* sol re ut is spelled with sol.[55]

In summary, first Engelbert, for the purpose of mutation, posits a preferential succession of syllables, mostly based on the hard and natural properties; then he admits some exceptions to this succession, mainly due to the presence of *b* flat or to mutation by leap.[56] It is not clear, however, whether Engelbert's exposition is supposed to be prescriptive or descriptive. In my opinion, the presence of similar descriptions in Amerus and in the anonymous author of the *Tractatus de musica plana et organica* speaks in favor of an actual practice based on certain preferred mutations (*mutationes principales*). [57]

One last observation regards Engelbert's specification to change the natural syllables with an intervening *b* flat "because fa does not

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[55]GS II, p. 326.

[56]The succession of properties in the natural progression is: ascending, hard-natural-hard-natural-hard (or soft); descending, hard-natural-soft-natural-hard.

[57]As we saw, while the anonymous treatise explicitly speaks of seven principal mutations, Amerus simply provides two ten-line "staves," one showing the mutations between hard and natural hexachords, the other the mutations between natural and soft hexachords. See chapter three, pp. 106-108, and chapter nine, pp. 293-4, in the present study.

follow naturally la, so that it would be said la fa, both ascending and descending."[58] Thus, Engelbert is advising to use mutation, rather than the succession la fa, apparently excluding the "celebrated" (by modern scholarship) *fa-supra-la* rule.

In Jacques's treatise the subject of mutation spans over two chapters, one devoted to the regular mutations, the other to the irregular ones. This seems to be a new, personal approach to a matter which so far has been treated in terms of *falsa musica* or *falsa mutatio*..

In the chapter about regular mutations, first of all Jacques states the definition of mutation:

> Regular mutation, as taken here, is the change, one into the other, of distinct [yet] unison or equal syllables which are sung through different properties in order to ascend and descend.[59]

The definition is clearly cast on similar ones found in thirteenth-century treatises, although it shows some refining for the purpose of clarity. In particular, the term *variatio*, change, used in place of the commonly found *divisio* and *dimissio*, surely proves to be a better choice.

The definition is then meticulously dissected and analyzed into its parts:

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[58]"Quia fa non sequitur naturaliter la fa, ut dicatur, la, fa, ascendendo vel descendendo." GS II, p. 326. The sentence refers to the stepwise descent from *D* to *A* which I listed under 1, on p. 327 of the present chapter.

[59]"Mutatio regularis, ut hic sumitur, est distinctarum vocum per diversos modos decantatarum aequalium vel unisonantium ad ascendendum vel descendendum unius in alteram variatio." Bragard, p. 179.

1-"regular mutation" was said to exclude the other type, the irregular mutation;

2-"distinct syllables" was said to exclude mutation where there is only one syllable;

3-"unison or equal" was stated to make sure that the syllables involved in a mutation express the same pitch, especially on account of *b* fa *b* mi, which could be mistaken as a letter with two syllables; in reality, those are two different pitches, since the letter *b* takes two different shapes and is repeated before the second syllable, which is never done in other *claves*;

4-"to ascend and descend" was added to show the major reason for mutating, to go beyond the limits, either upward or downward, of the hexachord.[60] Jacques also mentions another cause of mutation, to change property, in other words, to enter the singing through b flat.

In dealing with the types of mutation, Jacques does not rank mutations by assuming some principal ones, but rather takes into consideration all possible mutations and reduces them to eighteen fundamental types or *species*:

ut-re, ut-fa, ut-sol

re-ut, re-mi, re-sol, re-la

mi-re, mi-la,

fa-ut, fa-sol,

sol-ut, sol-re, sol-fa, sol-la

la-re, la-mi, la-sol

Jacques mentions and criticizes another position which assumes eight types of mutations. The theorist explains these eight types as

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[60]Ibid., p. 180.

all the mutations by tone, namely ut-re, re-ut, re-mi, mi-re, fa-sol, sol-fa, sol-la, and la-sol. However, this classification is clearly unacceptable because it lacks the fundamental mutations by fourth and fifth, as Jacques points out.

As to the direction of mutations, Jacques does not mention the common rule that ut-re-mi are to ascend, while fa-sol-la to descend. Starting from the eighteen species of mutations he established, he says that twelve mutations include either ut or la, and consequently can be divided into six ascending ones and six descending ones; the remaining six mutations, which involve the middle syllables, are again subdivided into three ascending ones (sol-re, mi-re, sol-fa) and three descending ones (re-mi, re-sol, fa-sol). The whole matter becomes more clear when Jacques lists all the possible cases, after stating the general rule that the direction of mutation depends on the relationship between the two syllables involved. In fact, if the second can ascend higher than the first, the mutation is ascending; if the second can descend lower than the first, then it is descending. For instance, if ut mutates into re, since re cannot ascend higher than ut, but can descend lower, then the mutation is descending. Here follows the complete classification of mutations according to the direction of movement:
Ascending mutations: re-ut, fa-ut, sol-ut, mi-re, sol-re, la-re, la-mi, sol-fa, la-sol.
Descending mutations: ut-re, ut-fa, ut-sol, re-mi, re-sol, re-la, mi-la, fa-sol, sol-la.

At this point, it is evident how Jacques's classification diverges from the rule of considering mutations ending in ut-re-mi as

ascending and mutations ending in fa-sol-la as descending: according to Jacques, sol-fa and la-sol are ascending, in spite of their descending last syllables fa and sol; ut-re and re-mi are descending, in spite of their ascending last syllables re and mi.[61]

Irregular mutation is defined as the mutation between non-associated syllables, that is, syllables which would belong to different *claves* in the regular gamut. This occurs between syllables a third apart, like ut-mi, re-fa, mi-sol, and fa-la; a sixth apart, like ut-la; and a semitone apart, like mi-fa. However, Jacques specifies, even syllables a tone apart--such as ut-re, re-mi, fa-sol, and sol-la, produce a regular mutation only on the notes *G* and *g* (ut-re), *A*, *a* and *aa* (re-mi), *c* and *cc* (fa-sol), *d* and *dd* (sol-la), while making irregular mutations on any other *clavis*.[62]

Irregular mutation is an equivalent of *falsa mutatio* or *falsa musica*:

> Irregular mutation is named *falsa mutatio* because a syllable is mutated into another syllable to which it is joined in a false, not true way; it is also called *falsa musica* because it goes against the regular arrangement of syllables in the gamut.[63]

Jacques cites two examples of false mutation practiced by some singers in plainchant. The first one refers to the sharpening of *G*,

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[61]See the different classification in Jerome and Egidius and the related discussion, in chapter five and eight.

[62]See Bragard, pp. 183-84.

[63]"Vocatur autem irregularis mutatio "falsa mutatio" propterea quia vox mutatur in vocem quae sibi non vere, sed false coniungitur; vocatur etiam falsa musica, quia vadit contra regularem vocum in gammate <dispositionem>." Bragard, p. 184.

when moving down from *b*, in fourth mode; the second example refers to the sharpening of *c* in seventh and eighth mode, when descending from *e*. In both cases, instead of singing two tones, singers make a tone and a semitone, thus mutating from la to sol, respectively on *b* and *e*, and then singing sol-fa-mi, in place of la-sol-fa.

Next Jacques gives an example of what some people *falsely* call *falsa mutatio*, namely, in leaps of a sixth, a seventh, or an octave. This cannot be called a mutation, not even an irregular one, since mutation has to occur on a common note. The remark is interesting because it refers to what will be called, in later hexachordal theory, a *disiuncta*, that is, a change of hexachord caused by a leap, such as the minor seventh *D-c*, which is spelled re-fa, re of the natural property (second deduction), fa of the hard property (fourth deduction). However, even though the leap produces a switch of properties, strictly speaking it does not make a mutation because the switch does not occur on a common pitch.

Thus, Jacques shows a conservative attitude towards the use of *falsa musica* in plainchant, while also bearing witness that it was actually practiced. In the realm of secular and instrumental music, however, *falsa mutatio or falsa musica* is accepted, especially to correct intervals:

> Yet, since music is of two types, plainchant and mensural, irregular or *falsa musica* goes against plainchant because plainchant does not use such a mutation and the hexachord [*cantus*] which follows the other [hexachord], since it would go against the regular arrangement of the monochord, which is desirable to observe. But the afore-said mutation does not go [in the same way] against mensural music, which has to do with several voices perfoermed together and having a certain harmoniousness among themselves.[64]

The specification that plainchant uses neither irregular mutation nor the *cantus* which follows, might imply the use of false hexachords as well, deriving from that mutation, in other words, *coniunctae*. In any case, the passage is significant for drawing a line between plainchant and mensural music, whereas almost all the other theorists who speak of *falsa mutatio* do not make such a distinction.

6. Syllables and Intervals

Engelbert describes intervals by means of syllables. As we saw, in the second treatise, which deals specifically with the subject of *consonantiae*, Engelbert first adds the octave to the six intervals established by Guido (tone, semitone, ditone, semiditone, diatessaron, diapente); then, he states that some modern musicians added the tone with diapente and the semitone with diapente (major and minor sixth), although these are very rare in plainchant.[65] While intervals are listed by using letter-syllable combinations, Engelbert uses syllables alone for the classification of intervals according to species. Thus, the two species of the minor third are described as re-fa and mi-sol, while the three species of fourth, as ut-fa, re-sol, and mi-la. The four species of fifth are related to the three species of fourth, starting from *D* re. Only the third species is described with

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[64]"Sed cum duplex sit musica, plana et mensurabilis, irregularis vel falsa musica vadit contra planam musicam quia musica plana tali mutatione et cantu, qui ad aliam sequitur, non utitur, cum obviet regulari dispositione monochordi quam observare nititur. Sed tacta irregularis mutatio non sic vadit contra musicam mensurabilem quae respicit plures voces simul prolatas et aliquam concordiam inter se habentes." Bragard, p. 186 (underlining mine).

[65]See GS II, p. 300.

syllables, as fa-mi-re-ut/sol-fa, descending from *c* sol fa ut to *F* fa ut, and making a mutation on *G*. One last reference to syllables in connection with intervals is found near the end of this second treatise, where Engelbert describes the minor sixth by means of syllables and mutation: from *F* to *A*, descending, the sixth is read fa-mi-re-ut/sol-fa-mi.[66]

In dealing with the joining of non-unison syllables, in other words with melodic intervals, Jacques distinguishes between conjunctions *immediatae*, by step, and *mediatae*, by leap. The former occur between adjacent syllables, as either a tone (ut-re) or a semitone (mi-fa). The latter occur between non-adjacent syllables and produce different intervals, such as ditone (ut-mi, fa-la), semiditone (re-fa, mi-sol), diatessaron (ut-fa, re-sol, mi-la), diapente (ut-sol, re-la), and tone with diapente.[67] Syllables turn out to be very important in defining the internal configuration of the principal intervals, namely tone, semitone, the two types of third, fourth, and fifth. Quoting from the *Regulae rythmicae*, Jacques distinguishes four *constitutiones*, of which the first is simple, the second double, the third quadruple, and the fourth octuple. These constitutions are the possible melodic configurations of an interval. Since tone and semitone do not have any note in between, they can only have one configuration, as, for instance, re-mi, and mi-fa. Thirds, both minor or major, can have two configurations, with or without the internal

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[66]GS II, p. 319.

[67]See Bragard, pp. 187-88. As to the tone with diapente Jacques cites E to c, which actually is a semitone with diapente.

note: thus, for example, re-mi-fa or re-fa; fa-sol-la or fa-la. Fourths can have four configurations, since they have two intermediate notes: re-mi-fa-sol, re-mi-sol, re-fa-sol, or re-sol. Finally, fifths have eight configurations: re-mi-fa-sol-la, re-mi-fa-la, re-fa-sol-la, re-mi-sol-la, re-sol-la, re-mi-la, re-fa-la, and re-la.[68] The examples are the ones provided by Jacques, always starting from re (whenever possible), thus relating this classification of melodic configurations to the first mode, and, likely, to singing exercises which must have been used to learn intervals and their *constitutiones*.

7. Syllables and Modes

Engelbert devotes the whole fourth treatise to the exposition of modal theory.[69] As announced earlier, Engelbert resumes his treatment of *cantus naturalis*, explaining that the whole doctrine regarding *cantus naturalis* consists of four material parts (*inceptio, ascensio, descensio, terminatio*) and four formal parts (*intonatio, tenor, distinctio, permutatio* or *transformatio*), all related to modes. In dealing with each of these parts, the theorist uses either letters or letter-syllable combinations. Syllables acquire a special significance in relation with the concept of *convenientia*, which is important to establish which notes may be used to begin a song in a certain mode. As Engelbert explains, some notes agree (*conveniunt*) entirely, some differ (*differiunt*) entirely, and some agree or differ only in part. The degree of *convenientia* between two notes is measured by the type of

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[68]See Bragard, p. 189.

[69]See GS II, pp. 338-369.

interval they form and especially by the number of syllables they have in common:

> Those [notes] which differ entirely are those which do not have any syllable in common, although they form a consonance with each other: such as the finals C, D, E; even though C and D, and D and E make a tone, and E with C, and vice versa, make a ditone, yet C has two syllables, fa and ut, which neither D nor E has. And D has sol and re, which C and D do not have. And E has la and mi, which C and D do not have.[70]

Notes which agree in one or more syllables with the finals can begin a song, while notes which totally differ are ruled out. Also as regards endings, there is a strong *convenientia* between the four finals, *D, E, F,* and *G,* and the four notes *a* la mi re, *b* mi, *c* sol fa ut, and *d* la sol re, in which a song can end without disrupting its mode. However, it should be noticed that the relationship between the four finals and their fifths is a particularly strong *convenientia*, as shown by Engelbert's use of a different term, *sociales*, to define the four final substitutes.[71]

Jacques uses solmization syllables throughout the treatment of modal theory, to describe psalm intonations, *differentiae*, modal tenors or modal beginnings.[72] The most interesting aspect, in terms of the hexachordal theory, is the relationship the theorist establishes between syllables and finals, which is found in chapter seventy-five.

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[70]"Quae vero omnino differunt, sunt, quae nullas voces communes habent, licet consonantias aliquas ad invicem faciant: sicut C. D. E. finales; licet enim C ad D et D ad E faciant tonum, et E ad C et e converso faciant ditonum, C tamen habet duas voces, fa et ut, quas non habet D nec E. Et D habet sol et re, quas non habent C et E. Et E habet la et mi, quas non habent C et E." GS II, p. 356.

[71]See chapters XXVI on the *convenientia vocum* and chapter XXVIII on *sociales* (GS II, pp. 356-358.)

[72]See Bragard pp. 227ff, 230ff, 232-33, 236ff.

Here, Jacques states that of the six syllables ut re mi fa sol la, four are called *finales* because a chant more often ends in one of them. By using the syllables, Jacques can refer both to the standard finals on *D, E, F,* and *G* and to their *affinales*. He also states that the four syllables re mi fa sol are most commonly used as finals because a chant needs to be able to move by one step above or below its final, without producing a mutation, and this cannot occur with ut and la.[73] However, in the next chapter, Jacques does take into consideration the other two syllables, ut and la, to find out the mode to which they may belong. Songs ending in ut are of the fifth or sixth mode, when ut is associated with the letters *C, F,* and *c;* they belong to the seventh or eighth mode, when ut is on the letters Γ, *G,* and *g*. Thus, the affiliation with a certain mode is determined by the presence, in conjunction with ut, of a final syllable, such as fa or sol. However, in conjunction with re, as in *G* sol re ut, it does not indicate the first or second mode because of the different species of fifth it produces.[74] As to songs ending in la, they may belong to the first or second mode, as well as to the third or fourth, if the syllable la is on the letter *A, a* or *aa*. They can only be of the third and fourth mode when la is associated with the letter *E*. The occurrence of la in conjunction with sol in *d* la sol re could imply a possible relationship of la with the seventh and eighth mode; however, this is ruled out by Jacques, who denies an *affinalis* to the last modal pair.

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[73] The remark recalls Smits van Waesberghe's observation that the hexachordal unit is the most suitable for modes because it includes the step below and above each final. Waesberghe, *Guidone Aretino*, p. 97.

[74] See Bragard, pp. 219-220.

8. Summary

Both Engelbert's *De musica* and Jacques's *Speculum* provide a complete treatment of hexachordal theory. The *Speculum*, in particular, deals with all aspects of the theory while also referring to other theorists' positions.

As to the specific issues, both Engelbert and Jacques try to reconcile the problem of having seven letters, yet only six syllables, to define pitches. They both refer to the practice of solmization, which Engelbert calls *ars solfandi* and Jacques *solfatio*; however, while Engelbert's *ars solfandi* is an autonomous practice, Jacques's *solfatio* represents only the first step in reading music.

In the treatment of mutation, Engelbert appears to be in line with Amerus and the *Tractatus de musica plana et organica*. He establishes four principal mutations and then discusses the matter of mutation in both stepwise motion and leaps. Jacques follows Lambertus's approach in distinguishing between a regular and an irregular mutation, the latter being an equivalent of *falsa mutatio*. In his discussion of irregular mutation Jacques provides valuable information about the use of accidentals in chant.

In dealing with leaps Engelbert seems to exclude the later *fa-supra-la* rule, which, according to some modern scholars, was already in force in the thirteenth century.

Jacques's treatment also includes a brief discussion of the relationship between syllables and modes, although he does not establish a correspondence of property and mode as Jerome does.

Chapter 11

CONCLUSIONS

In this last section, each component of the hexachordal theory, which had been previously discussed in relation to a single theorist or a small group of theorists, will be reviewed, in a synoptic way, by comparing all treatises together.

1. The elements of the system

In discussing the basic elements of the system we encountered a host of different terms, three of which seem to recur with particular insistence: *littera*, *clavis*, *vox*. I will now briefly review the different meanings associated with these three terms, while also discussing other, related terms.

Litterae refer to the alphabetical letters which were devised to write down elemental verbal sounds and later came to be used, by analogy, to designate discrete musical sounds.[1] Since musical sounds were measured by means of the monochord, letters were also used to indicate the points of division of the string. Some theorists

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[1]Duchez notes that the first musical terms derived from Latin grammatical terminology. In particular, "the notion of a distinct unit [a discrete sound] went from language to the music which accompanies it; the musical sound was regarded, in comparison with the letter, as an elemental act of delivery and listening." ("La notion d'unité distinctive passa du language à la musique qui l'accompagne; le son musical fut considéré, par comparaison avec la lettre, comme un acte élémentaire de prononciation et d'écoute." Duchez, "Description grammaticale," pp. 569-70).

specifically refer to the "monochord operation" in discussing letters: the author of *De plana musica*, either Garlandia or an anonymous compiler, starts his treatment of the system with the description of a monochord division that results in seven *signa monochordi*, which by virtue of octave repetition can be reiterated infinitely.[2] Odington too explicitly refers to the monochord division when stating that "the monochord sounds are indicated by the letter of the alphabet."[3] The English theorist uses the term *signa vocum* along with *litterae*, and *signa monochordi* is found in Jacques. The only theorist who tries to provide a definition for *littera* is Elias Salomon. According to his definition, "a letter is the smallest part of a composite sound which cannot be written by itself."[4] As we saw, Salomons's definition of *littera* is cast on the one provided by grammarians, with the noteworthy difference that, for Salomon, a letter "cannot be written." Whether this is just a matter of notation or rather a philosophical statement, in which letters are compared to rough matter and solmization syllables to knowledgeable forms, remains to be ascertained.[5] In any event, Salomon's speculations seem to have remained an isolated effort. The most intriguing aspect of the use of the term *littera* by thirteenth-century and early fourteenth-century theorists is its relationship with

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[2]See the sixth chapter of the treatise, *De operatione monochordi* (Reaney-Gilles-Maillard, pp. 16-17).

[3]"Voces monochordi litteris alphabeti signantur." Hammond, p. 92.

[4]"Quid est littera? Minima pars vocis compositae, quae scribi non potest." GS III, p. 18.

[5]On the interpretation of Salomon's definition see the discussion in chapter four, pp. 128ff, of the present study.

the term *clavis*. As noted by Berger, the term *clavis* is found neither in grammar, nor in arithmetics, nor in philosophy, and seems to have originated in the realm of musical practice.[6] Some theorists refer to the similitude with "key," so that, as a key enables us to open a lock, thus a *clavis* opens the knowledge of music. However, we cannot exclude the possibility that this metaphor was created *a posteriori*, and that the term *clavis* originated in some other way.

In thirteenth-century theory, the term appears to be used with the following connotations:

1-*clavis* as a mere synonym of letter. Lambertus and the anonymous author of *De musica plana breve compendium* seem to identify *claves* with *litterae* when speaking of "*A B C D E F G*, which are also called *claves*."[7] However, they also seem to draw a distinction when referring to number, since *litterae* are said to be seven, and *claves* twenty. Amerus seems to use both terms almost interchangeably ("If it is asked: through which letter or *clavis* is it sung?")[8] He even uses the term *litterae*, not *claves*, when stating that they are twenty-three.[9] The author of the *Introductio* seems to use the term *littera* when speaking of music in general, and then switches to the more specific *clavis* in the treatment of the fundamentals of plainchant theory. Thus, he

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[6]Berger, *Hexachord*, pp. 98-99.

[7]"A B C D E F G, quae etiam claves vocantur." CS I, p. 254. See also Gilles, p. 42: "Item sunt septem litterae latinae . . . quae etiam signa sive claves vocantur."

[8]"Si queritur: quali littera vel clavi canitur?" Ruini, p. 23.

[9]See Ruini, p. 22. There is an obvious mistake in the counting of letters, since Amerus's gamut, which only reaches *dd* sol la, contains only twenty-one letters.

states that in Γ ut, "*G* is the *clavis*, and ut is the syllable."[10]

2-*Clavis* as a letter-syllable combination to denote a particular pitch: Jerome is the only theorist to explicitly state this meaning of the word *clavis*: "the above-mentioned combinations of letters [and syllables] by some people are called *claves*, in resemblance with keys."[11] The theorist also provides the following definition, which again he ascribes to other people: "*Clavis* is the unison congeries of the primary elements of music, which opens the way of proper singing [*modulare*]."[12] The "primary elements" are, obviously, letters and syllables. The same concept is expressed by means of the term *dictio* by Grocheio, who speaks of "twenty phrases (*dictiones*) composed of seven letters and six syllables."[13] Still another term, *deductio*, seems to be used in the meaning of letter-syllable combination by the author of the *Introductio*.[14]

3-*Clavis* as a pitch location, whether in the abstract, conceptual series of notes (gamut), in the tangible representation on the hand, or on the system of lines and spaces for the writing of music. This seems to be the most common meaning, implied even by those theorists who speak of "clavis sive littera," thus apparently using the term *clavis*

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[10]"G est clavis, ut est vox." CS I, p. 159.

[11]"Supradictae autem litterarum combinationes a quibusdam claves dicuntur ad similitudinem clavium." Cserba, p. 47.

[12]"Clavis est unisona congeries primorum elementorum musicae viam reserans modulandi." Cserba, p. 48.

[13]"Undeviginti dictiones ex septem litteris et sex vocibus compositas." Rohloff, p. 48.

[14]See CS I, p. 160. See also the discussion in chapter seven, pp. 243-45 and 252-53, in the present study.

as synonymous of *littera*. The theorist who explicitly draws a distinction between *clavis*, pitch location, and *littera*, its designation by an alphabetical letter, is the author of *Summa musice*.[15] He refers to the tangible placement of *claves* on the hand's *articuli* (joints), and to their position on the system of lines (*clavis spatialis* or *linealis*), which sometimes is also represented on the hand. In other words, the pitches of the tonal system are conceptually put in succession, that is, positioned in a gamut, according to a precise sequence; they are also physically located on the hand, by means of the joints, as a quick reference for singing and solmizing, and on the written page, by means of lines and spaces, in order to notate and read music. The anonymous *Tractatus de musica plana et organica*, which in place of the term *clavis* uses *locus*, expresses a similar concept when saying that *loci* are designated by either Latin or Greek letters, and that they are either *spatialia* or *linealia*.[16] The Mettenleiter Anonymous 3 stresses more the connection with the hand, by specifying that *claves* are letters located on the hand ("There was discussion of the letters that are placed in the picture of the hand, which are also called *claves*").[17] As a consequence of this concept of

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[15]Also the anonymous *Ratisbonenses quidam*, that is, Mettenleiter Anonymous 3, speaks of "clavis per capitalem [litteram] signata," ("*clavis* designated by a capital [letter]") Mettenleiter, p. 71.

[16]CS II, p. 484: "And these *loci* are certainly designated by Greek letters, as will be shown . . . . Therefore, of [these] *loci* some are on a line, some on a space." ("Qui quidem loci ideo per grecas litteras sunt designati, ut ostenditur . . . . Igitur locorum, alia sunt linealia, alia spatialia.")

[17]"Dicto de litteris in figura manus locatis que et claves dicuntur." Mettenleiter, p. 72.

clavis, the association of syllables with *claves*, according to the three properties, represents an additional step. Thus, *clavis* cannot always be translated as a letter-syllable combination, as Dyer suggests, since, aside from Jerome's testimony, most theorists use *clavis* as a pitch location, which is defined by a letter, and further by means of syllables.[18] We might be tempted to use the English term "note" to render *clavis*, since our note implies the location in a gamut and the writing on the staff; yet it would be restrictive, not only because of the metaphorical meaning inherent to *clavis*=key, but also because a *clavis* contains in itself the potential to be a clef as well. Therefore, I propose to leave the term untranslated.

4-As a corollary meaning for the term *clavis* we find "clef," which is better defined as a particular usage of *clavis*. In fact, when notating a chant, the scribe is not required to use the whole system of lines and spaces on which *claves* are placed, but only a portion of it, four or five lines; then, in order to make clear which portion is in use, only one line needs to be identified by the letter which designates its corresponding *clavis*. *Claves* used in this way are restricted to a few, and some theorists refer to them as *claves principales*.[19]

5-The use of *clavis* as a key on a keyboard instrument, which we found in Jerome and in Engelbert, seems to be an extension of the meaning of note in the gamut, and could be interpreted as another physical pitch location, this time on a keyboard.[20] On the other hand, the use of

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[18]Dyer, review of "Summa musice," pp. 221-22.

[19]See Amerus (Ruini, p. 27) and Odington (Hammond, p. 98). The author of the *Metrologus* simply speaks of *claves* (Smits van Waesberghe, p. 72) while the *Introductio* has *signa principalia* (CS I, p. 159.)

[20]See Cserba, p. 48 (Jerome), and Gerbert II, p. 327 (Engelbert).

clavis to mean hexachord is peculiar to only Elias Salomon: as we saw, the French theorist distinguishes a "clavis ut genus," which I interpreted as the series of six hexachord degrees in the abstract, without reference to any particular location; a "clavis ut species," which seems to be the hand itself, in that it contains all the possible locations of the "clavis ut genus"; and a "prima clavis," which corresponds to the first deduction.[21] Finally, we should remember that Salomon also uses the term *clavis* in relation to exercizes for learning intervals inside the hexachord, and that this usage clearly refers to a passage in Guido's *Micrologus*: "since when you hold these [intervals] as keys, you can command skill in singing."[22]

As we turn to the term *vox*, two basic meanings emerge: the more general meaning of sound, mainly vocal sound, and the specific meaning of solmization syllable. In this second sense, other alternative terms are used, often in the attempt to maintain a distinction between a sound, with a particular pitch, and a "type of sound," one of the six hexachord degrees, which can refer to different pitches. The following list shows, for each theorist, the terminology preferred:

Lambertus: *vox* in both meanings (but in announcing the topics of his discussion he also uses *nomina vocum* for syllables)

De musica plana: like Lambertus

Amerus: *vox* for sound, *vocabula vocum, notas, signa* or *nomina vocum* for

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Reckow also quotes other treatises which use the term in this specific meaning. See Reckow, "Clavis," pp. 3-4.

[21]See discussion in chapter four, pp. 139ff and especially 143, in the present study.

[22]*Hucbald, Guido, and John on Music*, p. 61.

solmization syllables;

Salomon: *vox* for sound, *punctus* or *denominatio puncti* for solmization syllable;

(*punctus* also used to mean a graphic sign);

Jerome: *vox* with both meanings (sometimes *syllaba*, like his source John of Afflighem);

Summa musice: *vox* for sound, *nota* for hexachord degree, *nomina notarum* or *voces notularum* for solmization syllables (*syllaba* is used in the specific linguistic sense);

De plana musica: *vox* with both meaning, or *nomen vocis* for solmization syllable;

Introductio: *vox* with both meanings;

Odington: *vox* is sound, *nota* the graphic representation, *nomina vocum* or *syllabae* refer to solmization syllables;

Egidius: *vox* with both meanings, but also *nomina vocum* and *syllabae* for solmization syllables;

Grocheio: *vox* with both meanings, but also *syllaba* for solmization syllable);

Tractatus de musica plana et organica: *species* for solmizations syllables;

Metrologus: *nota* for solmization syllable;

Engelbert: *vox* for sound, *note vocum* for solmization syllables (but also *voces*);

Jacques: *vox* with both meanings, but also *syllaba* for solmization syllable).

The discrepancy between the number of letters, which are seven because of the octave repetition, and the number of syllables, which

are six, seems to have troubled more than one theorist in the thirteenth century. Lambertus speculates on the possibility of reducing the number of letters, but only to reaffirm the importance of having the octave *G* with Γ, and to fill the gap between the last syllable (on *E*) and *G* in order to mutate.[23] Salomon takes a more radical position, asserting not only that letters could be well reduced to six, or even five (since *C*, *F*, and *G* have almost the same character), but going as far as to propose a solmization system based on five rather than six syllables, since for him the syllable ut is unnecessary.[24] Perhaps the desire to make the first syllable coincide with the beginning of the first mode, which is seen as ruling the whole gamut, might be at the basis of such a proposition.

The author of *Summa musice*, when dealing with the number of solmization syllables, provides some non-musical explanations, like the perfection the of number six and the correspondence with the six days of creation, along with a more specifically musical reason, based on the aethetic principle of non-repetition.[25] Indeed, he maintains, since after the first six notes (Γ, *A*, *B*, *C*, *D*, *E*) the semitone would occur again, that is, would repeat, and since repetitions should be avoided in art, therefore no further syllable is needed. In other

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[23]See chapter two, pp. 71-73, in the present study.

[24]See chapter four, pp. 130f, in the present study.

[25]Grocheio and Odington refer to the perfection of number six (see Rohloff, p. 48, and Hammond, p. 96). See also the discussion of the third reason, criticized by Handschin, in chapter six, pp. 207-208, of the present study.

words, his explanation stresses the central role of the semitone, the recognition of which indeed represents the main reason for using the hexachord.

The rationale provided by Engelbert to explain the number of syllables rests on the idea, echoed by later theorists as well, that the hexachord contains the three species of fourth.[26] His demonstration, which appears quite complicated and not completely convincing, is complemented by his justification of the number seven for letters based on the importance of the octave. As a matter of fact, Engelbert cites the number of melodic intervals (semitone, tone, ditone, semiditone, diatessaron, diapente, and octave) to explain the number of letters, while these intervals could have been invoked more properly--although with the exception of the octave--to explain the presence, and number, of solmization syllables.[27]

Jacques, summarizing the other theorists' views, states that syllables are six because of the perfection of the number six, because they can express the three species of fourth, and, finally, because they correspond, excluding the fourth, to the six melodic intervals (*consonantiae*) of semitone, tone, ditone, semiditone, diapente, and tone with diapente.[28] Thus, the six Guidonian *consonantiae* are slightly changed to allow the sixth too among the intervals that can be sung inside the hexachord.

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[26]For instance by Gallicus, cited by Henderson, "Solmization Syllables," pp. 19-20.

[27]Grocheio too explains the number of letters with the number of concords. See Rohloff, p. 48.

[28]See Bragard, pp. 166-7.

2. The gamut

The thirteenth-century gamut starts from Γ and goes up to either *dd* or *ee*. The theorists who include the upper *ee* in the gamut are Lambertus, the compiler of *De musica plana*, Jerome, Jacques, the Anonymous Mettenleiter 3, and the author, possibly Garlandia, of *De plana musica*; the others remain faithful to the gamut established by Guido. The addition of Γ is explained either in metaphorical or in musical terms. Some theorists interpret the positioning of Γ at the beginning of the gamut as an acknowlegdement of the primacy of the Greeks.[29] Lambertus explains the presence of Γ with the necessity of having a tone under *A* and to form an octave with *G*; both reasons could be related to modal theory, although Lambertus does not make such an explicit connection. Indeed, the tone below *A* is necessary for some chants of the second mode, as John of Afflighem states; on the other hand, the octave below *G* could derive from the need to have a low range for the seventh and eighth modes, since these are the only two modes that do not have *affinales*, neither above or below.

Amerus ambiguously speaks of a need to distinguish letters, maybe meaning that once it was decided to add a tone under *A*, the letter *G* could not be used because it was already in the gamut, and that is why a Greek letter was introduced. The anonymous compiler of *De musica plana* mentions three *alphabeta supina*, perhaps referring to the three forms of *G*: Γ, *G*, and *g*. The only theorist who provides an authentic

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[29]This explanation is found in Amerus (Ruini, p. 21), the *Tractatus de musica plana et organica* (CS II, p. 484), and Lambertus (CS I, p. 254).

hexachordal explanation is Salomon: the letter Γ was added not as a letter, but as a syllable, to provide an ut to the following notes.[30]

The gamut itself is defined as *gamma*, *compositio gammatis*, *claustrum musicae*, *manus* or *palma*, and expresses not only the succession of *claves*, according to octave repetition, but also the syllables associated with each *clavis*, according to the three properties.[31]

The gamut is represented either by a diagram or by the Guidonian hand. Lambertus, the authors of *De musica plana* and *De plana musica*, Odington, the anonymous commentator of *Metrologus*, and Jacques, all have diagrams in which, on the left side, letters designating *claves* are placed, and by each letter, on the right side, the associated syllables are shown.[32] Most diagrams also indicate the properties,

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[30]"But why is it placed first in the gamut? I answer: it is placed first as a syllable, not as a letter, this has to be noted." ("Sed quare in palma praeponitur? Respondeo: praeponitur ut punctus, non ut litters, hoc est notandum." GS III, p. 19)

[31]The term *compositio gammatis* is found in Lambertus (CS I, p. 256), *De plana musica* (Reaney-Gilles-Maillard, p. 17), Jacques ("gammatis constitutio, dispositio, ordinatio," Bragard p. 174), while *De musica plana* has *manus* and *claustrum musice* (Gilles, pp. 42-3). The hand (*manus* or *palma*) is found in Amerus ("ponimus gamma in manu sinistra," Ruini p. 22), Salomon (see chapter VII "Rubrica de notitia palmae," GS III, p. 21), Jerome ("Singulae vero conjunctiones in singulis et in determinatis digitorum articulis in manu diversimode a diversis collocantur," Cserba, p. 47), *Summa musice* (see chapter eight, "De palma et lineis et spaciis eius," Page, p. 157), Egidius ("Qui vero monochordum non habent, vice ipsius instrumenti ad artem dispositi, utuntur manu," Robert-Tissot, p. 78), Grocheio ("alii in undeviginti iunctures manuum undeviginti dictiones cum suis litteris et syllabis figurant," Rohloff, p. 49), Engelbert (see, for instance, chapter fourteen of the first treatise, "Quare in manu sint VI notae et VII litterae musicales, et non plures," GS III, p. 295) Jacques ("sed etiam dicitur manus vel palma," Bragard, p. 174), Mettenleiter Anonymous 3 ("a figura manus inchoandum est," Mettenleiter, p. 71), who also refers to the positioning of the last note ee "extra manu" (Mettenleiter, p. 72).

[32]Respectively in CS I, p. 255, Gilles, p. 43, Reaney-Gilles-

usually at the bottom of the page, corresponding to each series of six, i.e., to each deduction. Odington's diagram offers even more information: on the left side, by the letters from Γ to *dd*, he puts also the letters from Γ to *S*, corresponding to the points of division of the monochord; furthermore, the *claves E, F, e,* and *f* are marked with both signs of square and round *b*, to remind the reader of their movable nature.[33]

Along with the diagram, Jacques also offers the representation of the gamut on the hand, as Amerus, Salomon, and Jerome do.[34] Other theorists, like the author of *Summa musice*, Egidius, and Grocheio, refer to the positioning of the gamut on the hand, but do not provide either a diagram or a picture of the hand.

The comparison of the pictures of the hand by the four above-mentioned theorists reveals some interesting differences. Jerome's hand, as we saw, turns out to have twenty-two joints, instead of the customary ninenteen, or twenty with the *clavis ee* la on the back of the hand. This deviation is explained by Jerome's insistence on regarding *b* fa and *b* mi, that is, round *b* and square *b*, as two different *claves*, which therefore need to be placed in two different joints. The picture in Salomon's treatise shows nineteen letter-syllable combinations from Γ ut to *dd* la sol, which the theorist enumerates as *puncta*, a term

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Maillard, p. 18, Hammond, p. 98, Smits van Waesberghe, p. 70, and Bragard, p. 176.

[33]As a matter of fact, also the note *c* is regarded by Odington as a movable one, but the round *b* by *c* is missing in the diagram. See Hammond, p. 98.

[34]See, respectively, Bragard, p. 175, Ruini, pp. 24-5, Gerbert III, p. 22, and Cserba, p. 47.

which he had reserved mostly to solmization syllables (or hexachord degrees). The explanation for this inconsistency is found in the text of chapter four, where the theorist explains that there are nineteen *puncti* in the hand, but only as a result of the process of multiplication of letters and *puncti*, so that really there are but six *puncti*.[35] Salomon's hand also indicates the beginning of each *clavis*, and we should recall that by this term he means deduction. Amerus's picture of the hand is perhaps the most complete, whereas the one found in Jacques's treatise is quite scant, since it only provides the list of letter-syllable combinations. Amerus's hand not only shows all the *claves* with their syllables, but also the property to which each syllable belongs. It also seems to show a short line for those *claves* which are positioned on lines of the staff.[36] On the bottom part of the hand, the *radices*--that is, the starting points of the three properties (*f, c, g*)--are shown, along with the ending points (*d, a, e*). As we saw, Amerus also draws two versions of the gamut, one with hard and natural hexachords only, the other with natural and soft.[37] I do not believe this should be interpreted as a proof of the existence of two separate gamuts, but only as a clearer presentation of all the

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[35]See GS III, p. 20. For a complete discussion of the meaning of *multiplicatio* see chapter four, p. 137, in the present study. There seems to be no particular significance in the use of the neuter *punctum* in the picture of the hand in place of the masculin *punctus*, which is always found in the text.

[36]It is hard to determine whether the lines in the picture refer to staff lines or mark some separation between the joints. In either case, there is no consistency.

[37]As a matter of fact, in the second gamut the first hexachord is still hard, since there is no *B* flat in the first octave. See Ruini, p. 27.

mutations occurring in the gamut in a stepwise motion; in other words, Amerus wants to show the points of mutation when this is made necessary by ascending, or descending, beyond the limits of one hexachord.

Amerus and Salomon also seem to suggest the actual use of the hand in singing, as a quick reference for solmizing and mutating: in explaining the choice of the left hand for the drawing of the gamut, Salomon replies that the right hand is needed for other operations, like turning the page or showing the notes with the finger, while Amerus recognizes that a drawing from left to right, as can be done from thumb to small finger on the left hand, complies better with our reading notes and text while singing.[38]

The author of *Summa musice*, although not providing the picture of the hand, is quite specific in the definition of each single joint. The hand appears to be compared to the human figure, where the head corresponds to the *frons* (the tip of the finger), the chest to the *sinus* (first joint from the top), the lap to the *gremium* (second joint from the top), and the bottom to the *radix*.[39]

3. Property and deduction

The concept of property, which may be defined as a categorization of hexachords according to the position of the syllable mi-fa in the gamut, is found in most theorists expressed by the term *proprietas*.

The basic definition of *proprietas* is found in Lambertus, where property is said to be nothing else but a difference, a distinguishing

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[38]See chapter three, p. 96, and chapter four, p. 149, in the present study.

[39]Page, pp. 158ff.

characteristic. As we saw, this definition was exactly repeated by the author of *De musica plana* and also echoed, with some slight differences, by the author of *De plana musica* and Jacques.[40] The anonymous author of the *Tractatus de plana musica et organica* has a similar definition of property, as *distinctio* of simple sounds.[41] A different definition, which stresses more the character of being proper, is found in the Garlandean *Introductio*: *proprieties* are so called because they introduce us, naturally and properly, to the knowledge of singing.[42] In this definition the rendition with the English term propriety seems literally more appropriate. Grocheio and Odington, probably having in mind Lambertus's definition, use the term *differentiae* when speaking of properties.[43]

Another term which is used to express the concept of property is *cantus*. Jerome explicitly states that there are three *cantus*, or ways of singing, in the hand.[44] Other theorists refer to the same terminology, but prefer to use the verb *canere* or *cantare*. Thus Egidius, when listing all the letter-syllable combinations, specifies,

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[40]For a comparison of the three versions (Lambertus, *De plana musica* and Jacques), see chapter seven, pp. 234ff, in the present study.

[41]"Est autem proprietas vocum simplicium distinctio," CS II, p. 484.

[42]CS I, p. 158.

[43]Odington: "Ex praedictis differentiis, scilicet b quadrata, b molli, et proprio cantu." (Hammond, p. 99). Grocheio: "Voces similiter per triplicem differentiam distinxerunt, quam b-quadratum, naturam, b-molle vocaverunt." (Rohloff, p. 49).

[44]See Cserba, p. 50.

for each syllable, how it is sung: for instance, the first note, Γ ut, is sung through (*cantatur per*) *b quadratum*, while the fourth note, *C* fa ut, as fa is sung through *b quadratum*, but as ut is sung through natura.[45] Similarly, Amerus, when posing the quaestion on the number of hexachords in the gamut, also asks through what they are sung ("per quid canitur?").[46] Jacques, in his effort to be exhaustive, along with the term *proprietas* also uses *differentia* and *modus cantandi*.[47]

Salomon's *clavis* refers more properly to a deduction. In the chapter about solmization (*solfiando*), the theorist shows the different properties involved in each mode by pointing out where the semitones are supposed to occur, or, in his words, where the mode *plangit*.[48]

Engelbert omits properties too, and offers only a scant reference to deductions when stating that there are seven beginnings (*inceptiones*) and endings (*terminationes*) in the gamut.[49]

As to the names of the three types of property, there seems to be a basic equivalence between the terms *b quadratum* and *b durum*, on the one hand, and *b rotundum* and *b molle*, on the other. Lambertus is the only theorist who apparently uses *b durum* and *b molle* for the properties, while referring *b quadratum* and *b rotundum* more specifically to pitches. As we saw, that distinction was not kept by

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[45]Robert-Tissot, pp. 66ff. A similar list is started, but not completed, in the *Introductio*, with the same specification of the property through which each syllable is sung. See CS I, p. 159.

[46]See Ruini, p. 22.

[47]See Bragard, pp. 175ff.

[48]See GS III, p. 42-43.

[49]See GS III, p. 327.

the the theorists who quoted Lambertus, and this brought about some misunderstandings.[50]

The third property is called either *natura*, hence *naturalis*, or *proprius cantus*. The former term is more widely used, while the latter is found in Amerus's treatise, Odington's, the *Tractatus de musica plana et organica*, and the *Metrologus*.[51] Since three of the aforementioned treatises are from England, the term *proprius cantus* seems to point to an English tradition. The author of the *Introductio* and Jacques mention both terms.[52] The properties of *b durum* and *b molle* derive their names from the occurrence of either square *b* or round *b* in the hexachord. Jerome in particular emphasizes the harshness of the syllable mi, occurring on the square *b*, and the softness of the syllable fa, on round *b*, and he relates the natural property to the characteristic of containing the finals, where any song naturally ends.[53] Lambertus explains that, since a property is a difference, there are three types of difference: the property of *b durum*, characterized by square *b*, the property of *b molle*, distinguished by round *b*, and the natural property, taken without either *b*, that is, "without difference."[54] Jacques, in quoting this explanation, omits the last remark, "without difference," in order to avoid the

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[50]See the discussion of this point in chapter seven, pp. 233ff, in the present study.

[51]See Ruini, p. 22, Hammond, p. 97, CS II, p. 485, and Smits van Waesberghe, p. 71.

[52]See CS I, p. 158, and Bragard, p. 179.

[53]See Cserba, p. 50.

[54]See CS I, p. 255.

inconsistency between the first statement, in which *differentia* is synonym of property, and the last one, in which it is identified with *b*.[55] The author of the *Introductio* offers two explanations for the two terms, *natura* and *proprius cantus*, used for the *C* property. It is called *natura* because it holds the middle position between the soft and the hard properties, and the middle position is considered the best by Aristotle; it is called *proprius cantus* because it is sung "without alteration of tones and semitones."[56] This last remark seems to suggest that, as long as one stays in the natural property, there is no question about whether to change to *b* flat or not. Walter Odington explains the presence of the double *b*, and consequently of the soft and hard properties, with the reference to Greek theory, which allows both *b* natural, as *mese* in the Greater Perfect System, and *b* flat, as *trite synemmenon* of the Lesser Perfect System.[57]

The concept of deduction receives its own term and status only in some treatises. Amerus provides the specific term of *cunae*, "cradles," which correspond to the *radices*, i.e., the beginning of each of the seven deductions in the gamut.[58] For Salomon, who does not deal explicitly with the concept of property, the term *clavis* seems to embody both the hexachord as an abstract unit and its different positions in the gamut.[59] Jacques uses the term *solfationes* to refer

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[55]See Bragard, pp. 175-6.

[56]CS I, p. 158. See also the discussion in chapter seven, pp. 235-36, in the present study.

[57]See Hammond, p. 81 (for the Greek nomenclature) and p. 97.

[58]See Ruini, p. 22.

[59]GS III, p. 22. See also the discussion in chapter four, p. 143, in the present study.

to the seven recurrences of the hexachord.[60] Jerome, Egidius, and the author of the *Introductio* do not provide a specific term; however, deductions are implied when the three theorists relate each of the syllables of a given note to the ut of their hexachord: as an example, the note *G* sol re ut, which has three syllables, refers to the ut of *C* fa ut for the syllable sol, to the ut of *F* fa ut for the syllable re, and to itself for the syllable ut.[61] In order to refer to the corresponding deduction, Jerome uses the formula "ad usum" of a certain ut, and explains that ut cannot form a hexachord (*cantus*) by itself but needs the other syllables, which therefore are for its use. The author of the *Introductio* uses the preposition "per," as Egidius does, and then emphasizes that the syllable ut is the foundation of the hexachord, so that the other syllables have to be led back to it and not vice versa. Thus, in referring to the different positions of the hexachord, the author of the *Introductio* assigns to the syllable ut a predominance over the other syllables, while Jerome, on the contrary, seems to stress its dependence on the other syllables.

Finally, even Lambertus and the two related treatises, *De musica plana* and *De plana musica*, seem to imply the idea of deduction in the expression "every ut with its followers," which is found in the rule about the different positions of the three properties.[62]

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[60]See Bragard, p. 176.

[61]See Cserba, pp. 49ff.; Robert-Tissot, pp. 66ff.; CS I, p. 159.

[62]See CS I, p. 256; Gilles, p. 44; Reaney-Gilles-Maillard, p. 19.

4. Mutation

The following definitions of mutation are found in the treatises examined:

Lambertus: mutation is the separation (*divisio*) of one syllable next to another under the same sign and the same sound.[63]

De musica plana and *De plana musica*: mutation is the dismissal (*dimissio*) of one syllable because of another one under the same sign and the same sound. Also: it is the delivery of two different syllables under the same sign and sound.[64]

Jerome: mutation is the transition (*transitio*) from one syllable to another under one and the same unison *clavis*. It is named after changing [*mutare*] since a syllable of one property is changed into the syllable of another property.[65]

Introductio: mutation is the separation (*divisio*) of one syllable (or the splitting of a sound?) because of another, under the same sign, voice, and sound.[66] It is called after the verb mutare, because we change one property or syllable under the same sound into the next property or syllable.[67]

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[63]CS I, p. 256.

[64]Gilles, p. 45; Reaney-Gilles-Maillard, p. 19.

[65]Cserba, p. 49.

[66]The definition, which is very close to Lambertus's phrasing, is attributed, in the *Introductio*, to Guido. For a discussion of the relationship between the two definitions see chapter seven, pp. 246ff, of the present study.

[67]"Mutatio autem, secundum Guidonem sapientissimum musice, diffinitum est: Mutatio est divisio unius vocis propter aliam sub eodem signo, eadem voce et etiam sono. Dicitur autem mutatio ab hoc verbo: muto, mutas, quoniam unam proprietatem vel vocem sub eodem sono in

Tractatus de musica plana et organica: mutation is the passage (*progressio*) from one property to another.[68]

Jacques: regular mutation is the change (*variatio*) of distinct yet unison or equal syllables belonging to different properties.[69]

The definition in Lambertus is echoed, with some variants, by the author of *De musica plana*, by Jerome, and by the author of the *Introductio*. It stresses the passage from one syllable to another in the same pitch location, although Lambertus and the *Introductio* speak of a separation between syllables, while Jerome prefers the term transition, and the anonymous compiler of *De plana musica* uses dismissal. In all cases, the emphasis is on the change of syllable. Jerome and the author of the *Introductio*, as well as the author of the *Tractatus de musica plana et organica* and Jacques, also point out that a mutation is really a change of property.

The reasons to mutate expressed by our theorists are essentially two: to go beyond the limits of one hexachord, either in ascending or in descending motion, and to change between properties. While Lambertus only mentions the first reason, the author of *De musica plana* states that we mutate "because of the syllable, because of the sign, and because of both."[70] He then specifies that by mutation *ratione vocis* he means the change of syllable caused by the reaching of the upper or lower hexachord boundary; the *ratione signi* must refer to the

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aliam subsequentem mutamus." CS I, p. 160.

[68]CS II, p. 485.

[69]See Bragard, p. 179.

[70]"Ratione vocis aut ratione signi aut ratione utriusque." Gilles, p. 46.

occurrence of *b*, either square or round, and to the shifting between hard and soft properties; however, the statement is so general that it could be interpreted as referring to other accidentals as well.

There are three fundamental rules about the way mutation should be performed:

1-any mutation ending on the syllable ut, or re, or mi, occurs in order to ascend; on the other hand, any mutation ending on fa, sol, or la, takes place in order to descend;

2-*claves* with two syllables have two mutations; *claves* with three syllables have six mutations;

3-mutation should be avoided as much as possible and should occur on the last possible note.

The second "rule" is actually the ackowledgement of a fact, and is found in almost all treatises. Jerome elaborates on the mutation in notes with three syllables, explaining that there is a precise order to be followed: first, the first syllable mutates into the third, and vice versa; second, the first syllable mutates into the second, and vice versa; third, the second syllable mutates into the third and vice versa. Jerome's motivations are mathematical, philosophical and musical. The musical rationale argues that the property that comes first in the sequence of the three syllables should maintain its priority in the succession of mutation (first-third, first-second, second-third), and it also seems to set a preference for mutations a fifth apart, since the first and third syllable are always a fifth apart.[71]

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[71]For a more detailed discussion, see chapter five, pp. 178-80, in the present study.

The first rule, concerning the direction of mutation, is quite widespread, and is either explicitly stated, or implied in the list of mutations. Jerome, the author of the *Introductio*, and Egidius provide such a list, in which each mutation is shown with its reverse, like, in *C* fa ut, the mutations fa/ut and ut/fa. Usually the reversed mutation also produces a change of direction, so that, in the example above, fa/ut is ascending, while ut/fa is descending. However, in the case of mutations between hard and soft properties, which always occur at the distance of a tone, the change of direction does not occur, by virtue of the above-mentioned first rule. Another theorist, Jacques of Liège, establishes a different rule, according to which the direction of a mutation depends on the relationship between the two syllables involved. Thus, the mutation ut-re, which for the other theorists is ascending, for Jacques has to be regarded as descending, since re cannot go higher than ut, but can go lower by a tone.[72] Jacques is also the only theorist who clearly distinguishes between a regular mutation and an irregular or *falsa* mutation. Lambertus too speaks of *falsa musica* or *falsa mutatio*, but not in the context of mutation. With Jacques, the matter of *falsa mutatio* finds a much more precise definition in comparison with Lambertus's treatment. However, Jacques confines the irregular mutation to mensural music, even though he admits that some singers use it in plainchant, while Lambertus seems to be more liberal.

As to the third rule, only the author of the *Introductio* explicitly states it; however, it seems to be implied by other theorists too, especially those talking about principal mutations.

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[72]Also the Mettenleiter Anonymous 3 maintains a symmetry between

A peculiar treatment of mutation is found in Amerus, the *Tractatus de musica plana et organica*, and Engelbert. The anonymous *Tractatus* speaks of seven principal mutations, without specifying which they are. They might be the same seven mutations shown by Amerus in the two scales notated on a ten-line staff. Of these scales, the first shows the interlocking of hard and natural properties, with mutations on *E* la/mi, *a* la/re, *e* la/mi, and *aa* la/re in ascending, and *g* ut/sol, *c* ut/fa, *G* ut/sol, and *C* ut/fa in descending. The second scale shows the mutations between natural and soft properties, which are, except for the first hard-natural one, *a* la/mi, *d* la/re, *aa* la/mi, *dd* la/re, in ascending, and *f* ut/fa, *c* ut/sol, *F* ut/fa, in descending. Thus there are seven stepwise ascending mutations and seven descending ones. In dealing with mutations by step, Engelbert recognizes only four types, which seem to arise from a combination of the three properties. The four ascending principal mutations are on *E* la/mi (hard-natural), *a* la/re (natural-hard), *e* la/mi (hard-natural), *aa* la/mi (natural-hard) or *aa* la/re (natural-soft); the four descending ones are on *g* ut/sol (hard-natural), *c* ut/sol (natural-soft), *F* ut/fa (soft-natural), and *C* ut/fa (natural-hard). It is hard to understand why these are the principal mutations: is Engelbert suggesting that in descending, in the second octave, the soft property is preferable?

Amerus and Engelbert are also the only theorists who devote some of their exposition to the matter of mutation by leap. Amerus speaks of *bona mutacio* for notes which lie a fifth apart, except for mi-mi and

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ascending and descending mutations without following the first rule.

fa-fa, which, with a later terminology, we could describe as *disiunctae*.[73] In the case of leaps between hexachords, he seems to suggest to "feign" the note where the mutation would occur if we were in a stepwise motion, in order to find the second syllable of the leap. Engelbert states the basic principle that the same mutations occurring stepwise--and he means the four principal ones--must be used in leaps. However, he finds three cases in which the principal or natural mutations need to be replaced by other mutations, and among such cases he mentions leaps.[74]

On the other hand, Jacques classifies mutations into eighteen types, and criticizes the musicians who speak of only eight types. These eight types, according to Jacques's report, are all the mutations by tone (ut/re, re/mi, and so forth), but one wonders whether these eight mutations could actually be the four plus four mentioned by Engelbert.

5. Syllables and Intervals

As we saw, there is a close relationship between solmization syllables and melodic intervals. Syllables are used in two principal ways: to describe the interval species, that is, the different positions of the semitone(s) inside the interval, or to show the different locations of any interval inside the unit of the hexachord.

The Guidonian *consonantiae* (semitone, tone, minor third, major third, fourth, and fifth) can all be expressed, learned and memorized

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[73]A *disiuncta* is an interval outside the limits of one hexachord.

[74]GS II, p. 326.

by means of solmization syllables: mi-fa, ut-re, re-fa, ut-mi, ut-fa, ut-sol. The practice of studying intervals through syllables is witnessed by the mnemonic verses, vestiges of an old oral tradition, quoted by Lambertus and *De musica plana*:

> With these six, six intervals are formed and varied:
> ut with re are wholly measured; also mi with re
> and mi fa give a semi[tone], nor does a whole tone occur underneath.[75]

Salomon is the only theorist to remain faithful to the classification into six intervals and to devote a main section of his treatise to the practice of learning intervals through solmization syllables. In his picture of the wheel (*rota*) the melodic intervals are arranged into five types of exercizes: first the singing by seconds (tone and semitone), then by filled-in thirds (ditone and semiditone); then, by leaps of the third, to reach finally the larger intervals of the fourth and fifth. All the exercizes are given in the *C* hexachord, but it is clear that the student is supposed to transpose them to any hexachord. Indeed, when talking about *clavis*--the hexachord in Salomon's own terminology--the French theorist refers to the possibility of counting thirty-five *claves*, that is, the five exercizes on intervals multiplied by the seven deductions of the gamut.[76] As we saw, Salomon asserts that there is only one *clavis*, which is moved to different positions of the gamut and, we might add, which is used for learning different intervals.

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[75]"His sex formantur motus et variantur:
Ut cum re plene modulatur; mi quoque cum re
Dantque semi mi fa, nec fit plenus tonus infra." CS I, p. 254.

[76]See GS III, p. 21.

The same concern about practicing intervals inside the hexachord is shown by Amerus, in his numerous musical examples--really, exercizes--where each interval is presented in its different positions inside the hexachord and is then supposed to be transposed to the other deductions. Amerus also uses syllables to describe intervals, but does not seem to be concerned with showing the species of minor third, fourth and fifth. Lucy Cross notes the lack of interval classification through syllables in other thirteenth-century theorists, criticizing the omission of what she believes is the main function of syllables.[77] However, the presence of the treatment of interval species really depends on the scope of each treatise. In the practical texts of Salomon and Amerus, the musical examples are meant for the practice of singing, rather than for the theoretical classification into species. In other words, these exercizes address singers, who do not need to be concerned with interval species, even though they practice them. Amerus's syllabic descriptions often start from the syllable re, as if the theorist meant to suggest the practice of intervals in relation to the first mode. As to the number of intervals, Amerus is a little less conservative than Salomon, by admitting the octave among the *consonantiae*. Engelbert too lists seven *consonantiae*, referring to Boethius's authority for the inclusion of the octave, while not taking into account major and minor sixths, which he listed in his second treatise, because of their being very rare in plainchant. He also seems to be more interested in the species of intervals, and distinguishes two types of minor third (re-fa and mi-sol), three types

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[77]See L. Cross, "Chromatic Alteration," p. 24.

of fourth, four types of fifth. In particular, Engelbert shows how the third species of fifth needs a mutation to be spelled out: descending from *C* to *F*, he uses the syllables fa-mi-re-ut/sol-fa.

Also the *Introductio* uses syllables to classify the intervals of minor third, fourth, and fifth into species. The treatise provides musical examples, possibly singing exercizes, on all the admitted intervals which, in the Garlandean tradition, are thirteen. However, in these examples, only the intervals up to the fifth are shown both stepwise and as leaps; the two sixths and the two sevenths are indeed presented as compound intervals, made up of fifth plus either semitone, tone, semiditone, or ditone. It could be inferred that, if Garlandia--and his follower, the author of the *Introductio*--posed more intervals for polyphonic reasons, he still regarded the six Guidonian consonances as the basic melodic intervals. Thirteen intervals are also found in the *Tractatus de consonantiis musicalibus* and in the *Tractatus de discantu* in CS III. The former, perhaps an early work by Jacques, uses syllables to show the different positions of semiditone, ditone, diatessaron, and diapente inside the hexachord, and therefore does not list the two species of fifth mi-mi and fa-fa.

Twelve intervals are acknowledged by Lambertus, who treats them right after the *unde versus* quoted above. More than show the species of intervals, Lambertus seems concerned with presenting all the positions of a given interval inside the unit of the hexachord. That is why he speaks of *modi*, actual positions, in which intervals may occur; thus, the tone has four *modi* (ut-re, re-mi, fa-sol, and sol-la), the semitone only one, and so forth. He also provides musical examples for all intervals, followed by the seven deductions, as if suggesting

that the established intervals should be transposed to the other positions of the hexachord in the gamut. The four "species," that is, positions of the tone, are also found in Mettenleiter Anonymous 3; however, for the fifth, the theorist lists all four species, starting with the first modal fifth re-la, up to the last ut-sol.

The *Tractatus de musica plana et organica* decreases the number of intervals to eleven, but assigns species even to the unison, saying that it has six species: ut-ut, re-re, mi-mi, fa-fa, sol-sol, la-la. The other intervals also double their "species," since the anonymous theorist counts them both in ascending and descending direction. The *Metrologus* lists only ten intervals and uses syllables to describe species of intervals, including the four species of fifth. *Summa musice* reduces the number of intervals to nine, admitting the two sixths and the octave besides the Guidonian *consonantiae*. Its treatment is original as to the reference to the hand, the instrument for the singer and the composer to immediately visualize the different types of intervals.

Finally, Jacques uses syllables in connection with intervals for still another purpose, to show their internal configurations (*constitutiones*). Therefore, while tone and semitone can only have one configuration, the third has two configurations, as for instance re-mi-fa or re-fa; the fourth has four (ut-re-mi-fa, ut-re-fa, ut-mi-fa, ut-fa) and the fifth eight (ut-re-mi-fa-sol, ut-re-fa-sol, ut-mi-fa-sol, ut-re-mi-sol, ut-fa-sol, ut-re-sol, ut-mi-sol, and ut-sol).

6. *Falsa musica*

There are two different perceptions of *falsa musica* in the theorists I have analyzed, as either the "illness" or the "remedy."

Salomon, when describing the association of syllables and letters, warns against any associations other than the ones prescribed, lest one fall into the error of *falsa musica*.[78] Similarly, the author of *Summa musice* defines as *falsa musica* the use of any irregular interval, constituting a hateful mistake comparable to a false proposition in dialectics, which is to be absolutely avoided.[79]

On the opposite side, Lambertus, followed by several other theorists, refers to *falsa musica* as the way to correct tritones and diminished fifths which would naturally occur in the standard gamut, therefore praising *falsa musica* as highly necessary.[80]

When trying to understand *falsa musica*, we have to be aware not only of the existence of the above-mentioned debate, but especially of the presence, among thriteenth-century theorists, of several different ways of describing and interpreting the phenomenon.

The standard definition of *falsa musica* refers to the operation of making a semitone where there is a tone, or vice versa. It is found in Lambertus's treatise, the anonymous compendium *De musica plana*, the Garlandean *Introductio*, the two anonymi *Tractati de discantu* (CS I and CS II), and Grocheio's *De musica*.[81] The way to achieve this exchange

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[78]GS III, p. 19.

[79]Page, p. 199.

[80]See CS I, pp. 258-259.

between tone and semitone is by using two signs, the round *b*, which corresponds to the upper note of the semitone (fa), and the square *b*, which corresponds to the lower note (mi). Thus, any time these signs are found in places other than their customary *clavis b*, they indicate *falsa musica*.

Among theorists who do admit such an operation, i.e., the use of *falsa musica*, opinions vary to some extent.

Lambertus is probably the founder of the expression *falsa mutatio* as equivalent of *falsa musica*. According to this equivalence, the operation of mutating, which is normally done inside the hexachordal system to shift from one property to another, would be performed even between hexachords that do not belong to the system. But does Lambertus really mean to establish new hexachords as a result, or better, as a prerequisite for this false mutation? Cross believes that Lambertus's words simply refer to a change of position of the semitone, the syllable mi-fa, and not to a real mutation between hexachords. Thus, a *falsa mutatio* is something different from the later *coniuncta*, which, on the contrary, produces new hexachords by transposition. To support her thesis, Cross mentions the passage in which Lambertus refers to the signs of square and round *b* as indications of *falsa musica* when found in a "changed" (*mutato*) place. Since other treatises have "unusual" (*inusitato*) in place of "changed," Cross suggests a misreading of the word by the scribes and dismisses the adjective "unusual" as a mistake. However, were "unusual" the correct *lectio*, it could point more in the direction of a real mutation to be done in

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[81]See, respectively, CS I, p. 258; Gilles, p. 48; CS I, p. 166; CS I, p. 310; CS III, p. 496; Rohloff, p. 49.

other, unusual points of the gamut. As we saw, the adjective *inusitatus* is attested not only in the Lambertean *De musica plana*, but also in the *Tractatus de discantu* (CS I), and, although not related to mutation, yet still in the context of *falsa musica*, in Odington's *Summa*.

However, there is an even stronger argument in favor of the interpretation of *falsa mutatio* as a real mutation. In the sixth book of his *Speculum*, which is devoted to plainchant theory, Jacques treats *falsa musica* as a type of mutation, the *mutatio irregularis* or *falsa mutatio*. Jacques condemns this mutation in plainchant, which nevertheless was performed by singers in specific instances mentioned by Jacques. We may suppose that singers would mutate without thinking about the new, foreign hexachords involved, and that this practice had yet to find a complete rationalization in the contemporary theory, by means of assuming a new set of hexachords.

Indeed, several theorists who admit *falsa musica* confine it to the realm of secular and instrumental music, where the problem of conformity to hexachordal theory must have been less stringent.[82]

A different view is proposed by Odington, who explains *falsa musica* in terms of the consonances of fifth and octave. Once we have admitted two pitches for the letter *b*, he specifies, we are also forced to admit other foreign pitches as well: *f* sharp, in relation with square *b*; *e* flat, in relation with round *b*; their octaves *F* sharp and *E*

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[82]The theorists who refer *falsa musica* to secular or instrumental music are: Grocheio (Rohloff, p. 49), the *Introductio* (CS I, p. 166), *De plana musica* (Reaney-Gilles-Maillard, p. 23), and Jacques (Bragard, p. 186).

flat; and *c* sharp, in relation with *f* sharp. The English theorist also goes as far as to put the square *b* and round *b* marks by the letters *f*, *e* and *c*, in the hexachordal representation of the gamut.

Still a different interpretation is provided by Jerome, with his idiosyncratic exposition of ten *synemmena* in the gamut, that is, ten tetrachords mi fa sol la starting on *Γ*, *A*, *C*, *D*, *F*, *G*, *c*, *d*, *f*, *g*. As I have tried to demonstrate, Jerome's *synemmena* are an attempt at rationalizing pitches outside the hexachordal system by relating them to the *synemmenon* tetrachord of Greek theory. They should not be regarded as the antecedents of *coniunctae*, since they do not represent an expansion of the hexachordal system, such as the *falsa mutatio* is, but an alternative system, based on a different division of the gamut. Indeed, when using tetrachords to divide the gamut, Jerome uses the unit ut re mi fa--which other scholars believe to be the foundation of the hexachord--and not the *synemmenon* mi fa sol la.[83]

7. Hexachord and modes

Syllables are often found to describe aspects of modal theory. They may be used to indicate psalm intonations, median cadences, and *differentiae*, as well as beginnings, tenors and finals of modes. In relationship with finals, the equivalence of the syllables re, mi ,fa, sol with the four modal finals implicitly attests the use of *affinales* as alternative finals.[84] Lambertus, for instance, distinguishes between the *sedes finales D*, *E*, *F*, *G*, which are the primary seats of modes, and

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[83]See Berger, "La quarte et la structure hexachordale," pp. 17ff.

[84]See Pesce, *The Affinities*, pp. 50ff.

the *voces finales* re, mi, fa, sol, which allow to end a chant on different pitch than the four regular seats. In particular, he refers to the ending of the second mode on a and of the sixth mode on c. The *Tractatus de musica plana et organica*, aside from stating that the eight modes are ended on re, mi, fa, and sol, also uses syllables to classify antiphons. Jacques has an interesting discussion about the relationship between syllables and modes. Each syllable, from ut to la, is analyzed and referred to a particular mode. For re, mi, fa, and sol the reference is unambiguous; however, ut can be either of the fifth/sixth modes, or of the seventh/eighth modes, while la belongs to either first/second, or third/fourth, depending on the other syllables ut and la are associated with.

Engelbert uses the association of syllables with a certain *clavis* as a method to determine the *convenientia* between notes, especially in order to establish the most suitable notes for beginning in a certain mode.

By far, the most interesting discussions of the relationship between hexachordal theory and modes are the ones found in Salomon's and Jerome's treatises.

Both of these theorists establish which hexachords should be used in each mode. Salomon, in his customary original language, defines each mode with five notes: the *regula*, that is, the clef to be used at the beginning of the chant in that particular mode; the final; and the three notes in which the mode "plangit," in other words, where the semitones occur. By showing the semitones, the whole set of hexachords involved can be easily reconstructed.

Jerome uses a more explicit language in his exposition of modal theory. After showing the modal ranges, which all go beyond the six notes of one hexachord, he asserts the necessity to use more hexachords to cover the modal ranges. His main principles seems to be the use of only two properties at a time--either natural and hard, or natural and soft--but in some cases he is forced to admit a third property *per accidens*. However, as to actual hexachords, either two or three may be used in a mode. The comparison between the list of hexachords provided by Jerome and the one offered by Salomon shows that while Jerome actually particularizes the use of properties according to a certain mode, Salomon almost always lists all three properties together, and is more interested in showing the different deductions. Thus, it seems that Jerome aims at establishing a certain priority of either soft or hard property in a mode, while Salomon prefers to include, in each mode, all the semitones implied by a certain range of the gamut, without caring which semitones are more likely to occur.

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