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# **English Music Theory c.1590-c.1690:**

**The Modal Systems, Changing Concepts,  
and the Development of New Classification Systems**

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**March 1997**

Una historia circular  
para  
un gatito cariñoso



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## Abbreviations

<i>AfMw</i>	<i>Archiv für Musikwissenschaft</i>
<i>Am</i>	<i>Acta musicologica</i>
<i>AS</i>	<i>Annals of Science: A Quarterly Review of the History of Science Since the Renaissance</i>
<i>BJhM</i>	<i>Basler Jahrbuch für historische Musikpraxis</i>
<i>EM</i>	<i>Early Music</i>
<i>JAMS</i>	<i>Journal of the American Musicological Society</i>
<i>JRMA</i>	<i>Journal of the Royal Musical Association</i>
<i>Md</i>	<i>Musica disciplina</i>
<i>Mf</i>	<i>Die Musikforschung</i>
<i>ML</i>	<i>Music &amp; Letters</i>
<i>MQ</i>	<i>Musical Quarterly</i>
<i>MR</i>	<i>Music Review</i>
<i>MSD</i>	<i>Musicological Studies and Documents</i> , ed. Armen Carapetyan
<i>Mth</i>	<i>Musiktheorie</i>

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## Abstract

The thesis examines the modal classification systems and the changes which lead to the development of new systems during the period c.1590 to c.1690 with particular reference to English music theory. It consists of three parts the first of which considers the English writings on music, their readership, their sources, and the basic ideas for the understanding of the traditional Gamut, solmisation system and hexachordal theory.

PART 2 examines the methods employed by theorists wishing to categorise music either according to the 8-mode system or the 12-mode system. By studying Italian and German sources referred to in English writings on music, it is seen that the English theorists deal with the modal classification systems in a similar way. Furthermore, the differences between Morley's popular tract (1597), adhering to the 12-mode system, and Dowland's translation (1609) of the small tract by Ornithoparchus, promoting the 8-mode system, are also discussed.

PART 3 begins by tracing the development of a new interpretation and definition of the octave as a circular principle. This leads to the theoretical recognition of the invertibility of intervals. In England, in particular the growing circle of natural philosophers and the Royal Society of London seem to play an important role by asking inquisitive questions. Seeing the octave as a circle (and hence also the Gamut), together with a stronger emphasis on the bass as the fundamental part of a composition, encouraged a new interpretation of triads and inversions. The increasing use of fixed pitches versus relative pitches also influenced the interpretation of transposition. The distinctions essential for a modal classification disappeared because of many of these new concepts.

Because of the irregularities of the traditional 8-mode system and the determination to adapt it more closely to musical practice, new 8-mode systems were proposed. However, simpler classification systems were also employed as can be seen in many indices in MSS. These systems indicate the final note either together with the transpositional system (i.e. *cantus mollis* or *durus*) or with the third above (major or minor). Albeit the invertibility of intervals was acknowledged in the beginning of the seventeenth century, theorists still adhered to the concept of the *senario*, strongly promoted by Zarlino (1558). The *senario* argument led to the pairing of major imperfect consonances in opposition to minor imperfect consonances (i.e. two scale types), thus suggesting that the invertibility of intervals was not recognised. The argument was still used by English theorists and natural philosophers at the end of the seventeenth century. However, the two scales were now not only distinguished by the imperfect consonances but also by whether the seventh degree of the scale was major or minor. Thus the theoretical recognition of the major and minor keys was established.

**PART 1**  
**SOURCES AND BACKGROUND**

## Introduction

The aim of the present thesis is:

To study English music-theoretical writings from c.1590 to c.1690 with particular reference to the classification systems of modes and the evolution of new, simpler methods of classification.

In order to fulfil this objective, an essential part of the study examines specific concepts so as to expose the subtle changes, fundamental for the understanding of the evolution of new classification systems.

To limit the scope of the thesis, music practice has in general not been included, unless directly relevant to the discussions. Thus subjects such as improvisation, compositional practice, or the development of *basso continuo* are not examined in detail, though a closer study of them would perhaps reveal some interesting aspects in terms of intervals and chords. On the other hand, solmisation and briefly hexachordal theory have been included as these areas are essential for the understanding of scale types, transposition, the notion of fixed pitches, and most importantly a redefinition of the octave in theory. Although the period is limited to c.1590-c.1690, it has been necessary to include discussions of earlier theorists in order to show a clearer line of development, which took place over a longer period of time, and also to indicate how new incipient signs of change can be traced even back to 1450s, for instance. The overall design of the thesis is chronological, that is, it deals first with the modal systems before proceeding to the changes and the evolution of new systems. However, a chronological approach between the various sections is not desirable or even practical as new incipient signs of development do not necessarily occur in a chronological order. Each section (subject) is, where possible, structured according to chronology.

PART 1 ("Sources and Background") categorises the English treatises on music according to addressee and the subjects dealt with, that is, music practice, theory, and

## *Section i: Introduction*

science. This division is important because in many instances it explains why some areas are discussed and others are completely ignored. Thus music-theoretical concepts will be discussed in different ways according to whether the author is addressing the natural philosopher, the serious student, or the able amateur wishing to play an instrument. Furthermore, the purpose, the complexity, and even the language of a tract depends to a very great extent on for whom it is written. Sources mentioned by English theorists are also listed, and they may provide an indication of the foreign treatises which were available and used in England. The many references, mostly to German and Italian sources, also suggests that the English theorists were not as isolated or disinterested in modal theory and classification systems as one might believe. The quoted tracts can therefore later be drawn into the discussion to illustrate the differences or similarities between English and foreign music theorists and thus also explain unclear viewpoints.

A brief overview is given in the section "The Ladder of Music...", on the traditional Gamut, the hexachord and solmisation theories. These topics are of paramount importance in understanding the inconsistencies in the traditional Gamut and the subtle changes proposed, creating a fertile ground for redefining the Gamut.

The objective of PART 2 is three-fold:

1. To deal with the methods which theorists of the time argue should be employed when classifying music either according to the 8-mode system or the 12-mode system.
2. To create a fundament for the understanding of the evolution of new concepts and the redefinition of other concepts and development of new, simpler classification systems.
3. Furthermore, the purpose is to analyse English music theory in terms of the modal classification systems and place it into a broader European context, thereby explaining both similarities and differences.

The methods important for the classification of a composition according to the 8-mode

## Part 1: Sources and Background

system or the 12-mode system are:<sup>1</sup> *ambitus*; clef combinations (together with transpositional system and final); cadences and cadential hierarchy; and melodic patterns.<sup>2</sup> The remaining areas dealt with are the species of fourth, fifth, and octave. These are important for understanding the different backgrounds of the two modal systems, and, furthermore, are used as part of the melodic patterns. The purpose of PART 2 ("Methods for the Classification of Modes") has not been to explain in detail the sometimes complex differences between the 8-mode system and the 12-mode system, or the many irregularities. To do this a thorough examination of the history of both systems and the probable influence on compositional theory and practices would be needed.<sup>3</sup> Besides a brief examination of the function of the tenor in terms of a modal classification, the modal pairing in a polyphonic composition is examined showing the diverse contentions on which part delineates the mode of a composition.

PART 2 can be seen as an abstract which mainly reinforces the findings already made by Powers and Meier;<sup>4</sup> however, no one has so far juxtaposed these findings with the statements made by English theorists of the time. Using the European background and their extensive discussions on the subject, it becomes easier to understand the English theorists and provide solutions to many of their, for us today, ambiguous

<sup>1</sup> Only subjects relevant to the understanding of the methods of classification are examined. Areas such as *mixtio*, *commixtio*, *musica ficta*, imitation, fugue, counterpoint, or harmony are outside the scope and purpose of the thesis.

<sup>2</sup> See Pedro Cerone, *El melopeo y maestro. Tractado de musica theórica y práctica* (Naples 1613), p. 912; and Johannes Michael Ravn, *Heptachordum danicum seu nova solisatio* (Copenhagen 1646), p. 73, who asserts:

Dignoscuntur a. Modi. 1. Ex Ambitu. 2. Repercussione. 3. Cadentiis seu clausulis formalibus. 4. Et Imprimis è fine claviū & vocum Musicalium.

[The modes are determined by: 1. the *ambitus*; 2. the *repercussa*; 3. cadences or *clausulae formales*; 4. and especially by the final note and solmisation syllable.]

On pp. 73-80 Ravn gives a thorough explanation on how to employ the different methods. For theorists promoting the clef combinations as a way, see PT. 2.iii; for Cerone, see PT. 2 CONCLUSION.

<sup>3</sup> For a more thorough discussion of the 8-mode system and the 12-mode system, see especially Harold S. Powers, "Tonal Types and Modal Categories in Renaissance Polyphony", *JAMS* 34 (1981), pp. 428-70; Powers, "Is Mode Real? Pietro Aron, the Octonary System, and Polyphony", *BJhM* 16 (1992), pp. 9-52; and Bernhard Meier, *Alte Tonarten. Dargestellt an der Instrumentalmusik des 16. und 17. Jahrhunderts* (Kassel 1992); cf. PT. 3 CONCLUSION.

<sup>4</sup> For Powers, see note above and Powers, "Mode", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 12, pp. 376-418; Meier, op. cit.; Meier, *The Modes of Classical Vocal Polyphony*, tr. Ellen Beebe (New York 1988).



### *Section i: Introduction*

explanations. Though some of the subjects are not directly touched on in English tracts, it is demonstrated that they are nevertheless implied.

PART 3 can be divided into two distinct sub-parts:

1. The new definition of the octave as a circular principle (SECTION i) meant that new concepts evolved and old ones were redefined (SECTIONS ii-vi).
2. The remaining SECTIONS vii-ix deal with the new classification systems which are a consequence of the concepts discussed in the first sections.

Thus the basis and the main criterion for which subjects have been selected is PT. 3.i, dealing with the problems concerning the Gamut, hexachords, and solmisation. Though many of the problems were already mentioned by earlier theorists, they had not been solved satisfactorily (PT. 1.iii). In England during the 1660s, the Royal Society of London played an important role in promoting new ways of understanding acoustics and temperament.<sup>5</sup> However, basic concepts, such as the paradox between using the hexachord with only six notes and the octave as containing seven different notes, were also dealt with and led to the definition of the octave as a circular principle. These areas have not earlier been studied in detail.<sup>6</sup>

While the tenor was the mode-defining part, the bass, as the lowest part of a polyphonic composition, was considered the foundation. The definition of the bass as

<sup>5</sup> These areas have to a large extent been dealt with by historians of science: Penelope M. Gouk, "The Role of Acoustics and Music Theory in the Scientific Work of Robert Hooke", *AS* 37 (1980), pp. 573-605; Penelope M. Gouk, "Acoustics in the Early Royal Society 1660-1680", *Notes and Records of the Royal Society* 36 (1982), pp. 155-75; Penelope M. Gouk, *Music in the Natural Philosophy of the Early Royal Society* (unpubl. Ph.D diss., University of London 1982); Mordechai Feingold and Penelope M. Gouk, "An Early Critique of Bacon's *Sylva sylvarum*: Edmund Chilmead's Treatise on Sound", *AS* 40 (1983), pp. 139-157; Jamie C. Kassler and D. R. Oldroyd, "Robert Hooke's Trinity College *Musick Scripts*, his Music Theory and the Role of Music in his Cosmology", *AS* 40 (1983), pp. 559-95. For an abstract, see Leta Miller and Albert Cohen, *Music in the Royal Society of London, 1660-1806* (Detroit 1987), pp. 5-18.

<sup>6</sup> However, Benito V. Rivera, *German Music Theory in the Early Seventeenth Century: The Treatises of Johannes Lippius* (Ann Arbor 1980), pp. 86-103, mentions briefly some aspects but does not relate the importance of them to the reinterpretation of other concepts and the development of new ones or to the classification systems.

## *Part 1: Sources and Background*

the lowest sounding note makes it difficult to recognise inversions of chords.<sup>7</sup> By using the new definition of the octave, it is possible to reconsider the function of the bass, and see it as the 'real bass-line'.<sup>8</sup> Theorists also begin to emphasise the importance of the bass as the first part to be composed and that the upper parts are ruled by it.

Though the invertibility of intervals was recognised and used as part of the art of descant and counterpoint, the new principle, seeing the octave as a circle, also meant that the definition of the sixth as a composite interval (i.e. a third and the perfect fourth) was challenged. The reason Zarlino (1558) included the minor sixth in his *senario* was precisely because this interval was made up of the minor third and the perfect fourth.<sup>9</sup> Also the complementarity of the fourth and fifth was acknowledged. Thus the distinction between a cadence involving a move from a fifth above a note and a fourth below it had become outmoded. The distinction was indeed a very significant concept according to the modal systems, as it characterised the subtle difference between plagal and authentic modes. The subject of invertibility has caused confusion among present-day scholars, because the conception of the *senario* at first sight seems to oppose the invertibility of intervals. Therefore, in this thesis the discussion of the circularity of the octave and inversions (PT. 3.iii) is treated separately from the discussion of inversions in relation to the *senario* (this is dealt with in PT. 3.viii). Using the real bass-line together with the new definition of the invertibility of intervals, it now becomes possible to acknowledge the inversions of triads. However, before a full acceptance is feasible, the *senario* must be disregarded and the triad must be seen as an entity in itself. Though German theorists around 1608 already began to mention that a chord in root position is the same as the sixth-chord, it took a long time for English theorists to follow.

According to Renaissance theorists, the cadence was defined as two parts mov-

<sup>7</sup> See PT. 3.iv.

<sup>8</sup> The real bass-line indicates that the lowest note in the bass is not necessarily the harmonic basis (i.e. Rameau's fundamental bass).

<sup>9</sup> The *senario* is defined as the first six divisions of the string: the octave (2:1), the fifth (3:2), the fourth (4:3), the major third (5:4), the minor third (5:3), and the major sixth (6:5). Thus the string ratio of the minor sixth (8:5) is not expressed within the number six.

## Section i: Introduction

ing from an imperfect to a perfect consonance. But as the bass was now the first part to be composed, this consequently led to the definition of the cadence as the fourth or fifth leap in the bass part. Furthermore, on the penultimate note of the cadence, one of the upper parts should be placed a major third or a major tenth above.

In the traditional 8-mode system, the hierarchy of cadential degrees was somewhat complex. Zarlino tried to simplify the hierarchy by using only the final, the fifth, and the third above the final. This very rigorous position proved to be untenable, as some modes (3, 4, 7, and 8), in both the traditional 8-mode system and Glarean's 12-mode system, would employ the second or fourth degrees instead of the fifth or third. In the beginning of the seventeenth century the cadential hierarchy was still the same. However, the exceptions were explained differently: keys or modes with a major third above the final did not use the third as a cadential degree, instead the second or fourth was employed.

An area which is not immediately linked with the new interpretation of the octave, is the concept of transposition. Because of the growing significance of using fixed pitches, and presumably also because of the increasing popularity of equal temperament, the otherwise clear distinction between transposition as a practical device and the terms *cantus durus* and *cantus mollis* becomes of minor importance. Ultimately the re-evaluation of transposition and the use of fixed pitches became important in the distinction of modes/keys and led to new classification systems. A redefinition of all these concepts meant that new systems could be proposed (such as the new 8-mode systems), either related to the traditional systems, or simply employing new, easier methods for classifying music.

At the same time, new theoretical concepts were discussed—in England, especially among the members of the Royal Society of London. SECTION viii examines the concept of the *senario*, beginning with Zarlino's explanation concerning the separation of the modes into two types depending on whether the third and sixth degrees are major or minor. In England the subject was discussed and developed further and ultimately influenced the recognition of only two scales. Theory and practice were

## *Part 1: Sources and Background*

united when Henry Purcell, in his revisions of Campion's tract (1694), explains to the student that all scales originate from C major or A minor.

However, in many contemporary English music manuscripts indices are found employing simple classification systems. One system makes use of the traditional definition of the terms *cantus durus* and *cantus mollis* together with the name of the final note. Another system only refers to the final note and the indication of whether the third above is major or minor. In this system the *durus* and *mollis* have been redefined indicating the 'sharp' or 'flat' third rather than a transpositional system.

The subjects examined in PART 3 have not earlier been thoroughly studied in modern writings in connection with English music theory. One of the problems could be that musicologists often have not been aware of the important discussions among the growing number of natural philosophers. On the other hand, historians of science have drawn attention to the natural philosophers, but most often in connection with the history of acoustics and temperament, for example. Because of the complexities of the music theoretical discussions c.1590-c.1690 including the modal classification systems, it is also difficult to draw a clear line between the traditional and the new evolving concepts. One way of solving these problems is to divide the examination of the concepts and classification systems into separate sections.

### MODERN DISCUSSIONS

Not many have studied the English theorists thoroughly in an effort to understand their arguments and examine their definitions of the music-theoretical concepts discussed (or not discussed!). Neither are there any extensive discussions on the 8-mode system and the 12-mode system and the new systems that evolved. Robert Wienpahl (1955), for example, defines modal theory as tenor-derived composition and tonal theory as bass-derived composition, and consequently fails to address many important aspects of English music theory.<sup>10</sup> Using modern concepts as a point of departure leads Wienpahl

<sup>10</sup> Robert W. Wienpahl, "English Theorists and Evolving Tonality", *ML* 36 (1955), pp. 377-93.

### Section i: Introduction

to the conclusion that "the most significant advances in tonal theory came from two of the most important exponents...Thomas Morley and Thomas Campion", and that "the English musicians... were in the absolute forefront of the turn to tonality".<sup>11</sup>

Lillian Ruff (1961) has dealt with English treatises published between 1574 and 1730; she has, however, completely avoided treatises dealing with the scientific aspects of music. Hence the author also refrains from discussing Robert Fludd's interesting treatise on the subject, "De templo musica" (1617-18), with the following arguments:

Whilst some of the theorists named in this thesis might be considered old-fashioned in their ideas, none can compare with Robert Fludd, who, in spite of the movement towards rationality, preferred to adhere to unproved theories rather than accept the evidence of his senses... like many other versatile gentlemen of the seventeenth century, he devoted some of his writings to music and musical instruments, only differing widely from his contemporaries by his fantastic metaphysical notions... Since it is unlikely that his writings, which were in Latin and obscure and mysterious, were ever studied by students of music, he is left out of account...<sup>12</sup>

It is clear that the first four parts of Fludd's "De templo musicae" are written in the medieval-Boethian tradition. This was the usual approach towards theory and history of music, even in the late Renaissance. In this sense Fludd cannot be considered either original or conservative. His discussion of ligatures was *de rigueur* and the rather long-winded explanation of the proportional time system and time signatures was popular, though declining after the turn of the century. These subjects did, nevertheless, have some practical value for the performer as can be seen in the compositions of the Baldwine manuscript written between 1581 and 1606.<sup>13</sup> Another theorist and composer discussing the rather complex proportional time system is Thomas Ravenscroft, *A Briefe Discourse* (1614). Fludd's and Ravenscroft's discussions are at times very similar,

<sup>11</sup> Ibid., p. 377.

<sup>12</sup> Ruff, *The Seventeenth-Century English Musical Theorists* (unpubl. Ph.D diss., University of Nottingham 1961-2), pp. 16-7.

<sup>13</sup> GB-Lbl MS Royal RM 24 d 2; another important example is *A Booke of In Nomines + other Solfainge Songes*, c.1578, GB-Lbl MS Add. 31.390

## Part 1: Sources and Background

but it does not seem that either of them copied from the other; rather, they probably knew and copied the same sources.<sup>14</sup>

That Fludd chose to write in Latin may for a modern reader seem to exclude musicians, composers and music theorists. But many of the Renaissance musicians, theorists, and composers belonged to the intellectual elite of the day and could both read and write Latin. We have Dowland's translation of Ornithoparchus' treatise which shows Dowland's unsurpassed skills as a translator; we have Thomas Campion's Latin poems which show his ability in writing and reading Latin.<sup>15</sup> Besides Italian, Thomas Morley was certainly also able to read Latin, as he quotes from the anonymous medieval manuscript *Quatuor principalia musicae*; and Glarean's *Dodecachordon* (1547) and Calvisius' *Melopoia* (1592), to which he also refers, are written in Latin. Ravenscroft understood Latin as he, too, used *Quatuor principalia musicae* as well as other treatises in Latin.<sup>16</sup>

Though Latin became less used during the Renaissance,<sup>17</sup> it was still regarded as a most important language, and those interested in reading books on music theory were in any case intellectuals, which the Elizabethan population at large were not. Indeed, the circle of English readers would have been much wider had Fludd published his writings in English. But one of the reasons Fludd wrote his work in Latin was not so much to exclude 'students of music' but to make it available to a wider 'European' audience. Latin was considered the universal language—a language understood by the intellectuals of the world—and therefore it seems particularly appropriate in Fludd's conception of the Universe to write in Latin. Fludd's work must be considered important as it shows intriguing signs of change in traditional music theory and practice.<sup>18</sup>

<sup>14</sup> See PT. 1.ii.

<sup>15</sup> Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. D8<sup>v</sup>, also explains that he used Calvisius' *Melopoia* which is written in Latin.

<sup>16</sup> Thomas Ravenscroft refers to numerous treatises on music written in Latin, among others: Sebald Heyden, *De arte canendi* (Nuremberg 1540); Nicolaus Listenius, *Musica* (Wittenberg 1537); Heinrich Glarean, *Dodecachordon* (Basel 1547); Senior [Lucas] Lossi, *Erotemata musicae practicae* (Nuremberg 1563); Johannes Magirus, *Artis musicae* (Frankfurt 1596); see TABLE 1.ii.2., item 10.

<sup>17</sup> Campion, op. cit., sig. D8<sup>v</sup>, indicates that less people could read Latin and therefore he finds it appropriate to translate Calvisius.

<sup>18</sup> Cf. PT. 3.ii, v, vi.

### *Section i: Introduction*

In general, Lillian Ruff considers most English theorists conservative, and notes that they mainly plagiarised from continental sources. Very often Ruff misses the important points made in the tracts by neither being aware of whom the theorists address nor of the purpose of the treatise, that is, whether practical or theoretical. Instead, the author applies a modern way of thinking and thus assumes interpretations which, when studied from another angle, yield a very different meaning. A similar interpretation is also found in W. R. Davies' short introduction (1967) to the modern edition of Campion's treatise from c.1613. Davies argues that

Campion's (with the possible exception of Coperario's) is the only Renaissance English treatise of interest to the historian of music theory, all the others being either mediaeval survivals... or interesting for their lively testimony about contemporary practice rather than for their theoretical innovations.<sup>19</sup>

Gertrude Brown Miller (1960) tries to trace incipient signs of tonality, but like Wienpahl she also simplifies modal and tonal concepts basically to tenor- or bass-derived composition.<sup>20</sup> Furthermore, she concentrates her discussion on the changes that occur in counterpoint. Both Ruff's and Miller's dissertations are descriptive and do not try to interpret the various topics dealt with in the treatises. Thus they avoid explaining the differentiations between a modern way of thinking and a Renaissance conception.

A short, but practical description and bibliography of English music theory in the seventeenth century has been written by Walter Atcherson (1972). He observes that

English music theory exhibits two orientations, the one practical and pervading the entire century, the other more purely theoretical and becoming prominent only in the second half of the century.<sup>21</sup>

<sup>19</sup> W. R. Davies (ed.), *The Works of Thomas Campion* (New York 1967), p. 322.

<sup>20</sup> Gertrude B. Miller, *Tonal Materials in Seventeenth-Century English Treatises* (Ph.D diss., University of Rochester 1960).

<sup>21</sup> Walter T. Atcherson, "Symposium on Seventeenth-Century Music Theory: England", *JMT* 16 (1972), p. 7.

## *Part 1: Sources and Background*

The author concludes that the progressive nature of the ideas found in English tracts were due to the fact that the theorists "were poorly schooled in the medieval/Renaissance tradition".<sup>22</sup> Joel Lester (1989), who deals mainly with German theory of music, includes a very brief, but sensitive and sympathetic discussion on French and English theorists.<sup>23</sup> The author mentions that the English music theorists were not interested in the problems of the modes, and that a study of modal theory was not encouraged by the fact that modes were usually associated with Catholic music, which at the time would have been considered "popish".<sup>24</sup>

Barry Cooper (1986), drawing his information primarily from Lillian Ruff, also deals with English music theory and practice.<sup>25</sup> First he provides a very brief discussion of each of the treatises he considers most important. Like Ruff, he ignores the discussions dealt with by the natural philosophers and therefore is not able to trace many of the incipient signs which lead to new musical classification systems. Although Cooper includes some brief sections on various topics on practice and theory, his discussion is descriptive. Hence numerous problems are left unsolved, such as a new conception of the Gamut and the octave, inversions of intervals, and the invertibility of chords.

Though some scholars have dealt with English music theory they have not tried to understand the nature and the axioms of the tracts in their own terms, or to relate them to contemporary continental discussions. Nor have they been able to make a clear distinction between tracts written for the musical amateur or the serious student, or even for the natural philosopher. In order to achieve a much more profound understanding of the developments of English music theory, and especially the classification systems, it is important to be aware of the subtle distinctions involved, in particular between theory and science, before creating a synthesis.

<sup>22</sup> Ibid., p. 12.

<sup>23</sup> Joel Lester, *Between Modes and Keys: German Theory 1592-1802* (New York 1989), pp. 101-4.

<sup>24</sup> Ibid., p. 101.

<sup>25</sup> Barry Cooper, "Englische Musiktheorie im 17. und 18. Jahrhundert", *Geschichte der Musiktheorie*, ed. Frieder Zaminer (Darmstadt 1986), vol. 9, pp. 145-256.



## English Treatises and Foreign Sources

It is curious that compared with the amount of continental treatises on music theory published during the late Renaissance and early Baroque, there are not many English books on the subject.<sup>1</sup> The amount of information which poured out in particular from the Italian and the German presses is tremendous and presents many different views. But it is also clear that many of the German books on music were written for the *Lateinschule*, where music was a very important part of the curriculum, rather than for the professional elite.<sup>2</sup> Many of these books are therefore easier to understand, but they are also somewhat conservative and maybe do not reflect the theory of the time but rely more on previous practices. French treatises, on the other hand, are few, the most influential being Marin Mersenne (1636-37).<sup>3</sup>

In England, the most significant book on music theory and composition was certainly Thomas Morley's *A Plaine and Easie Introduction to Practicall Musicke* (London 1597). Another important treatise, which has been rather overlooked, is Charles Butler's *Principles of Musick, in Singing and Setting* (London 1636). Though not well-known today, it presents many interesting details on music theory, composition, and practice of that time.<sup>4</sup> Only these two English tracts reach the high standard set by continental theorists such as Zarlino (1558).

It is possible to classify the English music-theoretical sources into three different categories:

<sup>1</sup> Albert Cohen (ed.), "National Predilections in Seventeenth-Century Music Theory: A Symposium", *JMT* 16 (1972), pp. 6-71. Concerning English theory, see Walter T. Atcherson, "Symposium on Seventeenth-Century Music Theory: England", *JMT* 16 (1972), pp. 6-15.

<sup>2</sup> The main purpose of teaching boys music and Latin in the German schools of the Reformation was to enable them to participate in the services of the church; Frederick W. Sternfeld, "Music in the Schools of the Reformation", *Md* 2 (1948), p. 104; Carl Parrish, "A Renaissance Music Manual for Choirboys", *Aspects of Medieval and Renaissance Music*, ed. Jan LaRue (New York 1966), p. 649.

<sup>3</sup> Cohen, op. cit., "Symposium on Seventeenth-Century Music: France", p. 20.

<sup>4</sup> The book was indeed very popular even as late as the end of the seventeenth century when Roger North borrowed it from his teacher John Jenkins; Lillian M. Ruff, *The Seventeenth-Century English Musical Theorists* (unpubl. Ph.D diss., University of Nottingham 1961-62), p. 21.

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CATEGORY I: music practice, that is, the art of playing or singing.

CATEGORY II: music theory (usually also briefly history), composition, and practice (solmisation and hexachordal theory).

CATEGORY III: music as a natural science, generally dealing with sound (physics) and temperament (mathematics (logarithms)).

It is important to be continuously aware of these three distinct categories, since they clearly address different aspects of music and therefore deal with music in various ways and from very different points of view. One cannot expect to find extensive discussions on complex theories of modes in books written for the amateur lute player (CATEGORY I) or in books only dealing with the calculation of temperaments using logarithms (CATEGORY III).(see TABLE 1.ii.1).

Treatises dealing with music as a science begin to appear around 1650-60 when the Royal Society of London was formed.<sup>5</sup> In the early years of the Society, various aspects of music science, such as acoustics, temperament, and the calculations of musical proportions were discussed. Also music therapy and hearing were examined. In spite of the preference for these topics, members and consultants also reviewed music theory and sometimes even music practice. Thus John Pell (c.1635-1666), Robert Hooke (1671-76), Francis North (1677), and William Holder (1694), who all had a great interest in music, were active members of the Royal Society, and John Wallis (c.1664), John Birchensha (c.1664), and Thomas Salmon (1672, 1688) were closely associated with the Society. Through their inquisitiveness, the musical scientists created a fertile ground upon which new musical concepts could grow. It is some of these most important ideas which will be dealt with in PART 3.

<sup>5</sup> For a brief and concise history of the Royal Society of London, see Leta Miller and Albert Cohen, *Music in the Royal Society of London, 1660-1806* (Detroit 1987), pp. 4-49.

*Section ii: English Treatises and Foreign Sources*

TABLE 1.ii.1

English Musical Tracts According to Subject

YEAR	CATEGORY I (practice)	CATEGORY II (theory, composition, practice)	CATEGORY III (natural sciences)
c.1558		[Kinaston] (MS)	
1568	John Alford/Le Roy		
1574	F. Kn. Gentleman		
[1596]		[William Barley]	
c.1596	William Bathe		
1597		Thomas Morley	
1603	Thomas Robinson		
1609		Dowland/Ornithoparchus	
1610	Robert Dowland		
c.1610	Thomas Ravenscroft (MS) <sup>6</sup>	Thomas Ravenscroft (MS)	
c.1613		Thomas Campion	
c.1614		John Coprario (MS)	
1614		Thomas Ravenscroft	
1617-18	Robert Fludd	Robert Fludd	[Robert Fludd]
1627			Francis Bacon
1631	Elway Bevin	Elway Bevin	
1635-66		John Pell (MS)	John Pell (MS)
1636		Charles Butler	[Charles Butler]
c.1650			Edmund Chilmead (MS) <sup>7</sup>

<sup>6</sup> Ravenscroft deals with three definitions of music: first, as an art; second, as speculative; and third, as practical.

<sup>7</sup> *An Examination of Certain Experiments in the Second & Third Centuries of the "Naturall History..."* Francis L<sup>d</sup> Verulam... *Touching the Nature of Sounds*, GB-Ob MS Tauner 204; Mordechai Feingold and Penelope M. Gouk, "An Early Critique of Bacon's Sylva Sylvarum: Edmund Chilmead's Treatise on Sound", *AS* 40 (1983), pp. 139-57. Though Chilmead was not a member of the Society his discussion

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YEAR	CATEGORY I (practice)	CATEGORY II (theory, composition, practice)	CATEGORY III (natural sciences)
1653			Brouncker/Descartes
1659	Christopher Simpson	Christopher Simpson	
1664		Birchensha/Alsted	
c.1664		John Birchensha (MS)	John Birchensha (MS)
1664			John Wallis (MS) <sup>8</sup>
c.1664		Silas Domvill (MS)	Silas Domvill (MS)
1667		Christopher Simpson	
1671-76			Robert Hooke (MS) <sup>9</sup>
1672		[Thomas Salmon]	Thomas Salmon
1672		Matthew Locke	
1672		[Thomas Salmon]	Thomas Salmon
1676	Thomas Mace	Thomas Mace	
1677		Francis North	Francis North
1694			William Holder
1694		Campion/Henry Purcell	

is related to Bacon whose ideas were fundamental to the Society.

<sup>8</sup> In connection with John Birchensha's musical proposals (read at the Royal Society, 27th April 1664), John Wallis made an examination of the mathematical part (proportions and temperament); *Letter to the Secretary of the Royal Society, Henry Oldenburg*, 14th May 1664, *GB-The Royal Society of London*, MS Boyle Papers BP.41.2, fols. 23'-31'. See also Thomas Birch, *The History of the Royal Society of London* (London 1756), vol. 1, p. 418, 425. Wallis' discussion has not been relevant for the present thesis and has therefore not been included.

<sup>9</sup> See Jamie C. Kassler and D. R. Oldroyd, "Robert Hooke's Trinity College *Musick Scripts*, his Music Theory and the Role of Music in his Cosmology", *AS* 40 (1983), pp. 559-95; Penelope M. Gouk, "The Role of Acoustics and Music Theory in the Scientific Work of Robert Hooke", *AS* 37 (1980), pp. 573-605.

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Other theorists fall in between these mentioned groupings. Thus, Robert Fludd, who deals with nearly all aspects of music, is difficult to place as he wrote about 40 years before there was any real interest in the physical science of music. Though Fludd's large volumes, *Utriusque cosmi... historia*, amounting to over 1,000 pages, were published in 1617-18, he claims that parts of it (including the section on music) were already written when he was studying at Oxford, which means at the earliest 1596.<sup>10</sup> The whole *Utriusque cosmi... historia* was completed about 1610.<sup>11</sup> Fludd, together with Francis Bacon (1627) and Marin Mersenne (1636-37), must be placed among those who encouraged a scientific approach to music (i.e. the study of sound and acoustics, for instance). Furthermore, presumably by the instigation of Fludd and Bacon in particular, philosophy of music slowly changed direction and became part of the

<sup>10</sup> Robert Fludd, *Utriusque cosmi majoris scilicet et minoris metaphysica, physica, atque technica historia* ["Metaphysical, Physical, and Technical History of both the Major and Minor Worlds"] (Oppenheim 1617-18), vol. 1, "De naturae simia", lib. 6: "De fure & furto indicando". Cap. i: "De veritate hujus partis Astrologiae", pp. 701-2:

...Posteaquam enim Oxonii Bacculaureatus gradum assumpseram, quo tempore in ipsa medulla studii Mathematici haerebam inter caeteras artes hujus quoque scientiae Astrologiae profunditatem scrutari omnibus viribus annitebar, operamque haud exigua in Geneseos & furti investigatione ponebam... Accidebat etiam non multò post, dum in studiis meis circa tractatum de Musica ita anxie occupabar, ut vix per integram septimanam è cubiculo meo egrederer, ut die quodam Jovis accederet ad me visendi causa juvenis, quidam satis nobilis, qui scientiis etiam humanioribus operam dabat in collegio Magdalense, quod à nostro collegio S. Johannis nomine insignito directè versus Orientem positum erat...

[For after that I had received the BA degree at Oxford, I adhered in the depth of my heart to the mathematical science [and] amongst its other arts I also strived to examine profoundly the science of astrology with all strength, and I put no small amount of work on horoscopes and on the investigation of theft... And not long time after, it happened, while I was anxiously occupied with my studies on the treatise of Music and I hardly left my study for a whole week, that one Thursday a quite noble, young man came to visit me by chance. He attended classes in humanities at Magdalen College which lay east of our renowned S. John's College...]

Fludd received his BA in 1596.

<sup>11</sup> Robert Fludd, *A Philosophicall Key*, c.1619, GB-Ctc Western MS 1150 (O.2.46), fol. 15<sup>v</sup>:

My Microcosmical history as well natural as artificiall was composd by me some fower or five yeares before the renowne and fame of the Fraternity of the Rose Cross had perced my ears, as by the testimonys of my worthy friends Mr. Dr. Andrews, and that most learned Gentleman of the Inner Temple Mr. Seldein...

The first Rosicrucian manifesto, *Fama fraternitatis*, was published by Wilhelm Wessell (Kassel) in 1614. Thus Fludd must have completed his work c.1610; William H. Huffman, *Robert Fludd: Essential Readings* (London 1992), p. 40, 106.

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natural science of music: the investigation of sound.<sup>12</sup>

Although only Morley and Butler have written thoroughly on most aspects of music theory, it does not automatically imply that English music theory was lagging behind the rest of Europe. When creating a synthesis of the available material, that is, including the practical treatises as well as those on music as a natural science, it becomes obvious that the level of knowledge of music was just as high as in Italy and Germany. On the other hand, comparing the English tracts with the continental in the context of music theory and in particular with the aspects of modes, it is very noticeable that the English avoid the subject. Thus Robert Stevenson (1952), regarding Thomas Morley's approach to modal theory and concepts, concludes:

—however much he may have known, or forgotten, concerning modes, he at the time of writing his treatise considered the subject of small moment;... Since manifestly he was a well educated musician as English education went, we must conclude that neither at Oxford [where Morley had studied] in his day, nor in the private tutelage he may have received from Byrd was modal science stressed.<sup>13</sup>

Or is the problem that we, today, understand and read the treatises, especially the English sources, in a different way, superimposing a conception and meaning of words which for the Renaissance musician, composer, theorist or amateur would be nonsensical? The difficulty lies in the fact that the various musical treatises address

<sup>12</sup> Though both philosophers seem to play a role in the 'Scientific Revolution', their views were indeed very different, even incompatible. Fludd believed, from a Neoplatonic point of view, that man was a microcosm of the Universe (macrocosm), and based his theories on ancient writings. Bacon, on the other hand, briefly states in *The Advancement of Learning* (London 1605/ Oxford 1640), book 4, 2.1, p. 186, that

Neither yet are we so senselesse, as to imagine with *Paracelsus*, & the Alchymists; That there are to be found in mans Body certaine Correspondences, and Parallels to all the variety of specifique Natures in the world (as Starres, Minerals, and the rest) as they foolishly fancy and Mythologize, straining, but very impertinently, that embleme of the Ancients, That man was *Microsmus*, an abstract, or modell of the whole world...

<sup>13</sup> Robert Stevenson, "Thomas Morley's *Plaine and Easie* Introduction to the Modes", *Md* 6 (1952), pp. 182.

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different media and thus choose the subjects accordingly: whether it is the serious student of music, the amateur or music lover, or in the middle of the seventeenth century, the scientist. Nearly all the tracts belonging to the first two categories (TABLE 1.iii.1) are clearly written for the music lover or amateur, and therefore avoid the more complex and difficult issues.<sup>14</sup>

Since there are numerous references to foreign treatises in English books on music, they have also been consulted. Furthermore, when collating the material and details of English treatises with continental ones, it becomes obvious that the English relied heavily on their foreign colleagues. Especially Glarean (*Dodecachordon*, Basel 1547), Zarlino (*Le istituzioni harmoniche*, Venice 1558/1573) and Calvisius (*Melopoia seu melodiae condendae ratio*, Erfurt 1592) were read and translated into English. Thomas Morley has a long list of "Authors whose authorities be either cited or used in this booke", and, indeed, when comparing many of Morley's subjects with Zarlino, it is evident that very often he has literally translated from *Le istituzioni harmoniche*. In spite of his long list, Morley also utilised sources without mentioning them at all.<sup>15</sup> Many of the composers, to whom he refers to in the same list, are merely taken from Glarean.<sup>16</sup> Morley must have had access to Glarean's, Zarlino's, and Calvisius' books as well as to the manuscripts from which he quotes.

Thomas Ravenscroft (1614) published a short treatise dealing with the prolational system which at this time was becoming obsolete. Ravenscroft supplies a *cornucopia* of references to sources, so much so that it can be more confusing than enlightening for the reader. This leads one to suspect that the author referred to the old

<sup>14</sup> One very special tract, which only deals with musical notation, has not been included in the above table: in 1638 William Braythwaite published his *Siren Coelestis* in which he tries to argue in favour of a new system using 231 symbols; for a more detailed discussion of this tract, see D. W. Krummel, *English Music Printing, 1553-1770* (London 1975), pp. 98-102. Neither have the writings of John Case been included, as he only considers the philosophical and mythological aspects of music (i.e. from an Aristotelian point of view); J. W. Binns, "John Case and the *Praise of Musicke*", *ML* 55 (1974), pp. 444-53.

<sup>15</sup> Orazio Tigrini, *Il compendio della musica* (Venice 1588); for a more detailed discussion, see Morley's *A Plain and Easy Introduction to Practical Music*, ed. Alec R. Harman (London 1952), pp. 241-2.

<sup>16</sup> These are listed under the heading "Practicioners, the moste parte of whose works we have diligently perused, for finding the true use of the Moods", *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), last folio<sup>verso</sup>.

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sources as a 'show off' or to give weight to his words, as it were. As in the case of Morley, one must conclude that, though Ravenscroft lists numerous works, it does not immediately follow that he had read them all but might have found some of the quotations in other musical tracts. Comparing Ravenscroft with the works to which he referred, one will notice that he is very precise though he did not copy them verbatim, but rather formulates their arguments using his own words. Consequently, it is also difficult to determine exactly to which editions he had access; for example, whether he read Dowland's translation of Ornithoparchus' treatise printed in 1609, or one of the original Latin editions from 1517 or thereafter.

Another English music theorist who made extensive use of foreign sources was Charles Butler. Again Glarean is quoted concerning the numbers of modes, but it is done in a somewhat vague manner and one could therefore argue that Butler had read a secondary source. It is evident that Glarean does not play the same important role as previously seen in Morley's treatise. Butler makes extensive use of the small but very popular book by Seth Calvisius, and has translated large sections of this treatise. Nevertheless, Butler nearly always gives his sources in the footnotes. The author uses the new numbering of the modes beginning with mode 1 on the note C rather than D which Zarlino proposed in the new edition of *Le institutioni harmoniche* from 1573 and to which Calvisius also adheres.

The following TABLE 1.ii.2 covers the English treatises, both those in manuscript and those published, together with the sources they indicate they knew or consulted. It has not been the purpose of TABLE 1.ii.2 to provide extensive details of sources quoted or referred to in English books on music, but rather to see which foreign treatises were known and which English theorists had access to read.



## Section ii: English Treatises and Foreign Sources

TABLE 1.ii.2

### Mentioned Foreign Sources in English Treatises

[Anonymous:]

1. *The Art of Music Collected of all Ancient Doctours of Music*, Scottish, after 1558, GB-Lbl MS Add. 4911.<sup>17</sup>

Volicus Baroducensis [Wollick, *Enquiridion de musica* (Paris 1512)]  
 Nicholas Barroducensis [the same as Volicus?]  
 Boethius [*De musica*]  
 Faber Stap. [Stapulensis, *Musica libris quattuor demonstrata* (Paris 1551)]  
 Franchinus [Gaffurio]  
 Franchinus Laudensis [Gaffurio]  
 Gaffurio [*Practica musicae* (Milan 1496) or *Theorica musicae* (Milan 1492)]  
 Erasmus Lapidica [quot. from Ornithoparchus?]  
 Johannes de Muris [*Libellus cantus mensurabilis*]  
 Ornithoparchus [*Micrologus* (s.l. 1517)]

F. Kn. "Gentleman":

2. *A Briefe and Plaine Instruction to Set All Musicke of Eight Divers Tunes* (London 1574) [tr. of Adrian Le Roy, *Instruction de partir toute musique* (Paris 1557)]

Glarean (on eight or twelve modes)  
 [*Dodecachordon* (Basel 1547)]

William Barley:

3. *Pathway to Musicke* (London 1596) [not extant, but according to Morley the sources are:<sup>18</sup>]

<sup>17</sup> Transcribed by John D. Maynard, *An Anonymous Scottish Treatise on Music* (Ph.D diss., Indiana University 1961); many of the rules given in the MS are very similar to Gaffurio (1496).

<sup>18</sup> Morley, op. cit., "The Annotations. Upon the third part", sig. \*3.

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Beurhusius [*Musicae rudimenta e  
pleniore* (Dortmund 1581)]  
Lossius [*Erotematum musicae  
practicae* (Nuremberg 1563)]

Thomas Morley:

4. *A Plaine and Easie Introduction to Practicall Musicke* (London 1597)<sup>19</sup>  
Peter Aron [*Thoscanello in musica*  
(Venice 1523)]  
Menfredus Barbarinus Coregiensis  
[?]  
Fredericus Beurhusius  
Sethus Calvisius [*Melopoia seu  
melodiae condendae ratio* (Erfurt  
1592)]  
Nicolaus Faber [*Musicae rudimenta*  
(Augsburg 1516)]  
Jacobus Faber Stapulensis [1551,  
with Jordanus]  
Francho [MS, mentioned in  
connection with Haulo]  
Joannes Thomas Freigius  
[presumably from Beurhusius  
(1581)]  
Franchinus Gafurius [1492, 1496]  
Henric. Loritus Glarean [1547]  
Robertus de Haulo [MS]  
Incertus Impressus Basilaie [?]  
Joannes Listenius [Nicolaus?; *Musica*  
(Wittenberg 1537)]  
Lucas Lossius [1563]  
Joannes Magirus [*Artis musicae  
methodice legibus logicis* (Frankfurt  
1596)]<sup>20</sup>  
Andreas Ornithoparcus [1517]  
Author Quatuor Principal<sup>21</sup> [MS]  
Andreas Raselius [*Hexachordum seu  
quaestiones musicae practicae*  
(Nuremberg 1589)]  
John Spataro [quot. from Gaffurio?]

<sup>19</sup> Morley must at least have read Zarlino, Listenius, Glarean, Tigrini, and Zacconi; cf. critical notes to the 1952 edn. by Alec R. Harman.

<sup>20</sup> The treatise by Magirus, only published the year before, would seem somewhat late for Morley to include. It was normal that a book—depending on the size, of course—could take up to two years to print; thus Morley's book must have been completed at the latest around 1595 or early 1596; Philip Gaskell, *A New Introduction to Bibliography* (Oxford 1985), p. 161.

<sup>21</sup> Regarding this MS, "Francho", "Robertus Haulo", and Morley, see *Robertus de Handlo Regule: The Rules*, ed. Peter M. Lefferts (Lincoln & London 1991), pp. 5-6.

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Ludovicus Zaccone [*Prattica di musica* (Venice 1592)]  
Josepho Zarlino [*Le istituzioni harmoniche* (Venice 1558)]

John Dowland:

5. *Andreas Ornithoparcus his Micrologus, or Introduction* (London 1609)<sup>22</sup>  
St Augustine  
St Bernard (Tonale Sancti Bernardi)  
Berno  
Boethius  
Faber Stapulensis [1551]  
Gaffurio (*Practica musicae* (Milan 1496, *Theorica musicae* (Milan 1492))  
St Gregorie  
Guido (of Arezzo) [*Micrologus*]  
J. de Muris  
Placentinus  
Plutarch  
Joannes Pontifex [Afflighemensis]  
Tinctoris  
Valle [Giorgio Valla de Piacenza]

Robert Dowland:

6. *A Varietie of Lute-Lessons: Necessary Observations* (London 1610)  
Emmanuel Adrianus [Emanuel Adriansen, presumably *Novum Pratum Musicum* (Antwerp 1592), containing intabulations of madrigals]  
Calvisius ("de initio & progressu musicis", on music history) [*Exercitationes musicae duae* (Leipzig 1600)]  
Glareanus (Book i) [1547]  
Nerni [?]  
Ornithoparcus [1517/1609]

<sup>22</sup> That Ornithoparchus refers to these sources does not mean that Dowland read them; when Dowland refers to them in the book by his son Robert (1610), he could, of course, have taken them from Ornithoparchus. For a thorough discussion on the sources of Ornithoparchus, see *A Compendium of Musical Practice* with introd. by Reese and Ledbetter (New York 1973), pp. xxiii-xxx.

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Thomas Ravenscroft:

7. *Treatise of Musicke*, c.1610, GB-Lbl MS Add. 19.758  
Calvisius [1600]<sup>23</sup>

John Coprario:

8. *Rules How to Compose*, 1610-14, US-HU MS EL. 6863<sup>24</sup>  
[Calvisius (1592)]  
[Campion, *A New Way of Making  
Fowre Parts in Counter-point*  
(London c.1613)]

Thomas Campion:

9. *A New Way of Making Fowre Parts in Counter-point* (London s.d [c.1613])  
Calvisius [1592]  
[Coprario?<sup>25</sup>]

Thomas Ravenscroft:

10. *A Briefe Discourse*, London 1614  
Beurhusius [1581?]  
John Case, *Praise of Musicke*  
[Oxford 1586]  
John Dunstable [*Mensurabilis  
musicae*, presumably Muris,  
*Libellus*?<sup>26</sup>]  
Franchinus [Gaffurio, quot. from an-  
other source?]  
Glareanus, *Dodecachordon* [1547]  
Heyden [*De arte canendi*  
(Nuremberg 1540)]  
Listenius [1537]  
Senior Lossi [presumably Lucas]

<sup>23</sup> The reference is presumably wrong and should perhaps have been David Mostart, *Korte onderwysinghe van de musykkonste* (Amsterdam 1598); but since Ravenscroft names Seth Calvisius and refers to solmisation, he must have read Calvisius, *Exercitationes musicae duae* (Leipzig 1600).

<sup>24</sup> For a discussion of the sources which Coprario might have used, see introduction to the facs. edn. by Manfred Bukofzer (Los Angeles 1952).

<sup>25</sup> See note above.

<sup>26</sup> According to Ruff, op. cit., p. 15, the reference to Dunstable implies that Ravenscroft had access to GB-Lbl MS Add. 10.336 where the name occurs on fol. 18<sup>r</sup>; nevertheless, none of the references given by Ravenscroft correspond with Add. 10.336 which would seem to indicate that this cannot be the MS Ravenscroft used, as he is otherwise very accurate in his references. The passage and the example in which Dunstable's name occurs is presumably an abbreviated version of Johannes de Muris, *Libellus cantus mensurabilis*; *Scriptorum de musica medii aevi*, ed. Charles Edmond Henri de Coussemaker (Paris 1864-76), vol. 3, pp. 46-58; cf. Margaret Bent, "Dunstable, John", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 5, p. 721.

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Lossius (1563)]  
Magirus [1596<sup>27</sup>]  
Morley [1597]  
Nucius, *Musices poeticae* [Neisse  
1613]  
Ornithoparchus [1517, 1609?]

Robert Fludd:

11. "De templo musicae", *Utriusque cosmi... historia* (Oppenheim 1617-18), pp. 159-259<sup>28</sup>  
[Calvisius (1592)]  
Cardanus [*De musica* (Basel 1570)?]  
[*Quatuor principalia musicae*<sup>29</sup>]

John Pell:

12. *Portions of Treatises etc. Relating to Music*, c.1635-66, GB-Lbl MS Add. 4388<sup>30</sup>  
Birchensha [1664]  
Dr. Samuel Brunsell [?]  
Butler [*The Principles of Musick*  
(London 1636)]  
Calvisius [1600?]  
Campion [c.1613]  
Kepler [*Harmonices mundi* (Linz  
1619)]  
[Lippius, *Synopsis musicae novae*  
(Strassburg 1612)]  
Mersenne [*Harmonie Universelle*  
(Paris 1636-37)]  
Morley [1597]

Charles Butler:

13. *The Principles of Musick, in Singing and Setting* (London 1636)  
Bacon (Lord Verulam) [*Sylva  
sylvarum* (London 1627)]

<sup>27</sup> Ravenscroft refers to Magirus on p. 12 "Of Great Diminution", compare with Magirus, op. cit., "De diminutione sub signo externo", p. 13.

<sup>28</sup> Some phrases which Fludd uses are very similar to Ravenscroft implying that they may have copied from the same sources (*Quatuor principalia musicae*); cf. Ravenscroft, op. cit., pp. 1-2, with Fludd, op. cit., pp. 190-1; also some of the rules which Fludd provides are paraphrases of Calvisius' *Melopoitia* (Erfurt 1592). It must be remembered that Fludd completed the section on music between 1596 and c.1610.

<sup>29</sup> Fludd mentions Robert Brunham (op. cit., p. 191 [recte 192], 201), which implies that the copy of *Quatuor principalia musicae* to which Fludd had access must have been GB-Ctc MS 1441 (O.9.29).

<sup>30</sup> Lillian M. Ruff, op. cit., p. 30, has erroneously ascribed this MS to Birchensha.

## *Part I: Sources and Background*

Calvisius [1592]  
Franchinus [Gaffurio (1496)]  
Glareanus [1547]  
Kepler [1619]  
Lystenius [Listenius (1537)]  
Mersenne (*in sua Musathena*)<sup>31</sup>  
Morley [1597]  
Ornithoparchus [Latin edn.]  
Padouanius [*Institutiones ad diversas  
ex plurimum vocum harmonia  
cantilenas* (Verona 1578)]  
Caelius Rhodoginus, *Variarum* [quot.  
from another source?]

Edmund Chilmead:

14. *An Examination of Certaine Experiments in the Second & Third Centuries of  
the "Naturall History..." Francis L<sup>d</sup> Verulam... Touching the Nature of Sounds,*  
c.1650, GB-Ob MS Tauner 204<sup>32</sup>  
[Bacon (1627)]  
[Mersenne, *Harmonicorum libri* (Paris 1635)]

William Brouncker:

15. *Renatus Des-cartes Excellent Compendium of Musick: With Necessary and  
Judicious Animadversions Thereupon* (London 1653) [tr. of Descartes,  
*Compendium musicae* (Leyden 1650)]  
Kircher (*Artis magn.*) [*Musurgia  
universalis* (Rome 1650); referred to  
in Brouncker's annotations]  
Mersenne [1636-37]  
Morley [(1597) referred to in  
Brouncker's annotations]  
Zarlino [1558]

Silas Domvill als Taylor:

16. *Miscellaneous Works Relating to Music*, c.1650-1700, GB-Lbl MS Add. 4910,  
fols. 39-72  
Birchensha [*Templum Musicum*  
(London 1664)]  
Brouncker [1653]

<sup>31</sup> The author of *Musathena* is Ericus Puteanus (Hanau 1602); see Birchensha (item 19).

<sup>32</sup> For a detailed description and discussion of this MS, see Mordechai Feingold and Penelope M. Gouk, "An Early Critique of Bacon's *Sylva sylvarum*: Edmund Chilmead's Treatise on Sound", *AS* 40 (1983), pp. 139-57.

*Section ii: English Treatises and Foreign Sources*

Campion [c.1613]  
Simpson [*A Compendium of  
Practical Musick* (London 1667)]

Christopher Simpson:

17. *The Division-Viol, or the Art of Playing ex tempore upon a Ground* (London 1659/1665)

Descartes [from Brouncker (1653)?]  
Morley [1597]

18. *A Compendium of Practical Musick* (London 1667)  
Morley [1597]

John Birchensha:

19. *Templum Musicum: Or the Musical Synopsis of... Alstedius...* (London 1664) [tr. of Johann H. Alsted, *Encyclopaedia* (Herborn 1630), lib. 20, pp. 1195-1211]

Cardanus [1570?]  
Lippius [1612]  
David Mostart [*Korte onderwysinghe  
van de musykkonste* (Amsterdam 1598)]  
Puteanus, *Musathena* [Hanau 1602]

Thomas Salmon:

20. *An Essay to the Advancement of Musick* (London 1672)<sup>33</sup>  
Kircher [1650]  
Simpson [Christopher Simpson, *A Compendium* (1667)]

Matthew Locke:

21. *Observations upon a Late Booke...* (London 1672)  
Birchensha [1664]  
Simpson [1667]

Thomas Salmon:

22. *A Vindication of an Essay to the Advancement of Musick* (London 1672)  
Descartes [1653]  
Gassendus, *Introduction to the*

<sup>33</sup> Salmon knew Birchensha and would presumably also have known Birchensha's translation of Alsted.

## Part 1: Sources and Background

*Theory of Musick* [*Manuductio ad  
theoriam musices* (Lyon 1658)]  
Morley [1597]

Robert Hooke:

23. *Musick Scripts*, 1671-76, GB-Ctc MS O.11a.1<sup>34</sup>  
[Bacon (1605, 1627)]  
[Brouncker (1653)]  
[Butler (1636)]  
[Morley (1597)]  
[Simpson (1667)]

Francis North:

24. *A Philosophical Essay of Musick* (London 1677)  
[Lippius (1612)]<sup>35</sup>

William Holder:

25. *A Treatise of the Natural Grounds and Principles of Harmony* (London 1694)  
[Brouncker (1653)?]  
[Hooke]<sup>36</sup>

A number of practical tracts exist which have not been relevant to the present thesis: John Alford's *A Briefe and Easye Instruction to Learne the Tableture* (London 1568). This short treatise is a translation of Adrian Le Roy, *Instruction de partir...* (Paris 1557), the second book, and contains only instructions on how to play the lute and some short compositions. In 1596, William Barley published *A New Booke of Tabliture, containing sundrie easie and familiar instructions... whereunto is added an introduction to Pricksong, and certaine familliar rules of descant, with other necessarie tables plainly shewing the true use of the scale or Gamut, and also how to set any lesson higher or lower at your pleasure*. However, though the title indicates that the author also deals

<sup>34</sup> For a detailed description and discussion of the MS, see Jamie C. Kassler and D. R. Oldroyd, "Robert Hooke's Trinity College *Musick Scripts*, his Music Theory and the Role of Music in his Cosmology", *AS* 40 (1983), pp. 559-95.

<sup>35</sup> Many concepts which North deals with stem from Johannes Lippius, *Synopsis musicae novae* (Strassburg 1612).

<sup>36</sup> Jamie C. Kassler and D. R. Oldroyd, op. cit., p. 517.



## *Section ii: English Treatises and Foreign Sources*

with music theory and composition, these subjects are not mentioned at all. The treatise contains music by various English composers such as Francis Cutting and John Dowland. William Barley's treatise is a vague paraphrase of Le Roy's tract. No mention is made of either theorists or music history and philosophy; no theoretical discussion or indeed practical advice, unless related to the playing of the lute, is considered. Thus it was possible for the musical amateur to play on an instrument (i.e. the lute) without any knowledge of musical notation, hexachords, solmisation, or even the Gamut. This is an important aspect as it indicates that amateurs not necessarily knew anything about music theory or composition. Because of this it was possible for them (as for example the members of the Royal Society) to question the relevance and purpose of some of the aspects of traditional music theory and practice.

William Bathe (c.1596) neither mentions nor uses foreign sources in his treatise. It is very practical in approach as will be discussed below, and in that context it reveals many ideas which later began to play a prominent role.<sup>37</sup> The lute treatise by Thomas Robinson (1603), the manuscript tract by Birchensha (c.1664),<sup>38</sup> and the lute treatise by Thomas Mace (1676) are also interesting in the context of the developments of music theory, but none of them quotes or seems to have used foreign music theoretical sources. The impressive treatise by Elway Bevin (1631), which exclusively deals with the art of composing canons, does not name any foreign sources; nor does the author give any specific rules concerning counterpoint, music theory, or practice. The student must learn by studying the numerous examples contained in the treatise.

Looking closer at TABLE 1.ii.2 one will discover that some foreign tracts were certainly more popular than others. Besides Glarean, Zarlino, and Calvisius, also Listenius, Gaffurio, Magirus, and Ornithoparchus are mentioned several times. Later, also Morley is referred to quite often, and Campion has been copied and used frequent-

<sup>37</sup> Cf. PT. 3.i.

<sup>38</sup> *A Compendious Discourse of the Principles of the Practicall & Mathematicall Partes of Musick for the Use of the Honorable Robert Boyle. Esqu.*, c.1664, GB-The Royal Society of London, MS Boyle Papers BP.41.1, fols. 1<sup>r</sup>-21<sup>r</sup>.

## Part I: Sources and Background

ly. In the more scientific treatises Descartes and in particular Lippius were often quoted and used. Through translations of foreign treatises (Descartes and Alsted, e.g.), Lippius seems to have had a major influence on English music philosophical thought. In addition, Marin Mersenne (1636-37) and, to a lesser extent, Athanasius Kircher (1650) and Johannes Kepler (1619) are also mentioned.<sup>39</sup> These three famous natural philosophers were the prime sources for many of the discussions at the Royal Society. However, it is only when dealing with sound, acoustics, temperament, and intervallic proportions that these theorists are mentioned, and not when the Society discusses music theory. They have therefore not been included in great detail in the present study.

In order to understand both the foreign and English tracts more fully, some sources which are not mentioned or do not seem to have been utilised have also been included. They have been chosen very carefully, using mainly three criteria: 1. because of their popularity (Rodio (1600) and Banchieri (1605, 1609, 1614), for example);<sup>40</sup> 2. because they explain some aspects which were accepted in general (Dressler (1563), Nucius (1613), Cerone (1613));<sup>41</sup> 3. in order to illustrate other viewpoints, that is, areas of dispute (Vicentino (1555), e.g.).

<sup>39</sup> Mersenne, *Harmonie universelle* (Paris 1636-37); Kircher, *Musurgia universalis* (Rome 1650); and Kepler, *Harmonices mundi* (Linz 1619). Kircher's theories are extensively dealt with by Ulf Scharlau, *Athanasius Kircher (1601-1680) als Musikschriftsteller: Ein Beitrag zur Musikanschauung des Barock* (Marburg 1969); for a short abstract, see Ulf Scharlau, "Athanasius Kircher (1601-1680), or Some Aspects of Acoustical Developments in the Seventeenth Century", *Fontes artis musicae* 25 (1975), pp. 86-9. For Kepler's theories, see Michael Dickreiter, "Der Musiktheoretiker Johannes Kepler", *Neue Heidelberger Studien zur Musikwissenschaft* (Bern 1973), vol. 5; and H. F. Cohen, *Quantifying Music: The Science of Music at the First Stage of the Scientific Revolution, 1580-1650* (Dordrecht 1984). On Mersenne, see especially Albion Gruber, "Mersenne and Evolving Tonal Theory", *JMT* 24 (1970), pp. 36-67.

<sup>40</sup> Rocco Rodio's small tract, *Regole di musica* was reprinted twice (Naples 1603, 1609) and circulated widely outside Italy; also the many books on music by Adriano Banchieri were reprinted several times: *Cartella musicale nel canto figurato, fermo, et contrapunto*, numerous revisions between 1614 and 1623; *L'organo suonarino* (Venice 1605), revised in 1611, 1622; *Conclusioni nel suono dell'organo* (Bologna 1609), revised in 1626. For other works by Banchieri, see "Banchieri, Adriano", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 2, p. 106.

<sup>41</sup> Gallus Dressler, in his manuscript *Praecepta musicae poeticae* (Magdeburg 1563), deals with the 8-mode system; Johannes Nucius, *Musices poeticae sive de compositione cantus* (Neisse 1613) with the 12-mode system; and Pedro Cerone, *El melopeo y maestro. Tractado de musica theórica y práctica* (Naples 1613) with both.

## The Ladder of Music: The Gamut, Hexachords and Solmisation Theory

In order to understand the subtle changes in music theory that occurred around the beginning of the seventeenth century, it is imperative to know the basis from which these changes grew. At first sight, it does not seem that the Gamut, hexachords, and solmisation could have any great influence on the classification of music according to modes. However, as will be shown in a later section (Pt. 3.i), the complex method of solmisation led to many proposals suggesting simplifications which ultimately would influence the theory of modes as well as new classification systems.<sup>1</sup> The section only deals with the most fundamental aspects of solmisation and the hexachordal theory which are relevant for the other sections of this thesis.

The hexachordal and solmisation systems were crucial for the understanding and teaching of music theory and practice during the medieval period, and an interest in them did not diminish until well into the seventeenth century.<sup>2</sup> Thus Francesco Gaffurio (1496) mentions that solmisation "is indeed almost mandatory for the instruction of youth".<sup>3</sup> In 1636, Charles Butler claims that singers

<sup>1</sup> It has not been the purpose of the present thesis to discuss the connection between modes, hexachords, and solmisation. For a more thorough explanation of this subject, see Walter Werbeck, *Studien zur deutschen Tonartenlehre in der ersten Hälfte des 16. Jahrhunderts* (Kassel 1989); Cristle Collins Judd, "Modal Types and *Ut, Re, Mi*, Tonalities: Tonal Coherence in Sacred Vocal Polyphony from about 1500", *JAMS* 45 (1992), pp. 428-67; Christian Berger, "Hexachord und Modus: Drei Rondeaux von Gilles Binchois", *BJhM* 16 (1992), pp. 71-87.

<sup>2</sup> For a thorough explanation of hexachordal and solmisation theories before 1600, see in particular Francesco Gaffurio, *Practica musicae* (Milan 1496), tr. Clement A. Miller (s.l. 1968), *MSD* vol. 20, pp. 25-42. For modern discussions, see Gaston G. Allaire, *The Theory of Hexachords, Solmization and the Modal System* (s.l. 1972), *MSD* vol. 24; Jehoash Hirshberg, "Hexachordal and Modal Structure in Machaut's Polyphonic Chansons", *Studies in Musicology in Honor of Otto E. Albrecht*, ed. John Walter Hill (Kassel 1980), pp. 19-42.

<sup>3</sup> Gaffurio, op. cit., p. 30. On the importance of these subjects in education, see Frederick W. Sternfeld, "Music in the Schools of the Reformation", *Md* 2 (1948), pp. 99-122; and Carl Parrish, "A Renaissance Music Manual for Choirboys", *Aspects of Medieval and Renaissance Music*, ed. Jan LaRue (New York 1966), pp. 649-64.

## Part 1: Sources and Background

may call any Note by any name, and all Notes by one Name: els hou coolde they sing Ditti, according to the Note, at first sight? But unto Learners (for whose help this fit Number of fit Names was invented) the strict observing of them in their proper places, will proove no small furtherance both in Singing and Setting...<sup>4</sup>

Thus according to Butler the solmisation system which had been a practical tool as it particularly helped the singer's sight-reading was not of any assistance for beginners in "singing and setting".<sup>5</sup>

In the medieval period musical notes, or rather steps, were ordered according to the so-called 'Guidonian Hand', which presumably was used more as a type of a mnemonic system than as a practical device.<sup>6</sup> This hand consisted of twenty points, defining twenty steps. To enable the recognition of them, twenty letters were used, divided into three sections:

The first is of Capitall Letters; the Second of small; the Third of double Letters... Of the Capitall there be eight, viz. Γ. A. B. C. D. E. F. G. Of the small also Eight, *a. b. c. d. e. f. g.*... of the double ones there be Six, viz. *aa. bb. cc. dd.* and *ee*.<sup>7</sup>

<sup>4</sup> Charles Butler, *The Principles of Musick, in Singing and Setting* (London 1636), p. 16.

<sup>5</sup> The solmisation system and hexachordal theory could also help to some extent the application of *musica ficta*, especially in medieval and early Renaissance music. It must, however, be emphasised that the importance of using *musica ficta* declined during the late Renaissance as instrumental music gained in popularity. The use of chromaticism also made the application of *musica ficta* less relevant. Thus Karol Berger (*Musica Ficta: Theories of Accidental Inflections in Vocal Polyphony from Marchetto da Padova to Gioseffo Zarlino* (Cambridge 1987), p. xiii) argues:

...by that time [i.e. after the middle of the sixteenth century] the growing interest of composers in genuine chromaticism made exact notation of accidental inflections increasingly desirable and thus began slowly to undermine the practice of implied accidentals.

For a more brief and practical approach, see Nicholas Routley, "A Practical Guide to *Musica Ficta*", *EM* 13 (1985), pp. 59-71; but see also Margaret Bent, "*Musica Recta* and *Musica Ficta*", *Md* 26 (1972), pp. 73-100. *Musica ficta* is outside the scope of the present thesis, since implied accidentals were becoming obsolete during the period, c.1590-c.1690.

<sup>6</sup> Karol Berger, "The Hand and the Art of Memory", *Md* 35 (1981), pp. 87-120.

<sup>7</sup> John Dowland, *Andreas Ornithoparcus his Micrologus, or Introduction* (London 1609), p. 8; Ornithoparcus recognises 22 "Keyes", since the "*b fa 4 mi.* is not one *Key* onely, but two" (ibid.); Charles Butler, op. cit., p. 41:

All these Partes set together (thowgh for the deepest Base-voice, and the loftiest Treble-voice) ar contained within the compas of 22 Notes: which is a *Trisdiapason*, or the ful extent of the *Tam-ut*: but ordinarily they doe not exceede the number of 19 or 20.

### Section iii: The Ladder of Music...

Later, this hand was altered and became commonly associated with a ladder or a 'scale' where every step was individual and had no immediate connection with any other step of the ladder (ILL. 1.iii.1).<sup>8</sup> The name of each step indicated its precise position in relation to the other steps above and below.

William Bathe (c.1596) defines the Gamut as having ten lines and ten spaces which are identified by a letter and up to several solmisation syllables. Furthermore, it is important to know the placement of the various G-, C-, and F-clefs:

The Scale of Musick, which is called Gam-ut, containeth 10 rules and as many spaces, and is set downe in letters and sillables, in which you must begin at the lowest word, Gam-ut, and so go upwards to the end still ascending, and learne it perfectly without booke, to say it forwards and backwards: to know, wherein every key standeth, whether in rule or in space: and how manie Cliefes, how many Notes are containd in every Key.<sup>9</sup>

Three different hexachords were defined, using the solmisation syllables, *ut*, *re*, *mi*, *fa*, *sol*, and *la*:

[1] The hard (*durus*) hexachord beginning on G with a B ♯.

[2] The natural (*naturalis*) hexachord starting on C. The range of this hexachord avoids both B ♭ and B ♯.

[3] The third hexachord begins on F, and is called the soft (*mollis*) hexachord because it uses B ♭.

Thus the Gamut, with the *ambitus G-e''*, contains seven interlocking hexachords (also known as *deductiones*), each starting with *ut* on G, C, f, g, c', f', and g' (ILL. 1.iii.2). It is possible to transpose the hexachords a fourth up, thus employing E ♭ in the soft hexachord.

<sup>8</sup> Heinrich Glarean, *Dodecachordon* (Basel 1547), tr. Clement A. Miller (s.l. 1965), MSD vol.6.1, p. 43.

<sup>9</sup> William Bathe, *A Briefe Introduction to the Skill of Song* (London s.d.), sig. A4<sup>v</sup>.

# Part 1: Sources and Background

ILL. 1.iii.1

ILL. 1.iii.2

Double or Treble keyes, Middle keyes, Great or Bass keyes,	cc	la	la	1 note.
	dd	la sol	sol la	2 notes.
	cc	sol fa	fa sol	2 notes.
	bb	fa mi	mi fa	2 notes, 2 clisses.
	aa	la mi re	re mi la	3 notes.
	ff	sol re ut	ut re sol	3 notes.
	ff	fa ut	ut fa	2 notes.
	c	la mi	mi la	2 notes.
	d	la sol re	re sol la	3 notes.
	c	sol fa ut	ut fa sol	3 notes.
	b	fa mi	mi fa	2 notes, 2 clisses.
	a	la mi re	re mi la	3 notes.
	ff	sol re ut	ut re sol	3 notes.
	ff	fa ut	ut fa	2 notes.
	f	la mi	mi la	2 notes.
	d	sol re	re sol	2 notes.
c	fa ut	ut fa	2 notes.	
b	mi	mi	1 note.	
a	re	re	1 note.	
ff	ut	ut	1 note.	

*Septima et prima.*  
*Sexta et tertia.*  
*Quinta et secunda.*  
*Quinta et prima.*  
*Tertia et secunda.*  
*Secunda et prima.*  
*Prima et secunda.*

Tui.

cc
dd
cc
bb
aa
ff
ff
c
d
c
b
a
ff
d
c
b
a
ff

Glarean, *Dodecachordon* (Basel 1547), p. 3

Thomas Morley, *A Plaine and Easie Introduction* (London 1597), p. 2

ILL. 1.iii.3

The Scale of <i>l</i> dure, and where the Mutations are made.	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut
	la	sol	fa	mi	re	ut

*The Scale of *l* dure, and where the Mutations are made.*  
*The Scale of *l* moll, and where the Mutations are made.*

Dowland, *Andreas Ornithoparcus his Micrologus, or Introduction* (London 1609), p. 15

### Section iii: The Ladder of Music...

Often medieval and early Renaissance polyphonic music was notated with one voice having one flat key signature and other parts without a key signature. This precisely indicates a hexachordal transposition. According to Margaret Bent (1972), it also signifies that the E $\flat$  will be employed as part of the Gamut, that is within the *musica recta*-system, and in this instance E $\flat$  should not be interpreted as part of the *musica ficta*-system.<sup>10</sup> This transposition does not have any modal significance (that modes are transposed), but merely indicates a transposition of the *recta*-system; or in other words, a transposition of the complete diatonic series, including both B $\natural$  and B $\flat$ . Partial signatures cannot imply a transposed mode, since that leads to an interpretation of bimodality where some parts are in a transposed mode and others are in an untransposed mode. This emphasises the argument that the key signature must indicate a hexachordal transposition.<sup>11</sup>

Transposing the whole system a fourth up or a fifth down was common practice, whereas transposing a fifth up or a fourth down, employing a sharp as part of the *musica recta*-system, was seldom used.<sup>12</sup> The sharp sign belonged to *musica ficta*, and a composition would never contain a sharp as a key signature in one voice alone. This notion is valid even as late as Thomas Morley (1597). When asked by the student to define the term 'clef' Morley replies:

<sup>10</sup> Margaret Bent, op. cit., p. 98; for another view see Karol Berger, *Musica Ficta: Theories of Inflection...* (Cambridge 1987), p. 64: "Musicians of our period thought of a system transposed by means of a signature as representing *musica ficta*, not *vera*".

<sup>11</sup> This has been extensively dealt with by Karol Berger, op. cit., pp. 62-5; and more briefly by Margaret Bent, op. cit., pp. 98-9. Richard H. Hoppin (1956) observes that "perhaps the relationship between conflicting signatures and part-ranges a fifth apart was adopted because... it made diminished fifths impossible" (quot. in Berger, op. cit., p. 66). The different key signatures in the same polyphonic composition also infers a division where if some parts are in the authentic mode then the remaining parts will be in the plagal. Berger, op. cit., p. 69, argues:

... we should think of 'conflicting' signatures as being signatures of voices other than the mode-defining one... In a piece with different signatures in different voices, the function of the signature in the mode-defining part was to effect a transposition of the mode, while differing signatures in other parts should be considered to 'conflict' with that of the mode-defining one mainly in order to ensure perfect fifths against it.

Cf. Pt. 2.iii.

<sup>12</sup> Karol Berger, op. cit., p. 60 ff.; Jehoash Hirshberg, op. cit., pp. 21-2.

## Part 1: Sources and Background

A *Cleife* is a character set on a rule at the beginning of a verse [i.e. a stave], shewing the heighth and lownes of every note standing on the same verse, or in space (although use hath taken it for a generall rule never to set any cleife in the space except the *b* cleife) and every space or rule not having a cleife set in it, hath one understoode, being only omitted for not pestering the verse, and saving of labor to the writer:....<sup>13</sup>

The quotation is somewhat difficult to understand due to Morley's use of terms which have a different meaning for the modern reader. The "*b* cleife" which can be placed either in the space or on the line is, of course, the accidental *b*. According to Renaissance terminology signatures were also seen as clefs. Morley does not seem to consider the *#* as a "cleife" and thereby also the possibility of using it as part of a key signature; instead, the sharp was still considered an internal signature.

It is, therefore, important to realise that accidentals did not simply imply that the pitch should be raised or lowered by a semitone. Rather, they indicate within which hexachord the solmisation should be made and on which step within the hexachord the note belongs. Hence *Bb* should always be solmised as *fa*, and the natural or sharp accidental solmised as *mi*.<sup>14</sup> But because of the difficulty in solmising accidentals, songs were seldom transposed beyond the key signatures *Bb* and *Eb*. Morley, addressing the pupil who had shown him a piece with two flats and with all the A's flattened, remarks that it is possible for the organist to write in this way, but for the singer reading the music the problems of solmisation and mutations (deductions) between hexachords would be nearly insurmountable:

...you have set it in such a key as no man would have done, except it had beene to have plaide it on Organes with a quier of singing men, for in deede such shiftes the Organistes are many times compelled to make for ease of the singers... you shall not find a musicion (how perfect soever hee be) able to *sol fa* it right, because he shall either sing a note in such a key as it is not naturally, as *la in C sol fa ut, sol in b fa my*, and *fa in la mi re*. or then he shall be compelled to sing one

<sup>13</sup> Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), p. 3.

<sup>14</sup> Karol Berger, op. cit., p. 17, 30; Margaret Bent, op. cit., pp. 86-7, 88.



### Section iii: The Ladder of Music...

note in two several keyes in continual deduction, as *fa in b fa b mi* and *fa in a la mi re* immediatlie after one another...[;] and what can they possiblief do with such a number of flat *b b*, which I coulde not as well bring to passe by pricking the song a note higher?<sup>15</sup>

Very often a melody would exceed the range of a hexachord and therefore, in order to solmise beyond a sixth, a mutation from one hexachord to another was necessary. Mutations can only be made between soft and natural hexachords, and hard and natural hexachords. A mutation between a soft and a hard was avoided whenever possible. The reason for this avoidance is that these two hexachords give two conflicting notes, B $\natural$  and B $\flat$ , within the same scale.<sup>16</sup>

Consequently, the three hexachords are combined in two distinct scales, *cantus mollis* and *cantus durus*, where the difference is that the former contains the B $\flat$  while the latter uses B $\natural$  (ILL. 1.iii.3). The two types of scales can also be interpreted as the Gamut (*cantus durus*) transposed a whole tone down to F (*cantus mollis*). Ornithoparchus (1517), in Dowland's translation from 1609, explains it thus:

Because of the diversitie of *Tones* causeth a diversitie in the *Solfaing*, especially about *mi* and *fa*, in *b fa  $\natural$  mi*, which before wee concluded was not one onely *Key*, but two: therefore the industrious Musitians have devised Two Scales, in which every Song doth runne, and is governed: and hath ordayned, that the first should be called  $\natural$  durall of the  $\natural$ ; the second, *b moll of b Flat*.<sup>17</sup>

Ornithoparchus implies that it is for practical reasons ("the industrious Musitians") that the *cantus durus* and *mollis* have evolved.

<sup>15</sup> Thomas Morley, op. cit., p. 156.

<sup>16</sup> Gaston G. Allaire, op. cit., p. 47 ff.

<sup>17</sup> Dowland, op. cit., p. 14; example occurs on p. 15.

## Part 1: Sources and Background

### IMPLICATIONS

Today hexachordal theory and solmisation theory are two areas which at first sight seem quite complex, but when studied more closely they yield a fascinating picture of the concepts used. One of the more striking features is that the Gamut should not be interpreted as a set of fixed pitches; rather it should be considered a pattern of intervals which could be transposed to variable pitch locations. Thus the singer read relative pitches knowing that, for instance, *ut-mi* always would be a major third, irrelevant of whether *ut* was G, F, or C. This was a great advantage for the singer and therefore a larger range of different clefs, showing the location of the solmisation syllables, could be employed. For most instrumentalists, on the other hand, it is easier to think of music in terms of fixed pitches.<sup>18</sup>

The musical *ambitus* (*G-e''*) was compared to a ladder where the name of each step indicated its precise position and hence its intervallic relationship with the steps above and below.<sup>19</sup> Consequently, the note an octave above or below a specific note was not considered the same (there is a big difference between the octave and the unison as intervals); neither was a fifth below a note the same as the note a fourth above. This essential distinction had great implications for the difference between authentic and plagal modes where the range of plagal modes is a fourth below the range of the authentic. Furthermore, a cadence on a note a fourth below was not considered the same as a cadence a fifth above the same note.<sup>20</sup> The complementarity of intervals, that is, dividing the octave into a fourth and a fifth, a third and a sixth, and a seventh and a se-

<sup>18</sup> Sebald Heyden, *De arte canendi* (Nuremberg 1540), explains that solmisation syllables are "nothing else than specific names of *intervals*" (tr. Clement A. Miller (s.l. 1972), *MSD* vol. 26, p. 32; my italics). On the reading of intervals or fixed pitches, see PT. 3.i, iii.

<sup>19</sup> Though in theory the Gamut, *G-e''*, had a clearly defined range, containing 20 steps in all, it does not immediately follow that choirs were only able to sing within that range. In practice the Gamut could be extended a fifth below the *G* and a third above *e''* (or sometimes, though seldom, a fourth). Morley, op. cit., p. 16, indicates:

Whereas you say there is nothing beneath Gam ut you deceive yourself, for music is included in no certain bounds, though the musicians do include their songs within a certain compass;... it is true as well without the compass of the scale as within, and so may be continued infinitely.

<sup>20</sup> See PT. 2.iv, PT. 3.v.

### Section iii: The Ladder of Music...

cond was not utilised in its present-day meaning.<sup>21</sup>

Thus the three clefs (G, C, and F) correspond to the three hexachords, hard (G), natural (C), and soft (F), respectively. The clefs, indicating a specific note, can therefore be used to locate the position of other notes and the solmisation syllables.<sup>22</sup> In his *Treatise of Musicke* from around 1610, Thomas Ravenscroft links the three clefs with the hexachords, explaining that "Ffaut, the F-clef, signifieth ♭ Molle"; and "Csolfaut, the C-clef, signifieth Properchant [the natural hexachord]"; and "Gsolreut, the G-clef, signifieth ♯ quare [the hard hexachord]".<sup>23</sup> Ravenscroft continues and transposes these hexachords a fourth upwards.

In the late Renaissance, when composers began to experiment with chromaticism, this led to overwhelming obstacles in the solmisation and the mutations of hexachords. In addition, the contradiction between the hexachord containing only six notes, and the octave, having seven different notes, created problems which meant that a system of complex mutations had to be employed. It became more and more difficult, and to some extent even meaningless, to maintain the old hexachordal practice and solmisation system as it had been used for many centuries.<sup>24</sup>

It is interesting to notice that the transpositional systems, *cantus durus* and *mollis*, were notational devices, indicating a high or a low range of a composition. The modern notion of transposition was, as Morley indicated, utilised in practice by organists, but was a tool which did not have any notational basis (i.e. using more than two flat key signatures or sharp key signatures) until well after the beginning of the seventeenth century.<sup>25</sup>

<sup>21</sup> See PT. 3.iii.

<sup>22</sup> William Bathe, op. cit., sig. A5<sup>r</sup>, explains that "the Cleves whereby we know the Ut standeth are thus marked as [G C F B ♭]". There is a more thorough explanation in "The rule of *Ut*", sig. A5<sup>v</sup>.

<sup>23</sup> *GB-Lbl* MS Add. 19.758 (c.1610), fol. 3<sup>v</sup>. However, also Bathe (op. cit., sig. A5<sup>v</sup>) and Morley (op. cit., pp. 4-5) make this observation.

<sup>24</sup> Cf. PT. 3.i.

<sup>25</sup> Cf. PT. 3.vi.



## **PART 2**

### **METHODS FOR THE CLASSIFICATION OF MODES**

## Species and *Ambitus*

The fourth, fifth, and octave species are closely related to the modal systems and were an essential part of the theory of modes. However, it must be emphasised that the cornerstone of the traditional 8-mode system was the species of fourths, and indeed not the octave species which became more closely associated with Glarean's new 12-mode system from 1547.<sup>1</sup> Using the range, that is, the *ambitus* was also an important method for determining the mode of a composition. This section will briefly deal with the species and will trace the discussions on *ambitus* from Gaffurio (1496), Glarean (1547), and Ornithoparchus (Dowland, 1609) to Morley (1597), who was the last English theorist to mention the subject.

### SPECIES

A most excellent discussion on the fundamentals of the 8-mode system is found in Tinctoris' *De natura et proprietate tonorum* (1476).<sup>2</sup> According to Tinctoris, the fundament of the traditional 8-mode system is the three species of fourths (EX. 2.i.1a). It is interesting to notice that the four species of fifths arise by the addition of a whole tone to the fourths (EX. 2.i.1b). Thus the eight modes are formed from the combinations of fourths and fifths (EX. 2.i.1c). Since there are only three different species of fourths, one of them has to be used twice in order to create four authentic modes and their plagals. Though the octave species of mode 1 and 8 are the same, they are not formed by the same species of fifths and, furthermore, in mode 8 the fourth is placed below the fifth whereas mode 1 has the fourth placed above the fifth. It was acknowledged by the early

<sup>1</sup> For a general review, see Harold S. Powers, "Mode", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 12, pp. 378-91.

<sup>2</sup> Johannes Tinctoris, *Liber de natura et proprietate tonorum*, (s.l. 1476), tr. Albert Seay, *Colorado College Music Press* (Colorado Springs 1976), vol. 2, pp. 6-14.

Section i: Species and 'Ambitus'

theorists that there was a certain similarity between these two modes.<sup>3</sup>

Ex. 2.i.1

Ex. 2.i.1a

Ex. 2.i.1b

Ex. 2.i.1c

<sup>3</sup> Tinctoris, op. cit., chap. 12, p. 15; Francesco Gaffurio, *Practica musice* (Milan 1496), tr. Clement A. Miller (s.l. 1968), *MSD* vol. 20, p. 62, mentions regarding mode 8:

...Since the latter [tetrachord, *D sol re - G sol re ut*] consists of the same notes as the lower tetrachord of the first Tone, it is considered a participant of its nature.

## *Part 2: Methods for the Classification of Modes*

During the early sixteenth century, theorists also began to discuss the octave species culminating with Glarean's proposal of the 12-mode system in *Dodecachordon* (1547). By looking at all the possible combinations of fourth and fifth species, Glarean arrives at 24 different octave species. He rejects twelve, explaining that their steps do not belong to the diatonic scale,<sup>4</sup> and accepts the other twelve. These twelve species are then divided into authentic and plagal modes.<sup>5</sup> He also argues that from the seven species of octaves fourteen modes can be formed. However, two of them are rejected, since they contain the diminished/augmented fifth/fourth. The twelve remaining modes can be divided into two categories, one containing the six "principal" modes and another containing six "collateral" modes. Consequently, from Glarean's point of view, it is absurd to make a harmonic division of the *d-d'* octave species, producing the authentic mode 1 (*d-a-d'*), and an arithmetic division, producing the plagal mode 8 (*d-g-d'*), while not also dividing the remaining octave species in the same way.<sup>6</sup> Glarean argues, furthermore, that the nature of modes 1 and 8 must indeed be the same, as the octave species are identical, and not because both modes contain the same tetrachord. In addition, it becomes clear from Glarean's extensive discussion on the 12-mode system that it is now the octave species, divided harmonically and arithmetically, which produce the authentic and plagal modes.

Thomas Morley (1597) argues in a similar manner. After a thorough explanation of the four different species of fifths and the three different species of fourths, Morley concludes that there are seven octave species, and points out that earlier theorists have wrongly distinguished between eight different modes:

Now the diapason conteining both the diapente & diatessaron, as consisting of the coniunction of them together, it must follow that there be as

<sup>4</sup> Heinrich Glarean, *Dodecachordon* (Basel 1547), tr. Clement A. Miller (s.l. 1965), *MSD* vol. 6.1, pp. 104-28.

<sup>5</sup> Illuminato Aiguino, *Il tesoro illuminato* (Venice 1581), one of the few Italian theorists who strongly adheres to the 8-mode system, undertakes the difficult task of integrating those species of fourths/fifths into this system and thus avoids creating four new modes as Glarean had to do; Peter N. Schubert "The Fourteen-Mode System of Illuminato Aiguino", *JMT* 37 (1993), pp. 175-210.

<sup>6</sup> Glarean, op. cit., p. 113, 115.



### Section i: Species and 'Ambitus'

many kinds of diapason as of both the other, which is seven. Therefore it is manifeste that our practicioners have erred in making eight tunes, separating the nature of the eight from that of the firste, seeing they have both one kinde of diapason, though divided after another maner in the last then in the first...<sup>7</sup>

Similar to Glarean, Morley claims that if the octave species, *d-d'*, can be divided, then the remaining six species must also be divided, creating in all "fourteene kindes of formes, tunes, or *modi*".

The octave species and the order of the fourth and fifth are usually the most frequently used intervals, both in the melodic structure and as cadential degrees.<sup>8</sup> Zarlino (1558) observes that by looking at the form of the composition, which, as he explains, is the modal *diapason* divided into its *diapente* and *diatessaron*, it is possible to discover the mode.<sup>9</sup> His discussion also suggests that there were differences in the means of assessing the mode of a composition: whether it was based on a *cantus firmus* or whether the composition was conceived as a free polyphonic piece. It is possible that

<sup>7</sup> Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), "The Annotations. Upon the third part", sig. \*\*2<sup>v</sup>.

<sup>8</sup> Cf. Pt. 2.iv-v; Gioseffo Zarlino, *Le institutioni harmoniche* (Venice 1558), 4.30, tr. Vered Cohen (New Haven 1983), p. 89 ff.; Glarean, op. cit., chap. 36 "That modes are recognised principally by the octave division which is made through the fourth and fifth consonances", p. 194. It was especially important to expose the fundamental intervals of a particular mode at the beginning of a composition. Thus Seth Calvisius, *Melopotia seu melodiae condensae ratio* (Erfurt 1592), sig. H8<sup>v</sup>, warns his students not to transform the fourth/fifth species by using accidentals in the *exordium*; that is,

...Modum non obscure ostendat. Et cum signa chromatica veras diapente ac diatessaron species in aliam formam traducere, atque ita modum ambiguum reddere, aut totum immutare possint, locus illis in principio dandus non est, sed alibi potius...

[...not to expose the mode in an obscure manner, and with chromatic signs to change the true fifth and fourth species to another form and in this fashion render an ambiguous mode or they can transform the whole [composition]. The place must not be given to them [the foreign fourths and fifths] in the beginning, but indeed elsewhere...]

Calvisius' statement is similar to a statement made by Nicola Vicentino, *L'antica musica ridotta alla moderna prattica* (Rome 1555), p. 47<sup>v</sup>.

<sup>9</sup> Zarlino, op. cit., 4.30, p. 90:

It should be noted that the mode of a composition can be judged by two things: first, by the form of the entire composition, and second, by the ending of the composition, namely, by its final note. Since it is form which gives being to a thing, I would consider it reasonable to determine the mode of a composition not merely by the final note, as some have wanted, but by the whole form contained in the composition...

First on the following page, however, does Zarlino clarify what he means by 'form'.

## *Part 2: Methods for the Classification of Modes*

Zarlino distinguished between the 8-mode system as more or less only applicable to sacred music while employing a *cantus firmus* as its basis, and the 12-mode system which was more or less associated with a style not based on a pre-composed part. This would confirm Morley's view, since also he argues for the distinction between the 8-mode system (for sacred music) and the 12-mode system (for secular). As the *cantus firmus* was most often identified with the tenor, this voice would, of course, also display the mode.<sup>10</sup>

The discussion of the harmonic/arithmetic division of the octave is found in English treatises up until the middle of the seventeenth century. Thomas Campion (c. 1613) mentions, though very briefly, that in discerning the "tone of musicke" the first point to consider is the division of the octave into fourth and fifth. He then continues defining the difference between the authentic and plagal modes, but he emphasises that the fifth is the important interval

that onely discovers the key, and all the closes pertaining properly thereunto. This fift is also divided into two thirds...<sup>11</sup>

For Campion the fourth is of little value and the authentic/plagal distinction is a question of range only. Around this time the discussion began slowly to change direction: it now became more common to link it with the discussion of the triad where the division of the fifth, according to harmonic or arithmetic means, became of paramount importance. John Birchensha (1664), for example, mentions that "A Musical Mood [i.e. mode], is an Octave mediated by his neighbouring voice. Otherwise it is defined to be the Species of a Diapason, which is made up of a Diatessaron and a Diapente."<sup>12</sup> But similar to Campion, Birchensha is more occupied with the division of

<sup>10</sup> See e.g. Zarlino's discussion of the 8-mode system (op. cit., 4.14, p. 47), which would imply this interpretation. It is also interesting to notice that Glarean clearly distinguishes between these two systems in his book where the traditional system with its roots in plainchant is clearly linked with ecclesiastical music; see PT. 3 CONCLUSION.

<sup>11</sup> Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sigs. D4<sup>r</sup>-D5<sup>r</sup>.

<sup>12</sup> John Birchensha, *Templum Musicum: Or the Musical Synopsis of... Alstedius* (London 1664), pp. 76-7.

### Section i: Species and 'Ambitus'

the fifth than with the octave, for the fundamental fifth of a key reveals the basic triad of that particular key.<sup>13</sup>

#### AMBITUS

Gaffurio deals only very briefly with the range of modes, merely indicating that it is an octave plus a tone under the *finalis* in modes 1, 3, and 7. Mode 5 is an exception because it only has a semitone beneath the *finalis*.<sup>14</sup> In his discussion, Gaffurio relies on the traditions of plainchant in which the range seldom exceeds an octave. Glarean echoes Gaffurio, but elaborates on some of the details and mentions some exceptions:

...Moreover, church songs in the uneven modes frequently add a whole tone below, as is evident in the first and seventh modes. The third mode sometimes adds two whole tones, but the fifth adds a small semitone. But on the other hand, they add a whole tone above in even modes, as the sixth and eighth modes. But in the second mode they add a semitone, although rather rarely, but very frequently in the fourth mode...<sup>15</sup>

Glarean also argues that mode 4 is often found encompassing the range *C-c*, thereby avoiding the theoretical octave, *B ♯-b ♯*. Consequently, the *ambitus* of this particular mode is exactly the same as the *ambitus* of Glarean's new mode 11 which he accepts, but at the same time he reminds the reader that the *finalis* and the melodic patterns are different.<sup>16</sup>

<sup>13</sup> Cf. PT. 3.iv.

<sup>14</sup> Gaffurio, op. cit., p. 50; Clement A. Miller ("Gaffurius's *Practica Musicae*: Origin and Contents", *Md* 22 (1968), p. 111) mentions that Gaffurio's discussion on modes first begins in chap. 8; however, it is clear that Gaffurio already starts in chap. 5 and continues in 6 and 7 which deal with the species of fourth, fifth, and octave.

<sup>15</sup> Glarean, op. cit., p. 73.

<sup>16</sup> Ibid., p. 148:

Further, it is customary and peculiar to this mode [mode 4] that its songs rarely reach the lowest string [i.e. *B ♯*] but remain at *C*, avoiding the small semitone from *C* to *♯*. Contrariwise they add a semitone above from *♯* to *c*, so that they remain between *C* and *c*, just like the Ionian songs, although they are vastly different from the Ionian in *phrasis* [melody, melodic pattern] and final key.

See PT. 2.v.

## Part 2: Methods for the Classification of Modes

Ornithoparchus (1517), dealing with the 8-mode system, mentions the same *ambitus* as Gaffurio. Nevertheless, he provides an example which shows that each authentic mode can proceed up to the tenth above the final and a tone below the final. In his translation, John Dowland (1609) significantly changed the ranges of the modes and deleted Ornithoparchus' quotation from Gaffurio. Instead, Dowland adds the sentence "Although at this time the licentious ranging of our modern Musicians, doth adde an Eleventh to each..."<sup>17</sup> Dowland has also drastically modified the example (ILL. 2.i.1) which therefore concurs with neither Gaffurio nor Glarean. Now the range of mode 1, for example, is *c-c'* rather than *d-d'*.

ILL. 2.i.1

<i>did</i>	I	2		3	4		5	6		7 <sup>10</sup>	8
<i>e</i>				10			10			9	
				9			9			8	7
				8			8			7	6
				7	6		6			5	5
<i>c</i> Amb:	7	7	Ambi:	5	5	Ambi:	5	5	Ambi:	4	4
	6	6		4	4		4	4		3	3
<i>a</i> Autem:	5	5	Autem:	3	3	Autem:	3	3	Autem:	2	2
	4	4		2	2		2	2		1	1
	3	3		1	1		1	1		1	2
	2	2		1	2			3		1	3
	1	1		2	3			4		2	4
		2		3	4					3	5
		3		4	5					4	
		4		5						5	
<i>f</i>		5									
Protos			Deuterus			Tritos.			Tetartos.		
The First.			The Second.			The Third.			The Fourth.		

Dowland, *Andreas Ornithoparcus his Micrologus* (London 1609), p. 12

Dowland does not give any explanation as to why his ranges are so different from previous theorists, or as to why he feels obliged to change those given by Ornithoparchus. One reason could be that at the time when Dowland translated the popular

<sup>17</sup> Compare John Dowland, *Andreas Ornithoparcus his Micrologus, or Introduction* (London 1609), p. 11, with Andreas Ornithoparchus, *Musice active micrologus* (s.l. 1517), sig. B2<sup>r</sup>.

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tract, the *ambitus* had, in fact, changed fundamentally from that which earlier theorists argued for. The ranges provided by Dowland do not render a modal classification impossible or undermine the distinction between authentic and plagal modes, since he clearly avoids extending the *ambitus* into the collateral mode.

With the 12-mode system, which tries to distance itself from the traditional 8-mode system, the range of the various modes is systematised so each mode only contains an octave, emphasising the importance of the octave species. Hence Zarlino and his followers—such as Calvisius (1592), for example—only discuss the somewhat crude rule that the *ambitus* of modes is no more than an octave. However, as a composer, Zarlino shows just how unsatisfactory this general rule is, as all his examples dealing with modal theory extend either above or below the modal octave.<sup>18</sup>

To determine the mode by looking at the *ambitus* was considered an important method.<sup>19</sup> It is evident, nevertheless, that the ranges and the special exceptions made for some of the modes, notably mode 3, render the procedure of discerning modes by *ambitus* rather complex and also less than satisfactory. Even as early as 1532, it was observed that the ranges of both authentic and plagal modes were hardly ever adhered to, and therefore it was meaningless to discuss them. In connection with free polyphonic composition (*cantus figuratus*), Sebald Heyden (1532/1540) opens his chapter on the modes by arguing:

<sup>18</sup> See his examples in the fourth book "On the Modes", *Le institutioni harmoniche* (Venice 1558), ed. Vered Cohen (New Haven 1983). Glarean's system with two times six modes must have felt highly appropriate especially for Zarlino with his obsession with the *senario*, that is the division of the string in six equal parts, thus also defining the thirds and sixths as consonances (ibid., lib. 1 cap. 14). According to the Pythagoreans, the consonances were only included in the first four divisions of the string, which fits well with the 8-mode system with four authentic and four plagal modes.

<sup>19</sup> See e.g. Gallus Dressler, *Praecepta musicae poeticae*, Magdeburg 1563 (MS), chap. 6, ed. Bernhard Engelke, *Geschichts-Blätter für Stadt und Land Magdeburg*, 49-50 (1914-15), p. 228:

Quicquid restat ad percipiendum cursum singularum cantilenarum id ex ambitu tonorum petendum est inde enim certa fundamenta sunt extruenda et transpositio una cum licentia et alijs rebus necessariis observanda sunt.

[Whatever is left in order to observe the course of individual compositions, it can be perceived from the *ambitus* of the tones [i.e. modes], for certain fundamentals must be established and allowed transposition and must be observed in other necessary cases.]

Dressler's treatise is a very good traditional example of the use and application of the 8-mode system in the middle of the sixteenth century.

## *Part 2: Methods for the Classification of Modes*

Here I will purposely refrain from describing Tones at length. For why is it necessary to pursue religiously the ranges of authentic and plagal Tones, as they are called, and the *differentiae* added to them, when we know that they have almost no meaning in figural music?<sup>20</sup>

The issue is extremely interesting as it precisely pinpoints the problems which arise when considering modal theory in connection with polyphonic music as opposed to plainchant.<sup>21</sup> Heyden also seems to imply that the 8-mode system was difficult to use as a classification system in free polyphonic music. What could also have led theorists to consider the species of fourths and fifths rather than the *ambitus*, is suggested by Heyden's statement that in *cantus figuratus*, the ranges of modes were never kept within the boundaries of an octave, and it would therefore be meaningless to study the *ambitus* in order to discover the mode.

Thomas Morley is one of the last English theorists to mention modes and *ambitus* in greater detail. However, he does not discuss the ranges in the main text, but rather in the "Annotations" given at the end of the book; hence they do not seem to be of major significance to the author. On the other hand, since it was common in this period to show the *ambitus* as being more or less a tenth, Morley would not have to deal separately with the ranges of modes. This could also be implied in his section on clefs where it becomes obvious that the ranges are approximately a tenth. Transgressing the ranges would immediately mean that another clef (or combinations of clefs) would have to be employed.<sup>22</sup> Morley explicitly distinguishes between sacred and secular music and the traditional 8-mode system and Glarean's 12-mode system. Nevertheless, in connection with the 8-mode system ("church music"), he gives the same ranges as Glarean. Evidently, Morley has copied this paragraph from Glarean.<sup>23</sup>

<sup>20</sup> Sebald Heyden, *De arte canendi* (Nuremberg 1540), lib. 2 cap. 8, tr. Clement A. Miller (s.l. 1972), *MSD* vol. 26, p. 113.

<sup>21</sup> For a more extensive discussion on this subject, see PT. 2.ii.

<sup>22</sup> Morley, op. cit., pp. 165-6; cf. PT. 2.iii.

<sup>23</sup> Ibid., "The Annotations. Upon the third part", sig. \*\*\*2<sup>r</sup>:

And in the odde or autenticall tunes, the church musicke doth often goe a whole note under the finall or lowest key, and that most commonly in the first and seventh tunes: in the third it commeth sometimes two whole notes under the finall key, and in the first

### *Section i: Species and 'Ambitus'*

One could argue that the reason why Dowland chose to translate and to publish the treatise by Ornithoparchus was because of Morley's neglect of (what Dowland considered) important issues, such as the eight modes and their *ambitus*. It must be emphasised that Dowland very consciously evades discussing the *ambitus* in the traditional fashion as Gaffurio, Glarean, and even Morley do, but gives a somewhat different view which could have been adapted from contemporary musical practice.

### CONCLUSION

The modes in the traditional 8-mode system were combinations of the fourth and fifth species. The 12-mode system, on the other hand, made first of all use of the seven octave species, which were changed into six authentic and six plagal modes.

The *ambitus*, which is usually considered one important method for discovering the mode of a piece, can be difficult to apply. However, this does not immediately influence the conception of modes; contrarily, it is—as Zarlino explains—the form:<sup>24</sup> the harmonic and arithmetic division of the octave and the species of fifth and fourth are the essential determinants of mode.<sup>25</sup>

It is evident that Morley promotes the 12-mode system and relies heavily on Glarean's fundamental treatise, since he literally translated many sections of *Dodecachordon*. Zarlino, promoting the 12-mode system, is also heavily drawn upon by Morley, and again many paragraphs have indeed been translated from *Le institutioni harmoniche*. In 1609, Dowland published the conservative, but popular tract of Ornithoparchus which deals with the traditional 8-mode system, though some of the details

but a halfe note. But by the contrary in plagall tunes, they take a note above the highest key of the fift (which is the highest of the plagal) as in the sixt and eight, in the second and fourth, they take but halfe a note, though sildome in the second, & more commonly in the fourth.

Cf. Glarean, op. cit., p. 73.

<sup>24</sup> Zarlino, op. cit., 4.30, p. 91.

<sup>25</sup> When studying the music examples of Girolamo Diruta, for instance, it becomes clear that the essential intervallic cornerstones are precisely the octave, fifth, and fourth, and that they are clearly delineated in the beginning of a composition; Diruta, *Seconda parte del Transilvano Dialogo* (Venice 1609/1622), lib. 2, pp. 24-36.

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have been edited such as the range of the modes, for example. It does seem peculiar that Dowland should choose to translate a tract dating from 1517. However, it is very likely that Dowland felt it important to make the theory of the traditional 8-mode system, which Morley does not seem to have revered very much, available for the English readers and students. Thus it is important to see Dowland's translation as a counterpart to Morley's treatise, and it is in this context that the tract of Ornithoparchus is valuable. Morley is not the only source of English music theory.



## Tenor and Modes in Polyphony

The present section focuses on two areas: the tenor as the mode-determining part, and the arrangement of modes in polyphonic compositions (tenor and cantus in one mode, and bassus and altus in the collateral mode). It is curious that no English treatise—not even Thomas Morley (1597) who deals with compositional practice in particular—explicitly mentions this detail. However, the subject is closely associated with other concepts as will be explained in this and the following sections.<sup>1</sup> Furthermore, the mixture of two different modes in polyphonic music leads to a discussion of the interpretation of some of Morley's statements.

### TENOR

A majority of sources states that the tenor part in a polyphonic piece defines the mode. Already Tinctoris (1476) explains that, in songs of two or more parts, it is the tenor one should study in order to discover the mode of the composition.<sup>2</sup> Aaron (1525), whom Morley mentions in his list of works consulted, makes a similar comment, for only the tenor is "the firm and stable part... that holds and comprehends the whole concentus of the harmony".<sup>3</sup> Aaron also explains that it is easier if one looks at the tenor rather than the cantus, implying that this was also a possible way, since these parts were usually in

<sup>1</sup> A detailed discussion of this subject with particular reference to German and Italian sources is found in Bernhard Meier, *The Modes of Classical Vocal Polyphony*, tr. Ellen Beebe (New York 1988), p. 54 ff. et passim; Siegfried Gissel, "Zur Modusbestimmung deutscher Autoren in der Zeit von 1550-1650: Eine Quellenstudie", *Mf* 39 (1986), pp. 201-17.

<sup>2</sup> Tinctoris, *Liber de natura et proprietate tonorum* (s.l. 1476), tr. Albert Seay, *Colorado College Music Press* (Colorado Springs 1976), vol. 2, p. 25:

...whenever... a composition will have been put together from different parts of different tones, if anyone when asked may wish to seek absolutely of what tone such a composition may be, he should absolutely reply according to the quality of the tenor, for the reason that it is the principal part of every composition as the foundation of the whole relationship.

<sup>3</sup> Pietro Aaron, *Trattato della natura et cognizione di tutti gli toni di canto figurato* (Venice 1525), chap. 2, tr. Oliver Strunk, *Source Readings in Music History* (London 1950/1965), vol. 2, p. 19.

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the same mode.<sup>4</sup> However, it must be remembered that early Renaissance theorists usually discussed sacred music which were based on a *cantus firmus* placed in the tenor part. This also applies to Zarlino (1558). In connection with composing a simple counterpoint to a pre-composed tenor, he explains that it is the tenor that should be studied carefully in order to judge the proper mode, and thus to be able to form the appropriate cadences.<sup>5</sup>

However, some theorists claim that the mode should be judged by looking at the bass. Thus Rocco Rodio (1609) mentions that some believe that the mode

must be observed in the bass, as [it is] the fundament of the other parts, and others (with whom I agree more) by the tenor... And truly, those that say the mode is observed in the bass are seriously wrong. For there should be a great confusion among musicians: the first mode, being formed in *D lasolre* in the tenor, might be judged by the bass—composed on this tenor—which should then be in the second [mode] and not the first.<sup>6</sup>

The two different viewpoints could be due to the two distinct ways of composing: that is, using a *cantus firmus* which often was placed in the tenor, or when composing in a free-polyphonic style where the species of fourth and fifth would often be easily

<sup>4</sup> See below this section.

<sup>5</sup> Gioseffo Zarlino, *Le institutioni harmoniche* (Venice 1558), 3.40, tr. Guy A. Marco (New Haven 1968), pp. 85-6:

...it is necessary to choose a tenor from any plainchant to be the subject of the composition or counterpoint. This tenor must then be scrutinized to determine its mode and from it the proper allocation of the cadences, which will indicate the character of the composition.

When defining the names of the four parts, Zarlino also mentions that the tenor "is the part that governs and regulates the composition and maintains the mode upon which it is based". However, in this instance Zarlino is dealing with "cantus firmus or *figuratus*, ...chanson, madrigal, or motet..." (op. cit., 3.58, pp. 180-1). Also Seth Calvisius explains that the "tenor is most observant of the mode..." (*Melopoiia seu melodiae condendae ratio* (Erfurt 1592), sig. C1<sup>r</sup>); see PT. 3.ii, note<sup>1</sup>.

<sup>6</sup> Rocco Rodio, *Regole di musica* (Naples 1609), p. 58:

si debbia giudicarsi per lo basso, come fondamento dell'altre parti, & altri (à quali io più acconsento) per lo tenore,... & in vero quei che dicono il tuono osservarsi dal basso; errano gravemente: perciò che gran confusione sarebbe tra musici, essendo che se il primo tuono formato in D, sol, re, per lo tenore, si giudicasse per lo basso composto sopra detto tenore, e sarebbe secondo, & non primo...

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discernable in the bass part. However, judging whether the mode of a composition is authentic or plagal is not necessarily possible by only looking at the fourth and fifth species.<sup>7</sup>

Though the subject is dealt with extensively in German and Italian sources, it seldom appears to have been noticed by English theorists. Morley does not directly mention that the tenor is the mode-bearing voice in polyphonic music. First when explaining the 8-mode system and the principles of *cantus firmus*, does he imply that the tenor is the mode-bearing part.<sup>8</sup> Neither do later English theorists address the subject, presumably because it had become obsolete. They simply observe that in former times the tenor was considered the mode-bearing part.<sup>9</sup> However, as Dowland's translation of the treatise by Ornithoparchus in 1609 shows, early composers (and thus perhaps also theorists) did not follow this rule strictly:

First, If you desire to compose any thing, first make the *Tenor*, or some other Voyce; according as the *Tone* by which it is ruled dothe require.<sup>10</sup>

### MODES IN POLYPHONY

In polyphonic music not all parts will usually be in the same mode. They cannot have

<sup>7</sup> Notably Nicola Vicentino, *L'antica musica ridotta alla moderna prattica* (Rome 1555), pp. 48<sup>v</sup>:

& questi essempli, saranno per alcuni termini principali della sua Quinta, & della sua quarta, nella parte piu bassa, perche quella come fondamento et Basa della Fabrica, ...et molti Compositori quando voleno cognoscere una compositione, guardano il soprano; ilche, non possono sicuramente giudicare, di qual modo sia la compositione,... [And these examples [i.e. of modes transposed to *cantus durus*, *cantus mollis*, and *musica ficta*] will have some proper endings on the fifth and the fourth [i.e. the species of the mode] in the lowest part, because this part is like the fundament and basis of the composition... Many composers—when they want to know a composition—observe the *soprano* which cannot be judged properly as regards in which mode the composition will be.]

<sup>8</sup> Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), p. 147.

<sup>9</sup> Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. B6<sup>v</sup>.

<sup>10</sup> John Dowland, *Andreas Ornithoparcus his Micrologus, or Introduction* (London 1609), p. 80; later, when dealing with the intervals to be used in counterpoint, Ornithoparchus mentions that it was even possible to "make your *Base* first" (ibid., p. 87).

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the same *ambitus* of an octave, as the distance between the parts will cause either too much overlapping or none at all, thereby exposing the composition as somewhat disjointed. Thus, in order to create a coherent polyphonic composition, two different modes, an authentic and its plagal, having different octave species but the same final, must be employed. In a four-part composition the tenor and cantus would be paired in one mode, as already implied by Aaron (see above), whereas the two others, bassus and altus, would be in the collateral mode.

At the end of the sixteenth century it became customary to deal with the pairing of modes, and the explanations became more detailed. Seth Calvisius (1592) expounds more thoroughly on the subject:

Furthermore, regarding the procedure of the mode, it must be observed that if the *Cantus* and *Tenor* conform with a particular authentic mode, *Altus* and *Bassus* descend to the plagal mode of the same name. And contrarily:... Thus in any composition or figural song, both an authentic and a plagal of the same name of the mode are joined—unless the parts progress in the same range and in equal sounds [i.e. using the same notes], as it happens in [compositions of] two parts and three parts... If the outer parts comply with a particular authentic mode, the inner or middle parts will be plagal, and contrarily:...<sup>11</sup>

<sup>11</sup> Calvisius, op. cit., sig. C1<sup>v</sup>:

Observandum praeterea hic est, ratione modorum, quod si Cantus & Tenor contentum aliquem modum observant, Altus & Bassus ad ejusdem nominis remissum, descendant. Et contra, ...Ita ut in qualibet composita, seu figurata modulatione, tam contentus, quàm remissus, ejusdem nominis modi, conjungantur: nisi voces in eodem ambitu, & in sonis aequalibus progrediantur, id quod fit in biciniis, & interdum in triciniis. ...exterioribus voces si contenti alicujus modi, interiores seu mediae remissum observabunt. & contra:...

Gallus Dressler has a less detailed discourse, which is, however, typical of his time (*Praecepta musicae poeticae*, Magdeburg 1563 (MS), cap. 6, ed. Bernhard Engelke, *Geschichts-Blätter für Stadt und Land Magdeburg*, 49-50 (1914-15), p. 228):

...de domicilio cujusque vocis communis satis ut discant Tyrones Discantum cum Tenore et Altum cum Basso in octava iisdem fere limitibus includi, ita ut Altus quintam infra Discantum Bassus quintam infra Tenorem possideant.  
[...concerning the dwelling of each of the parts, it must be adequately emphasised that the beginners learn to keep the *Discantus* with the *Tenor* and the *Altus* with the *Bassus* an octave apart [and] within approximately the same limits, so that the *Altus* occupies [the range] a fifth below the *Discantus* and the *Bassus* a fifth below the *Tenor*.]

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Hence Calvisius also argues that some compositions—those of two parts (*Bicinia*) and sometimes those of three parts (*Tricinia*)—will have all the parts in the same mode, that is they employ essentially the same range; and, in addition, that if the outer parts are in one mode, then the inner parts will be in the collateral mode. Calvisius then concludes:

Furthermore, by this reason the voices or parts in a composition are joined so that they produce a Harmony, and by appropriate consonances, cadences and fugues they express the sentiment...<sup>12</sup>

At first sight, it would seem that Morley also avoids discussing modes in polyphony, but in his "Annotations. Upon the third part", he observes that two modes must be joined if a composition exceeds the *ambitus* of a mode. However, the modes can only be combined with their collateral; thus mode 1 with mode 2, mode 3 with 4, 5 with 6 etc.:

But if any song do exceed the compasse of a tune, then bee there two tunes ioyned together... an autentical still beeing ioyned with a plagal, but two plagals or two autenticals ioyned together, is a thing against nature.<sup>13</sup>

In this instance, Morley could be referring to polyphonic music, though he only states "any song [exceeding] the compasse of a tune", where "song" could imply a polyphonic composition. It is more likely, however, that Morley is referring to just one voice which only exceeds its normal range by a fourth or a fifth, for then the mode would be a mixture of an authentic and plagal mode. This procedure of combining various modes with each other was named *mixtio* or *commixtio*.<sup>14</sup> According to other theorists, it is

<sup>12</sup> Calvisius, op. cit., sig. C1<sup>v</sup>:

Porro qua ratione hae voces seu partes in cantilena jungantur, ut Harmoniam pariant, & appositis consonantiis, clausulis & fugis sententiam exprimant,...

<sup>13</sup> Morley, op. cit., "The Annotations. Upon the third part", sig. \*\*\*2<sup>r</sup>.

<sup>14</sup> *Mixtio* is combining modes with the same final; *commixtio* is when two modes with different finals are joined. Not all theorists differentiate between the two mentioned terms; cf. Tinctoris, op. cit., p. 16 and Zarlino, op. cit., 4.14, p. 45; see also Harold S. Powers, "Monteverdi's Model for a Multimodal Madrigal", *In cantu et in sermone: For Nino Pirrotta on his 80th Birthday*, ed. Fabrizio Della Seta and Franco Piperno (Florence 1989), "Italian Medieval and Renaissance Studies", vol. 2, pp. 185-219.

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possible to combine authentic modes with authentic modes, that is if it is done for expressive purposes or even for the sake of variety.<sup>15</sup> Furthermore, it must preferably occur in the middle of a composition.<sup>16</sup>

That Morley's statement refers to a melody rather than polyphony is emphasised by an earlier discussion between the Master and Philomathes:

...and above all thinges keepe the ayre of your key (be it in the first tune, second tune, or other) except you bee by the wordes forced to beare it, for the Dittie (as you shall know hereafter) will compell the author many times to admit great absurdities in his musicke, altering both time, tune, cullour, ayre, and what soever else, which is commendable so hee can cunninglie come into his former ayre againe.<sup>17</sup>

Since Morley uses 'tune' as meaning 'mode' in the first sentence (first tune, second tune), he must also be referring to the mode when the composer sometimes is forced to "admit great absurdities in his musicke, altering both time, tune,...". 'Tune' could refer to the eight ecclesiastical tones. However, this would not be in accordance with other of Morley's statements. He does not deal with composing sacred music for which he refers to the 8-mode system. Morley, as many of his contemporaries, does not seem to distinguish between the 8-mode system and the eight ecclesiastical tones though they were indeed different, presumably because he strongly adheres to the 12-mode system.<sup>18</sup>

One reason why Morley does not have to deal extensively with modes in polyphony could be because the subject is closely linked with the use of various clef combinations, that is, the ranges possible to notate using different clefs.<sup>19</sup> When studying Morley's clef combinations, it appears that he acknowledged the pairing of

<sup>15</sup> Cf. Powers, "Mode", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 12, pp. 405-6; Bernhard Meier, op. cit., pp. 290-2; Peter N. Schubert, "The Fourteen-Mode System of Illuminato Aiguino", *JMT* 37 (1993), pp. 189-90.

<sup>16</sup> Charles Butler (*The Principles of Musick, in Singing and Setting* (London 1636), p. 85) argues in a similar manner, though more vague, and associates the issue with the discussion of "Improper Figures". See also quot. from Calvisius (1592), PT. 2.i, note<sup>8</sup>.

<sup>17</sup> Morley op. cit., p. 166.

<sup>18</sup> Cf. Robert Stevenson, "Thomas Morley's *Plaine and Easie* Introduction to the Modes", *Md* 6 (1952), p. 182. For a more thorough discussion of the history and differences, see Powers, op. cit.

<sup>19</sup> See PT. 2.iii.

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cantus with tenor and bassus with altus, as they indicate the difference between plagal and authentic modes: the clefs also show the fourth/fifth distinction in the same way as the *ambitus* of authentic and plagal modes.<sup>20</sup>

### CONCLUSION

Morley does not explicitly mention that the tenor is the mode-bearing part. It is, however, implied in his examples of the "Eight Tunes" where the *cantus firmus* from the Sarum rite is placed in the tenor part.<sup>21</sup> The reason why Morley does not directly deal with the subject could be because he saw it as being part of the traditional 8-mode system and sacred music (i.e. using *cantus firmi*); or, simply because in free polyphonic music with no pre-composed *cantus firmus*, this detail is not highly relevant. Though Morley does not discuss the arrangement of modes in polyphonic music as detailed as many continental theorists do, he is, nevertheless, very much aware of the concepts and their function. Morley does not have to discuss the subject separately, as in his treatise it is part of the clef combinations.

<sup>20</sup> See PT. 2.iii.

<sup>21</sup> Morley, op. cit., pp. 147-8.

## Clef Combinations

Harold S. Powers (1981) has argued for the importance of using clef combinations together with final and transpositional system (*cantus mollis* and *durus*) as a more objective way of classifying polyphonic vocal music according to modal categories.<sup>1</sup> There are, however, problems with this method as Bernhard Meier (1988, 1992) has pointed out. Thus compositions ending on the co-final rather than the final will be difficult to classify.<sup>2</sup> Thomas Morley (1597) deals with the subject, but in connection with other topics and at times in quite an obscure manner. Still, Morley is one of the important sources on particular clef combinations and modes. In order to illustrate Morley's viewpoints and to place him in a broader context, some foreign theorists have been consulted, including Tigrini (1588), Bona (1595), Rodio (1600/1609), and Nucius (1613). In general, the subject is discussed in a somewhat vague manner in Renaissance treatises because it is closely linked with *ambitus* and the use of authentic-plagal modes in polyphony. Giovanni Maria Trabaci (1615), who is more known as a composer than as a theorist, is drawn into the present discussion as he mentions some very interesting aspects of the use of specific clef combinations in vocal music as opposed to instrumental.

Normally two clef combinations were utilised:<sup>3</sup>

<sup>1</sup> Harold S. Powers, "Tonal Types and Modal Categories in Renaissance Polyphony", *JAMS* 34 (1981), pp. 428-70; Arthur Mendel, "Pitch in Western Music since 1500: A Re-Examination", *Am* 50 (1978), pp. 1-93; one of the more satisfying discussions on this subject is Siegfried Hermelink, *Dispositiones modorum. Die Tonarten in der Musik Palestrinas und seiner Zeitgenossen* (Habilitationsschrift, Tutzing 1960); see also Anne Smith, "Über Modus und Transposition um 1600", *BJhM* 6 (1982), pp. 9-43; Patrizio Barbieri, "*Chiavette* and Modal Transposition in Italian Practice (c.1500-1837)", *Recercare* 3 (1991), pp. 5-79; in opposition to the above discussions: Bernhard Meier, *The Modes of Classical Vocal Polyphony*, tr. Ellen Beebe (New York 1988), pp. 87-8, 388-9; Bernhard Meier, *Alte Tonarten. Dargestellt an der Instrumentalmusik des 16. und 17. Jahrhunderts* (Kassel 1992), pp. 30-1.

<sup>2</sup> Powers is aware of this special problem; see "The Modality of *Vestiva in colli*", *Studies in Renaissance and Baroque Music in Honor of Arthur Mendel*, ed. Robert L. Marshall (Kassel 1974), pp. 31-46.

<sup>3</sup> Hermelink, op. cit., pp. 17-8, indicates two more variants which were, however, used extremely seldom: C1, C2 C3, F3 (or F4) and C2, C3, C4, F4 (or F5).



### Section iii: Clef Combinations

[1] High clefs (*chiavette*), using G2, C2, C3, F3, or C4. If C1 is used instead of G2, it must still be defined as the high clef combination.<sup>4</sup>

[2] The second combination employs the low clefs (*chiavi naturali*), using C1, C3, C4, and F4.

The combination also indicates the *ambitus* of each part. The fourth-fifth relationship between the clefs of the two clef combinations corresponds to the same fourth-fifth relationship between the authentic and plagal modes. Accordingly, the use of low clefs indicates a low *ambitus* often corresponding to a plagal mode and, contrarily, high clefs indicate an authentic mode. The final will then disclose the mode.

Valerio Bona da Brescia (1595) wrote a complete section dealing only with modes and clef combinations in his short treatise.<sup>5</sup> Before explaining how to discern modes by looking at the clef combinations and finals, Bona mentions that it is better to call the method practical rather than scientific.<sup>6</sup> Then he continues, mentioning the different clef combinations for the 8-mode system, and discusses also the transposition of modes 1 and 2.<sup>7</sup> Regarding the clefs for mode 4, Bona explains that one uses the same combination as for mode 3. This leads him to pose the question of how one recog-

<sup>4</sup> The terms *chiavette* and *chiavi naturali* were first used by Paolucci in 1765; cf. Mendel, op. cit., p. 60; however, see also Barbieri, op. cit., pp. 8-10.

<sup>5</sup> Valerio Bona da Brescia, *Regole del contraponto, et compositione brevemente raccolte da diversi auttori* (Casale 1595), pp. 39-42.

<sup>6</sup> Ibid., p. 39:

Hora ti voglio dar mi altra regola, per la cognitione delli toni, se bene si potrà chiamar più presto pratica, che scienza. però è ben fatto saper la prima, e poi questa Seconda. [Now I will give you my other rule on how to know the modes [toni] even if you would call it practical rather than scientific. But it is well to know the first [i.e. practical] and then the second [i.e. scientific].]

<sup>7</sup> Bona has no music examples in his treatise, but discusses all the details in the text; on mode 1 he comments (ibid., p. 39):

Quando il Primo Tono, si compone per be quadro, guarda che la chiave del basso sarà di F, fa[,] ut, posta in seconda riga. Quella del Tenore sarà in C, solfaut, posta anc'essa in seconda riga. Quella del Contralto, sarà di C, solfaut, posta nella terza riga. Quella del Soprano, sarà di C, solfaut, posta nella prima riga. [When [it is] mode 1, set in *cantus durus*, be aware that the bass clef is *F faut* and placed on the second line; the tenor clef is *C solfaut*, also placed on the second line; the contralto clef is *C solfaut*, placed on the third line; the soprano clef is *C solfaut*, placed on the first line.]

Bona numbers the lines descending from the top except for the soprano clef which lies on the first line counted from the bottom. See also Bernhard Meier, *The Modes...*, p. 87.

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nises whether it is mode 3 or 4 when both use the same clefs. To this intriguing question he answers that one must take heed of the melody and of the final note (*corda*):

The clefs of the parts [of mode 4] are similar to those of the third [mode], but how can you then know which will be the third and which the fourth when the clefs are the same? I say that you must judge it from the melody and from the final note.<sup>8</sup>

This is also valid for modes 7 and 8 when they employ the same clef combination (TABLE 2.iii.1).

Another theorist dealing with the subject is Rocco Rodio (1609).<sup>9</sup> The second part of the tract, *Come gli tuoni soni dodici*, deals with the twelve modes; the species of octave, fourth and fifth; and the transposition of modes, that is, to *cantus mollis*. Rodio does not directly advocate the relationship between authentic/plagal modes in a polyphonic composition; nor does he deal with transposition and clefs, but after each explanation of the modes and immediately preceding the music example, he mentions that the mode "is made in these clefs".<sup>10</sup> Rodio gives the clef combinations for all modes in the 12-mode system, both *cantus durus* and *cantus mollis* (TABLE 2.iii.1).<sup>11</sup>

Johannes Nucius (1613), whose short treatise Thomas Ravenscroft referred to

<sup>8</sup> Ibid., p. 40:

Le chiavi delle parti [of mode 4], sono simile à quelle del Terzo. e come conoscerai dunque, quale sia il Terzo, & qual il quarto, se le chiavi sono simili? dico, che & della Cantilena, & dalla corda finale, tu farai il giudicio.

On modes 7 and 8 (p. 41):

... & à conoscere la differenza dell'uno, & dell'altro, corre l'istessa ragione, che t'hò detto del Terzo, & Quarto.

[... and to know the difference between the one and the other, the same method is used as I have said to you concerning the third and the fourth [modes].]

<sup>9</sup> Rocco Rodio, *Regole di musica* (Naples 1609).

<sup>10</sup> Rocco Rodio, op. cit., pp. 58-85; preceding the example of mode 1, for instance, the author remarks (p. 58):

...e prima de i dodici regolari, che hanno le lor spetie naturali, cominciando dal primo, che è quel che termina in D, sol, re, acuto giudicando, e quelli, e gli altri sempre per il tenore, & si fa con queste chiave.

[...and the first of the 12 regular [modes] ([i.e.] which have the natural species to them), beginning with the first—which is the one terminating in high *Dsolre*, always judging this and the others by the tenor—is made with these clefs.]

<sup>11</sup> The music examples are found on pp. 59-85.

### Section iii: Clef Combinations

several times, also indicates that each mode had a particular combination of clefs.<sup>12</sup> In his chapter devoted to the modes, Nucius annotates each example with the *ambitus*, octave species, and melodic patterns, and went to the extent of providing the clefs for a four-part composition together with the final.<sup>13</sup> Nucius does not provide any further information concerning the clef combinations; neither does he indicate what happens with the clef combinations when modes are transposed to *cantus mollis* (TABLE 2.iii.1).

The Italian theorist, Orazio Tigrini (1588), whose treatise Morley seems to have known, mentions clefs in connection with final cadences in bass parts; thus, according to Tigrini it is possible to recognise the mode when focusing on clef and final cadence.<sup>14</sup> It is apparent from the examples Tigrini provides that the pitch of the *clausula tenorizans* is exactly the same in the authentic and plagal modes. The only difference is in the clefs which Tigrini uses: high clefs for the authentic modes and low clefs for the plagal modes with the usual exceptions as seen in TABLE 2.iii.1<sup>15</sup>

Morley, too, deals with clef combinations though in a somewhat obscure manner. He argues that the clefs indicate the compass of each part and he distinguishes between two combinations which are termed "high keys" and "low keys". Morley asserts that the composer can choose between these two combinations. He notates both the high- and low-clef combinations in the *cantus mollis* system. It was common to claim that plagal modes had a more subdued and 'sweet' effect than authentic modes, and Morley indicates that the two different clef combinations have this effect:

<sup>12</sup> Johannes Nucius, *Musices poeticae sive de compositione cantus* (Neisse 1613); Thomas Ravenscroft, *A Briefe Discourse* (London 1614), p. 1, where the author refers to Nucius' chap. 1 "De definitione musices poeticae"; cf. PT. 1.ii.

<sup>13</sup> Nucius, op. cit., cap. 9, sigs. I4<sup>r</sup>-K4<sup>r</sup>.

<sup>14</sup> On Tigrini's significant approach to the subject of cadences, see PT. 2.iv.

<sup>15</sup> See PT. 2.iv, for the examples.

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TABLE 2.iii.1

Clef Combinations, Transpositional System, and Final

Bona (1595)							
mode	cantus durus	final	cantus mollis	final			
1	C1 C3 C4 F4	D	G2 C2 C3 C4/F4	G			
2	C2 C3 C4 F4	D	C1 C3 C4 F4	G			
3	C1 C3 C4 F4	E					
4	C1 C3 C4 F4 <sup>16</sup>	E					
5	G2 C2 C3 F3	F	G2 C2 C3 F3 <sup>17</sup>	F			
6	C1 C3 C4 F4	F	C1 C3 C4 F4 <sup>17</sup>	F			
7	G2 C2 C3 C4/F3	G					
8	G2 C2 C3 C4/F3	G					
	C1 C3 C4 F4 <sup>18</sup>						

Rodio (1609)					Nucius (1613)		
mode	cantus durus	final	cantus mollis	final	mode	cantus durus	final
1	C1 C3 C4 F4	D	G2 C2C3 F3	G	1	C1 C3 C4 F4	D
2	G2 C2 C3 C4	D	C1 C3 C4 F4	G	2	G2 C2 C3 F3 <sup>19</sup>	D
3	C1 C3 C4 F4	E	C1 C3 C4 F4	A	3	C1 C3 C4 F4	E

<sup>16</sup> Bona only claims that the clefs for mode 4 are the same as those for mode 3; see above and note<sup>23</sup>.

<sup>17</sup> Bona, op. cit., p. 41, explains that modes 5 and 6 have the same clefs in *cantus durus* and *mollis*:  
 ... questi doi, cioè il Quinto & Sesto, tengono le istesse chiavi anco per bemolle...  
 [... these two, that is, the fifth and sixth [modes] have the same clefs as in *cantus mollis*...]

<sup>18</sup> Ibid., p. 41:  
 ...Le chiavi di questo tono, sono simili à quelle del Settimo... L'ottavo tono però, Alcuni l'hanno fatto (& si puo fare chivuole) con le chiavi del primo tono.  
 [...The clefs of this mode [mode 8] are similar to those of the seventh...; for the eighth mode, however, some have made use of the clefs of mode 1 (and one can do so if one wishes).]

<sup>19</sup> It is apparent that mode 2 is an exception. It should have a lower *ambitus* as it is a plagal mode. Nucius gives it the high clefs (*Musices poeticae sive de compositione cantus* (Neisse 1613), sig. I4<sup>r</sup>).

### Section iii: Clef Combinations

Rodio (1609)					Nucius (1613)		
mode	cantus durus	final	cantus mollis	final	mode	cantus durus	final
4	C2 C4 F3 F5 <sup>20</sup>	E	C1 C3 C4 F4	A	4	C2 C4 C5 F5	E
5	G2 C2 C3 F3	F	C2 C4 F3 F4	F	5	G2 C2 C3 F3 <sup>21</sup>	F
6	C1 C3 C4 F4	F	G2 C2 C3 F3	F	6	C1 C3 C4 F4	F
7	G2 C2 C3 F3	G	C2 C3 C4 F4	C	7	G2 C2 C3 F3	G
8	C1 C3 C4 F4	G	G2 C2 C3 F3	C	8	C1 C3 C4 F4	G
9	G2 C2 C3 F3	A	C1 C3 C4 F4	D	9	C2 C3 F4 F5 G2 C2 C3 F3 <sup>22</sup>	A
10	C1 C3 C4 F4	A	G2 C2 C3 F4	D	10	C1 C3 C4 F3	A
11	C1 C3 C4 F4	C	G2 C2 C3 F3	F	11	C1 C3 C4 F4 <sup>23</sup>	C
12	G2 C2 C3 F3	C	C1 C3 C4 F4	F	12	G2 C2 C3 F3 <sup>23</sup>	C

<sup>20</sup> For the bass part in mode 4, Rodio employs the unusual F5-clef; this is due to the low tenor part. For this reason the combination (or the mode) can be transposed up an octave or a fourth upwards to *cantus mollis*. (*Regole di musica* (Naples 1609), p. 64):

...ma conciosia che il tenore venga troppo basso, come si vede nel madrigale di Cipriano à cinque, che dice, Tu piangi, e quella, che fa tal pianto; non molto l'usano al luogo suo naturale perciò che ò la trasportano nell'ottava ad alto, ò lo fingono una quarta pur ad alto...

[...but since the *tenor* proceeds too low as it is seen in the madrigals for five [voices] by Cipriano, that is, "Tu piangi" which is so tearful. It is not very much used in its natural place, and therefore it is transposed either an octave higher or it is transposed [fingere: imagine] only a fourth higher...]

The clef (F5) can also be found in other works: Girolamo Diruta (*Seconda parte del Transilvano Dialogo* (Venice 1609/1622) lib. 2, p. 25) has C2, C4, F3, and F5 for mode 2, untransposed. Diruta's example of mode 4 (p. 27) shows that the range of the bass is very low, but he uses F4. Orazio Tigrini, *Il compendio della musica* (Venice 1588), p. 96, uses it in his example of a cadence in mode 4.

<sup>21</sup> Modes 5 and 6, which are usually notated in *cantus mollis*, are here shown as *cantus durus*, strongly implying that Nucius adheres to Glarean's 12-mode system (Nucius, op. cit., sig. K1<sup>v</sup>). In this system modes 5 and 6 are indeed considered different from modes 11 and 12.

<sup>22</sup> Ibid., sig. K3<sup>r</sup>; Nucius explains that the second clef combination, which is transposed up an octave, is more used ("Vel sic per octavam, quod usitatus est:"). According to Nucius, mode 9 most often makes use of the high clef combination which corresponds to the information given by Rocco Rodio. This also conforms with the later edn. of Zarlino's *Le institutioni harmoniche* (Venice 1573), p. 413, where the example of mode 9 has been transposed up an octave compared with the example of the first edn. (1558).

<sup>23</sup> The clef combinations for modes 11 and 12 are also reversed in Nucius (op. cit., sig. K4<sup>r</sup>), giving a high range to the plagal mode and a low range to the authentic. Except for two clefs, the list of Nucius is exactly the same as Rodio's (the clef for the tenor in mode 4 is, according to Rodio, F3, and the clef for the bassus in mode 10 is F4).

## *Part 2: Methods for the Classification of Modes*

It is true that the high and lowe keyes come both to one pitch, or rather compasse, but you must understand that those songs which are made for the high key be made for more life, the other in the low key with more gravitie and staidnesse, so that if you sing them in contrarie keyes, they wil loose their grace and wil be wrested as it were out of their nature...<sup>24</sup>

Morley's observation that the two different clef combinations "come both to one pitch" is in agreement with Tigrini's examples. But most important, the quotation implies that, in practice and presumably in vocal music, clef combinations must have been transposed downwards or upwards, making use of the same *ambitus* and thus erasing the difference between authentic and plagal modes, that is, removing the subdued effect of the plagal modes. At the same time, Morley continues to explain that if other clefs are employed (i.e. transposing the composition), the songs "loose their grace". Yet, following the above quotation Morley immediately continues his explanation, and it becomes clear that he, in fact, is talking about instrumental music:

... for take an instrument, as a *Lute Orpharion, Pandora*, or such like, being in the naturall pitch, and set it a note or two lower it wil go much heavier and duller, and far from that spirit which it had before, much more being foure notes lower then the natural pitch.<sup>25</sup>

It is possible that Morley is indicating that in vocal music the high clefs with a relatively high range were transposed down a fourth using the normal clefs (C2, C3, C4, F4). In instrumental music this procedure was not used as the transposition of a fourth down would be too great and would change the music "far from that spirit which it had before".<sup>26</sup>

Morley also briefly mentions that there is an even lower clef combination which composers used when writing only for men's voices:<sup>27</sup>

<sup>24</sup> Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), p. 166.

<sup>25</sup> Ibid.

<sup>26</sup> This view would seem to confirm Patrizio Barbieri, op. cit., pp. 5-79.

<sup>27</sup> Morley, op. cit., p. 166; he could have copied this from Zarlino (*Le istitutioni harmoniche* (Venice 1558), 4.31, tr. Vered Cohen (New Haven 1983), p. 94), who also mentions composing only

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(1) High keys	G2 C1/C2 C3 F3
(2) Low keys	C1 C2/C3 C4 F4
(3)	C3 C4 F3 F4

In his example, Morley furthermore shows the different ranges to be employed when using specific clefs:<sup>28</sup>

ILL. 2.iii.1

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#### The third part.



But if you would make your song of two trebles you may make the two highest parts both with one cleffe, in which case one of them is called *Quinto*. If the song bee not of two trebles, then is the *Quinto* alwaies of the same pitch with the tenor, your *Alto* or meane you may make high or lowe as you list, setting the cleffe on the lowest or second rule. If you make your song in the low key, or for meanes then must you keepe the compasse and set your cleffe as you see here.



The musicians also vse to make some compositions for men onely to sing, in which case they neuer passe this compasse.



Morley, *A Plaine and Easie Introduction* (London 1597), p. 166

When the author refers to "treble" keys he shows the G-clef; when referring to "mean" keys it is the C-clef; and the "base" key is the F-clef. The *ambitus* which Morley indicates is kept within the mode and thus avoids employing leger lines. Explaining the

for tenors and basses. See also discussion in Siegfried Hermelink, op. cit., p. 29.

<sup>28</sup> Morley, op. cit., p. 166; Morley notates his example in *cantus mollis*, which could stem from the English tradition transposing the hexachords so the natural starts with *ut* on F; see PT. 1.iii.

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high clef system, Morley remarks:

...if you would make your song of two trebles you may make the two highest parts both with one cliffe, in which case one of them is called *Quinto*. If the song bee not of two trebles, then is the *Quinto* alwaies of the same pitch with the tenor, your *Alto* or meane you may make high or lowe as you list, setting the cliffe on the lowest or second rule.<sup>29</sup>

Morley continues by warning the student that one must take care to "keepe the ayre of your key (be it in the first tune, second tune, or other)", thus suggesting that clef combinations infer a particular mode.<sup>30</sup> Later English treatises dealing with composition of polyphonic music such as Coprario (1610-14), Campion (c.1613), or Butler (1636) do not discuss clef combinations, presumably because it now was a much less important subject in the same way as the authentic/plagal distinction of modes.

The method of disclosing the mode of a composition by looking at the final, the transpositional system, and the clef combination, is particularly appropriate for vocal polyphonic music, as it does not often exceed the ranges of a tenth and thus can be notated within specific clefs. The rise of instrumental music, utilising the much greater *ambitus* which instruments have, makes the procedure more difficult to employ.

Trabaci (1615),<sup>31</sup> who clearly makes use of specific combinations of clefs for each mode in his music for the organ, mentions in one of his introductions to the reader that one must follow the rules of the old school, especially in the case of *ricercate*, motets and madrigals. This includes employing the proper clefs for each mode. The reason why Trabaci begins to discuss the subject is his argument that in instrumental music one can use a much larger *ambitus* than in vocal music and thereby exceed the ranges of the modes. This does not consequently mean that a modal designation is impossible or that a mixture of modes (between a mode and its collateral) takes place:

<sup>29</sup> Ibid., p. 166.

<sup>30</sup> Ibid., p. 166; the term "key" can both mean a clef or the *finalis* or, perhaps better, the range of a mode; cf. Morley, p. 147, where key implies either *finalis* or range.

<sup>31</sup> Giovanni Maria Trabaci, *Ricercate. Canzone francese... libro primo* (Naples 1603), pp. 1-33; *Il secondo libro de ricercate & altri varij capricci* (Naples 1615).



### Section iii: Clef Combinations

...But if we deal with matters of playing [i.e. instrumental music] we can enjoy a much greater freedom which we do not have in matters of singing. For example: if I compose a *Cantilena* for a harpsichord or concert of violins or other instruments, which need a music of large consonances [i.e. a large *ambitus*] for a better effect for the ears, I will make this *Cantilena*, not only of 22 notes but 50—if I need them, and as the occasion takes me. I will write it with the most appropriate clefs which suit me, and not for this should one notate it [wrongly] and say it is outside the mode, and that the eighth [mode], in proceeding so high, may become the seventh; and the third may become the ninth. That the first [mode] needs to be written with these or other clefs, is a rule of the first school. This and subtlety should be used in a motet, madrigal, and especially in a written *Ricercata*, as you can see in these 12 modes of my present book; or as in the composition and also in the order [of the pieces], it [i.e. the mode] is very clearly and distinctly regarded. But in the case of *Verseti* or *Fioretti* (as we wish to call them) or in a *Canzona Francese*, *Gagliarda*, various *Partite*, or in a *Toccata*, one should not pay heed that it descends or ascends more than the ordinary.<sup>32</sup>

Trabaci's statement is indeed very important for it becomes obvious that instrumental music cannot make use of the more objective criteria (final, system, and clef combinations). Pedro Cerone (1613) acknowledges that it is possible to use the system, final, and clef combination in order to disclose the mode of a piece, and even refers to this method when dealing with each mode; however, he warns the students to be careful:

<sup>32</sup> Trabaci, *Il secondo libro de ricercate...* (Naples 1615), p. 41:

...ma se noi trattiamo in cose di sonare, godemo molte licenze più larghe, che non habbiamo in cose di cantare. Per esempio: Io farò una Cantilena per un Cembalo, ò concerto di Violini, ò d'altri instrumeti i quali ricercano una Musica di Consonanze lontane per lo effetto dell'orecchio questa Cantilena la farò non solamente ventidue voci, ma Cinquanta, se mi sarà necessario, e secondo l'occasione che mi trasporta, e la scriverò con quelle chiavi sì come più comodo mi torna, non per questo s'hà da notare, e dire ch'eschi fuor di Tono, e che L'ottavo in caminar tanto in alto diventi settimo, e che il Terzo diventi nono, e che il Primo bisognava scriverlo con queste, e con quell'altre chiavi, questa è regola di prima scuola, e questo avertimento, e sottigliezza si dee tenere in un Motetto, in un Madrigale, e particolarmente in una Ricercata scritta, come potrete veder'in questi Dodici modi del presente mio libro, o de così nella Compositione, come anco nell'ordine vi s'è riguardato molto chiaro, e distintamente; ma in questa materia di Versetti, ò Fioretti (come dimandargli vogliamo) ò in una Canzona Francese, Gagliarda, Partite diverse, ò in una Toccata non si dee riguardar che scenda, ò che scaglia più del ordinario...

## *Part 2: Methods for the Classification of Modes*

they have not only to look at the final and the clefs to know the mode, for sometimes the composers make use of different clefs, placed on a line higher or lower...<sup>33</sup>

<sup>33</sup> Pedro Cerone, *El melopeo y maestro. Tractado de musica theorica y pratica* (Naples 1613), p. 912: ...no han de mirar solamente à la final y à las Claves para conocer el Tono, que *avezes los Compositores se serviran de diferentes Claves*, puestas una regla mas en alto ò mas en baxo...

## Cadences and the Cadential Hierarchy of Scale Degrees

### THE PERFECT CADENCE<sup>1</sup>

It is apparent from the numerous extensive discussions on the cadence in Renaissance treatises that this area was considered important.<sup>2</sup> Referring to Tinctoris, Ornithoparchus (1517) defines a cadence in terms which later in the sixteenth century became closely linked with the art of rhetoric.<sup>3</sup> Thus cadences would occur in the same places as commas, full stops etc. Ornithoparchus explains:

Being that every Song is graced with formall *Closes*, we will tell what a *Close* is. Wherefore a *Close* is (as *Tinctor* writes) a little part of a Song, in whose end is found either rest or perfection. Or it is the conjunction of voices (going diversly) in perfect *Concords*.<sup>4</sup>

Though Ornithoparchus seems to mention cadences ("formall *Closes*") in connection with monody, his statement concerning polyphony indicates that voices ending on an octave or even a fifth can be defined as a cadence. Thus a cadence, signifying a 'rest', does not, in his view, have any harmonic implications, except that at least two parts in

<sup>1</sup> It must be emphasised that the sub-divisions of this chapter (perfect, semiperfect, and imperfect cadences) refer to a Renaissance conception and definition of the terms and do not necessarily reflect a modern usage of the terms.

<sup>2</sup> On cadences, see Putnam Aldrich, "An Approach to the Analysis of Renaissance Music", *MR* 30 (1969), pp. 1-21; Malcolm Boyd, "Structural Cadences in the Sixteenth-Century Mass", *MR* 33 (1972), pp. 1-13; Charles Dill, "Non-Cadential Articulation of Structure in Some Motets by Josquin and Mouton", *Current Musicology* 33 (1982), pp. 37-56; Bernhard Meier, *The Modes of Classical Vocal Polyphony*, tr. Ellen Beebe (New York 1988), pp. 89-170 et passim; *Music before 1600*, ed. Mark Everist (Oxford 1992), passim; Anne Smith, "Willaert Motets and Mode", *BJhM* 16 (1992), pp. 117-65.

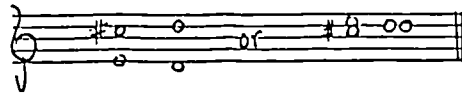
<sup>3</sup> See e.g. Nicola Vicentino, *L'antica musica ridotta alla moderna prattica* (Rome 1555), p. 51<sup>r</sup>; Gioseffo Zarlino, *Le institutioni harmoniche* (Venice 1558), 3.53, tr. Guy A. Marco (New Haven 1968), p. 151; Gallus Dressler, *Praecepta musicae poeticae*, Magdeburg 1563 (MS), ed. Bernhard Engelke, *Geschichts-Blätter für Stadt und Land Magdeburg*, 49-50 (1914-15), p. 238; Orazio Tigrini, *Il compendio della musica* (Venice 1588), p. 62, 71 (referring to Vicentino and Zarlino); Seth Calvisius, *Melopoia seu melodiae condendae ratio* (Erfurt 1592), sig. G3<sup>v</sup>; Joachim Burmeister, *Musica poëtica* (Rostock 1606), p. 35; Johannes Nucius, *Musices poeticae sive de compositione cantus* (Neisse 1613), sig. G4<sup>v</sup>; and Charles Butler, *The Principles of Musick, in Singing and Setting* (London 1636), p. 82.

<sup>4</sup> John Dowland, *Andreas Ornithoparcus his Micrologus, or Introduction* (London 1609), p. 84.

## Part 2: Methods for the Classification of Modes

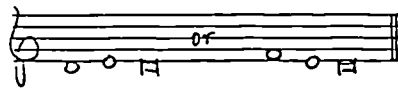
counterpoint proceed from a major sixth to a perfect octave, or from a minor third to a unison, or even from a major third to a fifth:

Ex. 2.iv.1



Hence, the cadence was defined from a melodic and contrapuntal point of view, where each part of a polyphonic composition had a specific melodic progression. In a cadential formulation, the melodic pattern of the cantus part (*clausula cantizans*) ascends a semitone to the ultimate cadence note; the tenor part (*clausula tenorizans*), which is the leading part, descends by step from the penultimate note to the final:<sup>5</sup>

Ex. 2.iv.2



Other parts (bassus and altus) are accommodated to the cantus and tenor and do not influence the definition of a cadence. Having defined the "formall Close", Ornithoparchus continues his discussion supplying a list of rules which clarify his understanding of the term:

<sup>5</sup> Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), p. 74, 127, defines the "cadence" as the *clausula cantizans*. During the early seventeenth century theorists also indicate that the *clausula tenorizans* can proceed a step up to the third above the final, thus emphasising the growing importance of a 'full' harmony. Johannes Nucius, op. cit., sig. H1<sup>v</sup>, remarks that the bassus can terminate on a third below the tenor or at the unison of the tenor:

Basis ultimam clausulae Notam, aut ad Octavam infra Tenorem detrudet, 1. aut cum eodem Tenore in Tertia infra ultimam Tenoris concordabit, 2. aut deniq. Unisonum sonabit....

[The *bassus* is brought to the last note of the cadence either to the octave below the *tenor*; or, 1. concords with the same *tenor* a third below the ultimate [note] of the *tenor*; or, 2. finally it sounds at the unison....]

#### *Section iv: Cadences and the Cadential Hierarchy of Scale Degrees*

##### *Rules for Closes.*

First, Every *Close* consists of three Notes, the last, the last save one, and the last save two.

2 The *Close* of the *Discantus* made with three Notes, shall always have the last upward.

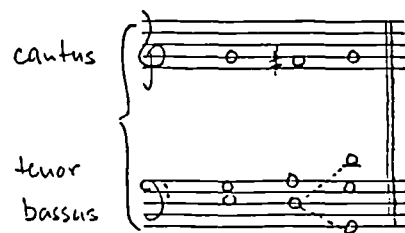
3 The *Close* of the *Tenor*, doth also consist of three Notes, the last always descending.

4 The *Close* of the *base* requires the last Note sometime above, and sometime beneath the *Tenor*. Yet commonly it thrusts it an eighth below, and sometimes raiseth it a fifth above.

5 The *Close* of a high *Tenor*, doth sometime rise, sometime fall with the last Note; sometime makes it an Unison with others. Which being it proceeds by divers motions, the sorting of it is at the pleasure of the Composers.<sup>6</sup>

Ornithoparchus' discourse suggests that the leap of a fifth in the bass was conceived from a contrapuntal point of view, for when dealing with the *clausula basizans* he mentions that the bassus usually is an octave below the last note of the tenor (or sometimes a fifth above). Consequently the only possible way of avoiding parallel octaves between tenor and bassus is to employ the fifth under the tenor on the penultimate note.

##### EX. 2.iv.3



In compositions of four parts, a *clausula altizans* can be formed usually ending on a fifth above the tenor. This part was adjusted to the available space between cantus and tenor.

<sup>6</sup> Dowland, op. cit., p. 84. The rules given by Ornithoparchus are very similar to those found in Johannes Cochlaeus, *Tetrachordum musices* (Nuremberg 1511), tr. Clement A. Miller (s.l. 1970), *MSD* vol. 23, pp. 79-80.

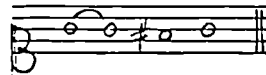
## Part 2: Methods for the Classification of Modes

The rhythm of the *clausula cantizans* is also very important and can occur, depending on the importance of the cadence, as a syncope. Thomas Morley (1597) explains:

PHI. What do you tearme a *Cadence*?

MA. A *Cadence* wee call that, when comming to a close, two notes are bound together, and the following note descendeth thus:

Ex. 2.iv.4



or in any other keye after the same manner.<sup>7</sup>

Furthermore, Morley indicates that a "cadence" belongs to "closes", the close being the contrapuntal device passing from imperfect consonance to perfect consonance.<sup>8</sup> Later on, Morley mentions that the syncope is a concept "which we abusively cal a Cadence",<sup>9</sup> and even as late as 1636, Charles Butler names the most prominent cadence a syncope.<sup>10</sup> Morley remarks that formal closes (i.e. with syncope and dissonance) are employed as the final cadence of a piece; however, formal closes can also be brief and are then found in so-called

light musicke, as *Madrigals*, *Canzonets*, *Pavins*, and *Galliards*, wherein a semibriefe will be enough to *Cadence* upon, but if you list you may draw out your *Cadence* or close to what length you wil. As for the *Motets* and other grave musick you must in them come with more

<sup>7</sup> Morley, op. cit., p. 73.

<sup>8</sup> Ibid., p. 74, "Examples of formal closing without a Cadence".

<sup>9</sup> Ibid., p. 144.

<sup>10</sup> Butler, op. cit., pp. 66; after defining "Alligation" as a tie, Butler continues:

Moste excellent in this kinde is a Cadence: which is an Alligation, whose Binding semitone falleth into the next key (I) always sharp: of which falling the Cadence hath his name:...

#### Section iv: Cadences and the Cadential Hierarchy of Scale Degrees

deliberation in bindings and long notes to the close

It has been argued that Morley must have known Tigrini's small tract *compendio della musica* (Venice 1588), since an overwhelming number of the examples of cadences are identical.<sup>12</sup> However, in his discussion of cadences Tigrini is much more detailed than Morley. One of Tigrini's most interesting chapters, which no one as yet has dealt with, is the discourse on *clausula enorizans* and *clausula basizans* in connection with the *finalis* and the use of clefs.<sup>13</sup> In a chapter on how to determine the mode of a composition, Tigrini illustrates each final *clausula enorizans* of the twelve modes. In the following chapter, the author gives all the *clausulae basizans* and mentions that by studying these two parts it is very easy to determine the mode of any composition (ILL. 2.iv.1).

From Tigrini's prototypes of *clausulae* it is obvious that he tries to distinguish between authentic and plagal modes, though each authentic/plagal pair has an identical final (i.e. unison, octave above, or octave below). The *clausulae enorizans* are identical in pitch for both authentic and plagal modes though different clefs are employed. However, the *clausula basizans* is never the same in the authentic or its contra mode in terms of pitch. It is apparent that the *clausulae basizans* in plagal modes are lower than in the corresponding authentic modes. In the authentic modes both *clausulae*-forms end in a unison, whereas in the plagal modes they are an octave apart. The use of a fourth/fifth in the bass also seems to depend on whether the bass is in a plagal or an authentic mode, the only exceptions being modes 3 and 4, 11 and 12. This obviously applies for *cantus durus*; in *cantus molis* it seems to be the opposite.

<sup>11</sup> Morley, op. cit., p. 132.

<sup>12</sup> Thomas Morley, *A Plain and Easy Introduction to Practical Music* (ed. Alec R. Harman, London 1952), pp. 241-2.

<sup>13</sup> For a general view of Tigrini's work, see "Tigrini, Orazio" *The New Grove Dictionary of Music* (ed. Stanley Sadie (London 1980), vol. 18 pp. 820; and Claude V. Palisca, *Studies in the History of Italian Music and Music Theory* (Oxford 1994), p. 10. Bernhard Meier, *The Modes of Classical Vocal Polyphony*, tr. Ellen Beebe (New York 1988), p. 88 mentions briefly Tigrini's treatise.

## ILL. 2.iv.1

Tigrini, *Il compendio della musica* (Venice 1588), pp. 96-7



*Section iv: Cadences and the Cadential Hierarchy of Scale Degrees*

Ex. 2.iv.5

Handwritten musical notation for Ex. 2.iv.5, showing three systems of piano accompaniment for scale degrees 1 through 12. The notation is in G major (one sharp) and 4/4 time. Each system consists of two staves (treble and bass clef) joined by a brace. The first system contains measures 1-4, the second system contains measures 5-8, and the third system contains measures 9-12. Measure 12 is followed by the word "or".

Ex. 2.iv.6

Handwritten musical notation for Ex. 2.iv.6, showing three systems of piano accompaniment for scale degrees 1 through 12. The notation is in G major (one sharp) and 4/4 time. Each system consists of two staves (treble and bass clef) joined by a brace. The first system contains measures 1-6, the second system contains measures 7-12, and the third system contains measures 13-16. The measures are labeled with scale degrees and specific intervallic instructions: 1, 2, 3, 4, 5 (trad.), 5 (a 4th up), 5 (a 5th down), 6 (trad.), 6 (a 4th up), 6 (a 5th down), 7, 8 (a 4th up), 9 (a 5th down), 10 (a 4th up), 11 (a 5th down), 12 (a 5th down).

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The *clausula basizans* of modes 3 and 4 seems at first sight peculiar, but because the fifth above the *finalis* E (B ♯) will create a diminished chord, the note is avoided and the note A is used instead (A is also the *repercussa* of mode 4 and a regular ending in mode 3).<sup>14</sup> Modes 11 and 12 do not comply with the system completely, for both modes terminate on the same pitch (i.e. C). However, Tigrini does give an optional *tenorizans* for mode 12 ending with the bassus on a unison and hence is in agreement with the other modes. Tigrini's approach implies that even the precise location of the *finalis* in the bassus can yield the plagal/authentic distinction between modes. If the bass uses the authentic range, two finals are possible: one ending with the tenor in unison and the other ending an octave below. If the bass employs the plagal mode, only one final will be available (Ex. 2.iv.5). When one part is in an authentic mode, Tigrini uses the lowest note of the octave species of that mode rather than the upper note.

Tigrini also illustrates the *clausula* prototypes in *cantus mollis*.<sup>15</sup> In Ex. 2.iv.6, Tigrini has incorporated the traditional modes 5 and 6 which usually were notated as *cantus mollis*, and thus could be considered as transposed Ionian modes. Nevertheless, comparing Tigrini's examples of modes 5 and 6 (untransposed, in *cantus mollis*), and modes 11 and 12 (transposed to *cantus mollis*), it becomes evident that he did not necessarily consider them as being the same. Although the *clausulae tenorizans* of the traditional modes 5 and 6 are indeed the same according to pitch and clefs, the *clausula basizans* is not the same. In mode 5 the bassus terminates on the octave below the final of mode 11, and the bassus of mode 6 has a lower *ambitus* than mode 12. The example also accords with the observation that the final interval between tenor and bassus in compositions of an authentic mode is a unison, whereas in compositions in a plagal mode it is an octave, except modes 5 and 6.

Morley has completely ignored these interesting aspects concerning the final, the *clausula tenorizans* and *basizans*, and clefs. It is arguable whether Tigrini's idea had any practical value, since no other theorist seems to mention this topic, and that would

<sup>14</sup> This is in agreement with the so-called *clausula in mi* as will be discussed below, "The Semiperfect Cadence".

<sup>15</sup> Tigrini, op. cit., pp. 97-8.

#### Section iv: Cadences and the Cadential Hierarchy of Scale Degrees

certainly explain why it is not found in Morley's *Plaine and Easie Introduction to Practicall Musicke*. Furthermore, in the late Renaissance the *clausula tenorizans* very often ascended a tone to the third above the final of the mode, and the fifth degree was just as often placed in the tenor as in the altus;<sup>16</sup> these features are not illustrated in Tigrini's examples. Before any evaluation can be made, a much more thorough investigation of polyphonic music and final cadences must be completed.

#### THE HIERARCHY OF PERFECT CADENCES

However, if the composer wished to shift the emphasis to other voices or make a weak cadence, he could then place the *clausula tenorizans* in the cantus and the *clausula cantizans* in one of the middle voices or even in the bass. The *clausula basizans* should always be placed in the lowest part; only the other *clausulae* structures could be exchanged with each other.<sup>17</sup> In order to create the strongest emphasis and perfection on the last and most important cadence, the three different *clausulae* (*cantizans*, *tenorizans*, and *basizans*) were placed in their respective voices, cantus, tenor, and bassus. Thus it becomes clear that it is possible to conceive a great variety of cadences. Thomas

<sup>16</sup> See note<sup>5</sup>; for further references, see Benito V. Rivera, "Harmonic Theory in Musical Treatises of the Late Fifteenth and Early Sixteenth Centuries", *Music Theory Spectrum* 1 (1979), pp. 80-95.

<sup>17</sup> Dressler, op. cit., p. 234, explains:

...sed voces invicem suum locum commutant, excepto basso qui suis terminis propter gravitatem et [recte: est] contentus. [in margin: Qua ratione omnes voces invicem locum mutant.] Tenor occupat clausulam Discanti, Discantus alti, et Altus Tenoris sibi vendicat locum, ita tamen voces coardentur ut intra disdiaparon [sic] omnes voces maneant.

[...but the voices change in turn the place—except the *bassus* which is content with its limits because of lowness. [in margin: by which reason all the voices change place mutually] The *tenor* uses the *clausula cantizans*; the *discantus* offers to itself the place of the *altus* and the *altus* [offers to itself] the *tenor*. Thus, however, that the voices are kept together so they remain within a *disdiapason*.]

Vicentino, op. cit., pp. 51<sup>v</sup>-59<sup>v</sup>, supplies an extensive discussion and numerous examples of all possible cadential formulations for all eight modes, showing the various *clausulae* placed in the various voices. Pedro Cerone, op. cit., p. 872, has an example showing how the *clausula cantizans* and *tenorizans* can be placed in other parts. Nucius, op. cit., sig. H3<sup>r</sup>, poses the question of what happens with the remaining voices if the tenor has got the *clausula cantizans* ("Si Tenor Discantus clausulam habuerit, Quæ erit reliquarum Vocum?"). Nucius then provides some examples, demonstrating how the *clausula basizans* may occur in the tenor if this part is lower than the bassus (sig. H4<sup>r</sup>).

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Morley, for instance, provides over 80 different cadences for four, five, and six voices and he remarks that they only form a very small part of all possible combinations.<sup>18</sup> Morley, who calls the cadence a *clausula cantizans*, shows various ways of using this in the bassus and in the altus (Ex. 2.iv.7).<sup>19</sup>

<sup>18</sup> Morley, op. cit., p. 142:

And though you have here some of everie sort of closes, yet wil not I say that here is the tenth part of those which either you your selfe may devise hereafter, or may finde in the works of other men, when you shall come to peruse them, for if a man woulde go about to set down everie close, hee might compose infinit volumes without hitting the mark which he shot at...

Morley could have paraphrased this statement on Orazio Tigrini, op. cit., who makes a somewhat similar remark (p. 77):

...perche sarebbe impossibile il darne l'esempio di tutti, si porranno questi altri pochi essempli, mediante i quali si potrà facilmente comprendere il modo, che si haverà da tenere nel ritrovarne del l'altre.

[Because it will be impossible to give an example of all [the cadences], these other few examples will be presented; and by means of these, it will be easy to understand the method which will have to be used in order to find the other ones.]

However, even Ornithoparchus (Dowland, op. cit., pp. 85-6) provides a list of possible cadences ("...the Exercise and forme of Closes") though not as many as Morley. Also Pedro Cerone, *El melopeo y maestro. Tractado de musica theorica y pratica* (Naples 1613), pp. 832-70, gives a vast amount of examples of cadences from two to eight parts. They do not correspond to Morley's examples, but the idea of listing examples of different cadences is not as unusual as one might believe.

<sup>19</sup> Morley, op. cit., pp. 127-8; Morley remarks that, besides being placed in the cantus, the *clausula cantizans* can also occur in the tenor, in the bassus, or even in the altus. ("If you carrie your Cadence in the tenor part"; "If you carrie your Cadence in the base part"; "But if you Cadence in the *Alto*"). Morley could have taken the definition of the cadence from Calvisius, op. cit., sig. G4<sup>r</sup>, who defines the cadence (*clausula*) as the *clausula cantizans*:

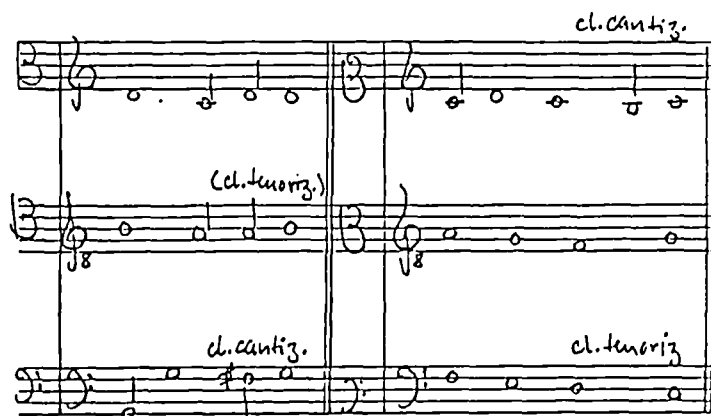
Clausula omnis, sive sit in acutis, sive in gravibus, constat tribus notulis, quarum penultima descendit, ultima ascendit. Et tam decensus, quam ascensus per Semitonum majus [recte: majum] fieri putatur.

[Every cadence (either in the high [parts] or in the low [parts]) consists of three notes of which the penultimate descends, and the last ascends. And both descending and ascending is to be considered made by a major semitone.]

Butler, op. cit., p. 71, quoting Morley and Calvisius, has a similar example and mentions that the cadence (*clausula cantizans*) can also occur in the bass part.

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Ex. 2.iv.7



THE SEMIPERFECT CADENCE

The *clausula tenorizans*, descending a semitone from the penultimate note to the final note, is a special cadence; this form of a close was known as the *clausula in mi*.<sup>20</sup> In the early Renaissance it was considered regular,<sup>21</sup> but later in the sixteenth century theorists interpreted it as semiperfect whenever it occurred, whether it was in the bassus, tenor, altus, or cantus.<sup>22</sup> Because of the characteristic melodic features of modes 3 and 4 with a semitone between the final and the degree above, the *clausula in mi* was normal for these two modes. In John Dowland's translation, Ornithoparchus reveals:

...If the *Close* of the *Tenor* end in *Mi*, as it is in the *Deutero*, or otherwise the last Note but one of the *base* being placed not in the fifth. But in the

<sup>20</sup> Dressler, op. cit., p. 234. When it occurs in the lowest part, ending on the perfect consonance with an upper part, it corresponds to the Phrygian cadence. On the history of the Phrygian cadence, see Saul Novack, "The Significance of the Phrygian Mode in the History of Tonality", *Miscellanea Musicologica* 9 (1977), pp. 82-127; Jean-Pierre Ouyard, "Modality and Text Expression in Sixteenth-Century French Chansons: Remarks Concerning the *E* Mode", *BJhM* 16 (1992), pp. 89-116.

<sup>21</sup> Bernhard Meier, op. cit., pp. 93-4.

<sup>22</sup> Dressler, op. cit., pp. 235-6.

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third beneath the *Tenor*, may fall upon the fift Finall without any hazard of Descant, as is declared in the underwritten *Concent*.<sup>23</sup>

Ex. 2.iv.8



In one of his "Rules for Closes", Ornithoparchus explains the *clausula in mi* more precisely:

7 The last Note save one of a *Tenor*, is flatly placed a fift above the *Base* and a sixt also, if the *Base* take the *Close* of the *Tenor*, and the *Tenor* the *Close* of the *Discantus*.<sup>24</sup>

Ex. 2.iv.9



Though Seth Calvisius (1592) does not directly mention the *clausula in mi*, he does elaborate on the subject when dealing with cadences with final on E in *cantus durus*. Before providing a similar example to Ornithoparchus', but in four parts, Calvisius remarks that the *clausula in mi* in the bass usually proceeds so it ends on the twelfth below the *clausula cantizans*.<sup>25</sup>

<sup>23</sup> Dowland, op. cit., pp. 84-5; cf. Pietro Aaron, *Thoscanello in musica* (Venice 1523), tr. Peter Bergquist, *Colorado College Music Press* (Colorado Springs 1970), vol. 4.2, p. 38.

<sup>24</sup> Dowland, op. cit., p. 84.

<sup>25</sup> Calvisius, op. cit., sig. G8'

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Ex. 2.iv.10



Morley does not deal directly with the *clausula in mi* in his tract, but he does include some examples of this cadence and classifies it as a formal close. However, if the *clausula cantizans* does not occur in any of the parts, he categorises the cadences as "middle closes, such as are commonlie taken at the ende of the first part of a song" (Ex. 2.iv.11).<sup>26</sup>

#### THE IMPERFECT CADENCE

Another kind of *clausula* was the so-called imperfect: instead of proceeding to the octave or unison, these terminate on an imperfect consonance such as the third. Often the tenor ascends instead of descending, or it can even skip instead of proceeding by a semitone or a whole tone. The imperfect *clausula* was normally used as a way to avoid ending the perfect *clausula* on perfect consonances and was employed for textual expression.<sup>27</sup> Morley names this form of *clausulae* for "passing closes" or "false closes, being devised to shun a final end and go on with some other purpose..." (Ex. 2.iv.12).<sup>28</sup>

<sup>26</sup> Morley, op. cit., p. 132; Morley shows in his examples that whenever the *clausula in mi* occurs in the *cantus* it can be considered a formal close; the examples are taken from p. 132 (no. 8, *clausula in mi*) and p. 134 (no. 3, "middle close"). See also Calvisius' example (op. cit., sig. G8<sup>r</sup>; Ex. 2.iv.10). Alec R. Harman has apparently not noticed this essential detail in his edn. of Morley's treatise (London 1952, p. 240). It should be noticed that if the final chord of the *clausula in mi* includes a third, it will most often be major, that is, using the 'tierce de Picardie'.

<sup>27</sup> "Fuggir la cadenza", Zarlino, op. cit., 3.53, p. 151.

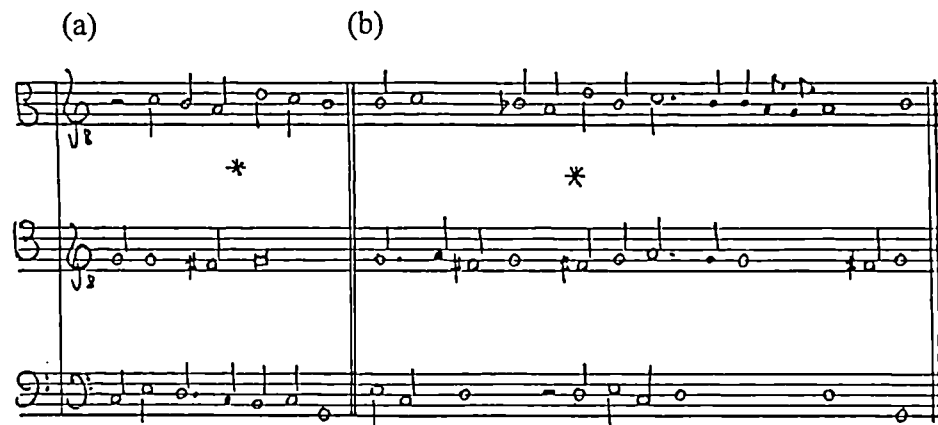
<sup>28</sup> Morley, op. cit., p. 127; examples are taken from p. 128 (nos. 5 and 6).

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EX. 2.iv.11



EX. 2.iv.12



In EX. 2.iv.12a, the imperfect cadence takes place on the fourth semibreve (\*) where the top part leaps a fourth upwards instead of proceeding a tone down as a *clausula tenorizans*; at the same time the middle part uses the *clausula cantizans*. In EX. 2.iv.12b, in the penultimate cadence of the example, it is the bass which avoids the characteristic fourth/fifth leap. Instead the bass proceeds by a tone upwards. Morley further comments that there are two kinds of imperfect cadences and uses the bass as a point of departure: either when the bass descends, ending on a sixth or, ascends,



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ending on a tenth or third.<sup>29</sup> Morley does not indicate from which other part he is considering the bass to ascend or descend. It seems most likely, however, that similar to Calvisius it is the "Cadence" or *clausula cantizans* which Morley relates to the bass. This fits Ex. 2.iv.12a-b. Even as late as 1636, Charles Butler defined the imperfect cadence in a similar manner. That is, the characteristic melodic figure of the *clausula cantizans* is interrupted by proceeding to a rest or to a note other than the one expected:<sup>30</sup>

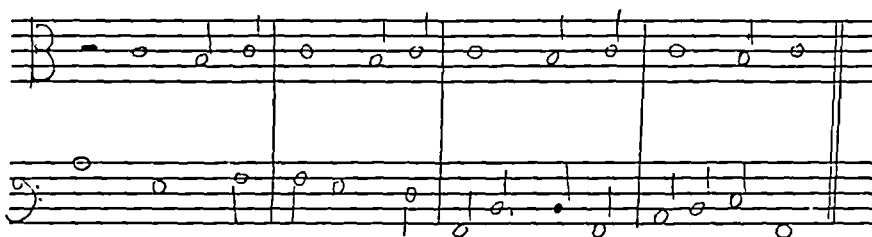
The Imperfect Cadence dooeth signifie very little rest, either of Harmoni or of Ditti: but that they ar bothe to proceede further: and if differeth from the perfect in the third or last Note: which either it silenceth,... or mooveth from the proper key of an Eight or Unison, to soom other: as

Ex. 2.iv.13



Soomtime this change is made in the Base, the Cadence remaining whole: which nevertheles is imperfect; becaus the last Note, by this means, is neither Unison nor Eight: as

EX. 2.iv.14



Using Butler's definition of the cadence as a *clausula cantizans*, the example (EX. 2.iv.13) he provides becomes clear. In the first of the six brief samples the penulti-

<sup>29</sup> Morley, *op. cit.*, p. 127.

<sup>30</sup> Butler, op. cit., p. 67; Butler obviously copied the definition from Calvisius whom he refers to several times and even names the cadence "the ornaments of ornaments"; this expression is also found in Johannes Lippius, *Synopsis musicae novae* (Strassburg 1612), tr. Benito V. Rivera, *Colorado College Music Press* (Colorado Springs 1977), vol. 8, p. 52.

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mate proceeds downwards a tone, thus arriving on the third below the final. The last sample leaps up a sixth instead of ending on the final and continues with a *clausula in mi*. Even if the *clausula cantizans* is perfect, but without the bass terminating on the octave or the unison, the cadence is still defined as imperfect according to Butler (Ex. 2.iv.14).

### THE SUPPLEMENTUM

A very important detail concerning the final cadence is that often a short *appendix* or *supplementum* can be added; thus what today would be termed as the final cadence is not necessarily so according to Renaissance theory. Seth Calvisius asserts:

Following the proper and final cadence a short appendix can sometimes be attached, but in such a manner that the voice which is on the note proper to that mode—made either in the middle or high parts [sonis]...—is left unmoved. Finally, the bassus proceeds either upwards or downwards to the octave or double octave.<sup>31</sup>

In William Byrd's "Peccantem me quotidie" from *Cantiones sacrae* (1575) (Exs. 2.iv.15-16), the final cadence takes place in the third-last bar. The *clausula cantizans* is found in the discantus, the *clausula tenorizans* appears in the tenor, proceeding a tone up rather than down, and the *clausula basizans* occurs in the bassus. The middle part (here the discantus) does indeed keep the same note throughout the *supplementum* as a kind of pedal-point ("middle or high parts... left unmoved"), and the bass ends on the double octave below the discantus. In the second example (Byrd's "Da mihi auxilium"), the *supplementum* is found already four bars before the final. Here the *cantizans* is

<sup>31</sup> Calvisius, op. cit., sigs. II<sup>r-v</sup>:

Post clausulam illam propriam & finalem interdum brevis appendix annecti solet, sed hac ratione, ut vox, quae est in clave, Modi illius propria sive fiat in medius, sive in acutis sonis... et immobilis relinquatur & Bassus tandem vel in eandem elevetur, vel per diapason, aut disdiapason deprimatur.

This is also discussed by Burmeister, *Musica poëtica* (Rostock 1606), p. 53, who names it *supplementum*.

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found in the top part, the *tenorizans* in the discantus, and *basizans* in the bassus; the final of the mode is held in the superius during the *supplementum*.

Ex. 2.iv.15

"Peccantem me quotidie"

Handwritten musical score for five voices: superius, discantus, contratenor, tenor, and bassus. The score is in G major (one sharp) and 4/4 time. The key signature is G major. The time signature is 4/4. The score is numbered 109 at the beginning. The superius part has a final note on a whole note. The discantus part has a final note on a whole note. The contratenor part has a final note on a whole note. The tenor part has a final note on a whole note. The bassus part has a final note on a whole note. The score is written on five staves.

Ex. 2.iv.16

"Da mihi auxilium"

Handwritten musical score for six voices: superius, discantus, contratenor, tenor, tenor secundus, and bassus. The score is in G major (one sharp) and 3/4 time. The key signature is G major. The time signature is 3/4. The score is numbered 113 at the beginning. The superius part has a final note on a whole note. The discantus part has a final note on a whole note. The contratenor part has a final note on a whole note. The tenor part has a final note on a whole note. The tenor secundus part has a final note on a whole note. The bassus part has a final note on a whole note. The score is written on six staves.

## The Cadential Hierarchy of Scale Degrees

### CO-FINALS

A concept special to Renaissance music theory was the many possible degrees of the scale on which cadences could occur. These vary according to the mode, reflecting the very nature of the mode, and thus cadences become essential in the classification of modes. Furthermore, the traditional 8-mode system also made use of irregular finals, known as co-finals:<sup>32</sup>

Some call Tones irregular when their melodies end on their respective confinals. There are four confinals in the series of eight Tones. A confinal in any *maneries* is the note which concludes the song on the upper note of the fifth; thus a confinal of any tone is a perfect fifth above its finals.<sup>33</sup>

It must be emphasised that Gaffurio is discussing plainchant, as there are exceptions especially with modes 4 and 8 which can end on the fourth above the final rather than on the fifth. That the Phrygian modes can use the note *a* and *A* as finals is very often mentioned in connection with the *clausula in mi* as will be shown below.<sup>34</sup> Although Glarean (1547) was very much aware of the principles of the co-finals of the 8-mode

<sup>32</sup> For a more thorough discussion on this subject in relation to plainchant and the early polyphony of the Renaissance, see Dolores Pesce, *The Affinities and Medieval Transposition* (Bloomington & Indianapolis [1987]).

<sup>33</sup> Francesco Gaffurio, *Practica musicae* (Milan 1496), tr. Clement A. Miller (s.l. 1968), *MSD* vol. 20, p. 51.

<sup>34</sup> See Pedro Cerone's table (TABLE 2.iv.1). Even today the cadential hierarchy of modes 3 and 4, in particular, have created confusion. Thus Charles Jacobs (ed.), *Antonio Valente: Intavolatura de cembalo, Naples 1576* (Oxford 1973), p. xix, concludes regarding one of the pieces:

Valente's 'Ricercar in Mode III' (No. 4) is a tonal enigma: it apparently mixes Mode III and A minor, with the latter eventually and ultimately assuming greater force; the composition cannot be said to be in Mode III transposed to A, since the pitch, B flat, appears only twice.

Had Charles Jacobs been aware of the theory of modes he would have realised that there is no enigma at all in the piece to which he refers. It is simply in mode 3, using the features characteristic of mode 3 (cadential as well as melodic) and ends on its regular co-final; it is a 'text-book' example of mode 3.

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system, it was this irregularity of the Phrygian modes that also inspired him to propose the new Aeolian modes.<sup>35</sup> These irregular endings, which are obvious when dealing with the 8-mode system (the notes A and C can never be regular endings, but must belong to one of the eight modes), kept their popularity through the entire Renaissance, and even the adherents to the 12-mode system recognised and made use of them.<sup>36</sup> It is therefore important also to be aware of the irregular endings so as not to classify compositions by solely examining the final.

#### REPERCUSSAE AND OTHER REGULAR DEGREES

In the traditional system of psalm tones, each tone had a particular reciting note (*repercussa*) and many types of endings. Often the 8-mode system with its roots based in plainchant adopted characteristic features of the psalm-tone system and thus also the *repercussae*. However, it must be emphasised that though psalm tones do have *repercussae*, the 8-mode system did not necessarily utilise them, but when the system did, the *repercussae* could be employed—not only as a melodic feature but also as important cadential degrees. Thus in the beginning of the sixteenth century the hierarchy of cadences not only included co-finals, but also the *repercussae*. Ornithoparchus (1517), when dealing with the "Repercussions of Tones", has the following set for the psalm-tone system.<sup>37</sup>

<sup>35</sup> Heinrich Glarean, *Dodecachordon* (Basel 1547), tr. Clement A. Miller (s.l. 1965), *MSD* vol. 6.1, p. 70:

...sometimes also the first two modes end on *a la mi re*, but only in songs which do not exceed the fifth, otherwise neither the first mode above nor the second mode below will have kept its fourth...

[Modes 3 and 4 have final on E:] but they may also have it on *a la mi re* if we have sung *fa* on *b fa 4 mi*; but they cannot have it on the *b* key so that the nature of the system may remain...

[Modes 7 and 8 have final on *G sol re ut*:] although they may also end on small *c*, but with *fa* on the *b* key.

<sup>36</sup> Palestrina's "Vestiva i colli" ends irregularly on A of mode 2, untransposed; Harold S. Powers, "The Modality of *Vestiva i colli*", *Studies in Renaissance and Baroque Music in Honor of Arthur Mendel*, ed. Robert L. Marshall (Kassel 1974), pp. 31-46. Aiguino tried to include co-finals in the traditional system; Peter N. Schubert, "The Fourteen-Mode System of Illuminato Aiguino", *JMT* 37 (1993), pp. 175-210.

<sup>37</sup> Dowland, op. cit., p. 12; Sebald Heyden (*De arte canendi* (Nuremberg 1540), tr. Clement A. Miller (s.l. 1972), *MSD* vol. 26, p. 114) indicates a different *repercussa* interval for mode 3: *mi-fa*, that is, a minor sixth.

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TABLE 2.iv.1

Ornithoparchus/Dowland (1609)

Mode	<i>repercussa</i>	Mode	<i>repercussa</i>
1	<i>re-la</i>	2	<i>re-fa</i>
3	<i>mi-mi</i>	4	<i>mi-la</i>
5	<i>ut-sol</i>	6	<i>fa-la</i>
7	<i>ut-sol</i>	8	<i>ut-fa</i>

Ex. 2.iv.17



Later in the sixteenth century there was a strong tendency to limit, modify and systematise the order and hierarchies of cadences. Glarean, promoting the 12-mode system, does not give the *repercussae* any great importance, but in his description of the traditional system the author does show the *repercussa* for each of the eight psalm tones, referring to Gaffurio (1496).<sup>38</sup> Because Glarean puts most weight on the species of octave and the harmonic/arithmetic division of the octave in his analyses, he does not specifically deal with the cadences. Zarlino (1558) insists that the regular cadences in all modes occur on *finalis*, the fifth above, and the third above.<sup>39</sup> Most other theorists disagree with Zarlino on this point, taking exception to modes 3, 4, 7, and 8, and include the *repercussa* note. Zarlino rigorously adheres to the principle of employing B♭ as a common cadence degree in spite of the harsh harmony that this note will create because B♭ does

What is a song of the Third Tone?

It is a song which ends on *mi* and which chooses a greater part of its melody from the minor sixth *mi* to *fa*...

Johannes Cochlaeus also gives the *repercussa* of mode 3 as *e-c*" in the cantus (*Tetrachordum musices* (Nuremberg 1511), tr. Clement A. Miller (s.l. 1970), *MSD* vol. 23, p. 50). This interval becomes the common *repercussa* for mode 3, presumably because of the difficulty of using the B♭ in polyphonic music as a cadence point, caused by the diminished fifth above this note.

<sup>38</sup> Glarean, op. cit., p. 71. Glarean argues that mode 1 often leaps from *re* to *la*; mode 2: *re-fa*; mode 3: *mi-fa*; mode 4: *mi-la*; mode 5: *ut-sol*; mode 6: *fa-la*; mode 7: *ut-sol*; mode 8: *ut-fa*.

<sup>39</sup> Gioseffo Zarlino, *Le istitutioni harmoniche* (Venice 1558), 4.18-29, tr. Vered Cohen (New Haven 1983), pp. 54-87: 1: D,F,a,d; 2: a,F,D,A; 3: E,G,♯; 4: ♯,E,G,♯; 5: F,a,c,f; 6: c,a,F,C; 7: G,♯,d,g; 8: d,♯,G,D; 9: A,C,E,a; 10: e,c,a,E; 11: C,E,G,c; 12: ♯,C,E,G.

#### *Section iv: Cadences and the Cadential Hierarchy of Scale Degrees*

not have a perfect fifth above and a perfect fourth below in the diatonic scale.<sup>40</sup>

As mentioned in PT. 1.iii, the Gamut was recognised as a ladder where the notes an octave apart were not necessarily seen as being of the same nature; hence, the inversive relationship between fourth and fifth was not employed in its present-day meaning.<sup>41</sup> A cadence a fifth above the *finalis* must, therefore, be considered different from a cadence a fourth below the *finalis*, thereby indicating the distinction between plagal and authentic modes: there is a great distinction between cadences occurring on the upper limits of the authentic *ambitus* and those to be found in the middle range of a plagal mode—that is, whether, for example, they occur on *D*, *d*, *d'*, or *d''*. Gallus Dressler (1563), who holds a common view regarding modal theory, implies briefly in his discussion of transposed mode 2 that this mode uses the fourth below the *finalis* ("the lower *D* (-*re*)") rather than the fifth above:

Therefore, when transposed, this mode has principal cadences on *G* (-*re*), *B* *b* (-*fa*), and on the lower *D* (-*re*)... It has a minor principal cadence on *mi* [i.e. *clausula in mi*] on the note *A*.<sup>42</sup>

Another theorist, Eucharius Hoffmann (1582), is much more explicit and observes that a cadence on the fifth above *finalis* is not permitted in the plagal modes, except mode 4.<sup>43</sup>

<sup>40</sup> Ibid., p. 61; Zarlino's rather awkward argument suggests a keen determination to over-systematise the complex cadence degrees stemming from his (and Glarean's) inclination to divide the octave according to harmonic and arithmetic means. His rules for cadence degrees are, therefore, perhaps a bit too vigorous and rather reflect his theory than normal practice of the time; cf. Zarlino, *On the Modes* (New Haven 1983), introd. Claude V. Palisca, pp. xiii-xiv.

<sup>41</sup> See also PT. 3.i.

<sup>42</sup> Dressler, op. cit., p. 239:

Ideo hic tonus principales habet clausulas, Quando transponitur, Re in clave G, Fa in Clave B, re in Clave D inferiori... Minus principalem clausulam habet in mi in clave A.

<sup>43</sup> Eucharius Hoffmann, *Doctrina de tonis seu modis musicis* (Greifswald 1582) cap. 6, sigs. C8<sup>r</sup>-E8<sup>v</sup>; Bernhard Meier, op. cit., p. 114. This is also implied by Zarlino, see list of cadence degrees in note<sup>38</sup>. Even as late as 1646, Ravn, presumably inspired by Hoffmann, mentions that cadences occur on the fifth above the final in authentic modes and on the fourth below the final in plagal modes (*Heptachordum danicum seu nova solisatio* (Copenhagen 1646), p. 77: "...in Authentis in Quinta supra infimum, In Plagalibus vero in quarta infra sedem finalem").

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However, Hoffmann also explains that using *b ♯* in mode 3 and 4 will sound unpleasant and therefore the notes *a*, *c*, and *c'* are employed instead. Seth Calvisius (1592) observes that regular cadences occur on the final, the third above, and the fifth above without mentioning any exceptions besides the Phrygian and Mixolydian modes for the same reasons as Hoffmann. Hence Calvisius, who otherwise closely follows Zarlino and the 12-mode system, also has a more practical approach to the rules of cadence degrees than Zarlino, and he is fully aware of the important function of the *repercussa*. Calvisius argues that, though modes 3 and 4 have regular cadences on E, G, and B ♯, they will frequently employ the cadence on A (*clausula Aeolij*), for the fourth E-A is common to both modes (i.e. Phrygian and Aeolian). In addition, also the *clausula* on C (*jonica clausula*) is used in the Phrygian modes. In mode 8, the cadence on C is also very often added.<sup>44</sup>

### THE IRREGULAR DEGREES

Besides the use of the co-final, *repercussa*, and the third degree above the final (except modes 7 and 8), each mode had also a set of irregular cadences (*clausulae peregrinae*). Thus all the degrees of the modal scale were arranged in a hierarchy consisting of three categories: *principales*, *minus principales*, and *peregrinae*.<sup>45</sup> Employing the irregular

<sup>44</sup> Calvisius, *Melopoia*... (Erfurt 1592), sig. H4<sup>r</sup>:

Phrygius in E. G. & ♯ suas clausulas format, durus est, & austerus, nisi frequenter Clausulam Aeolij, cum quo diatessaron commune habet, & jonici etiam adsciscat.  
[Mode 8:] Cognoscitur Clausulis in G. ♯ & d. addita frequentior jonica clausula.  
[Phrygius forms its cadences on E, G, and ♯; it is hard and austere, unless the Aeolian cadence (with which it has a common fourth) and the Ionian are accepted.  
[mode 8:] is recognised by the cadences on G, ♯, and d, frequently adding the Ionian cadence.]

*Phrygius* refers, of course, to both plagal and authentic modes (*remissus* and *contentus*).

<sup>45</sup> Dressler, *Praecepta musicae poeticae*, Magdeburg 1563 (MS), ed. Bernhard Engelke, *Geschichts-Blätter für Stadt und Land Magdeburg*, 49-50 (1914-15), p. 239:

Principales appellamus in quibus praecipuum fundamentum toni consistit ut sunt clausulae quae ex speciebus diatessaron et diapente vel ex repercussionibus extruuntur. Minus principales vocamus quae etiamsi ex praecipuis fontibus non effluunt, tamen mediae parti cantionis sine offensione inseruntur. (His utuntur musici cum iudicio.) ...Peregrinas dicimus quae proprium locum non habent sed ex alio tono tamquam ex peregrino advehuntur...



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cadential degrees does not necessarily imply a modulation from one mode to another; it is merely a characteristic of the mode and was used for expressive purposes.<sup>46</sup>

#### THE HIERARCHY

Pedro Cerone (1613), in his lengthy treatise extending to more than 1,000 pages, deals with both the traditional 8-mode system and the 12-mode system.<sup>47</sup> From Cerone's comprehensive discussion, it is possible to assemble TABLE 2.iv.2.

Morley, who read both Zarlino's large work and also Calvisius' shorter treatise, must have known about the two distinct approaches to the cadence degrees found in those tracts. Still, Morley does not discuss the hierarchy or even the degrees of cadences. From the examples on the use of cadences which Morley has copied from Tigrini (1588), it is possible to detect a hierarchical system. In the examples of "formall closes for foure... partes", he does seem to illustrate the cadences for modes 1 and 2 in both *cantus durus* and in *cantus mollis*. All cadences not belonging to modes 1 and 2 are marked with an asterisk indicating that these must only be used as "middle closes, such as are commonlie taken at the ende of the first part of a song". These closes include cadences on *e*, *c*, and a plagal ending (bass: *d* descending to *A*).<sup>48</sup> This corresponds to a statement made by Tigrini in which he explains that the less principal *clausulae* must

[We name [those] *principales* in which the principle fundament of the mode consists, such as cadences which are built from the species of the fourth and fifth, or from the *repercussae*.

We call [those] *minus principales* which—even if they do not come from the principal sources—are, however, inserted in the middle part of a song without offence (musicians use these with judgement).

We name those *peregrina* which have no proper place but are brought from another mode as if foreign.]

<sup>46</sup> Bernhard Meier, *The Modes of Classical Vocal Polyphony*, tr. Ellen Beebe (New York 1988), pp. 248-354, has dealt extensively with the expression of cadences and with the *clausulae peregrinae* in particular.

<sup>47</sup> Pedro Cerone, *El melopeo y maestro. Tractado de musica theórica y práctica* (Naples 1613), pp. 883-907. Cerone has literally copied the main essence of Pietro Pontio's treatise, *Ragionamento di musica* (Parma 1588), pp. 99-121. Pontio and Illuminato Aiguino, *Il tesoro illuminato di tutti i tuoni di canto figurato* (Venice 1581), seem to be the only Italian theorists arguing in favour of the 8-mode system.

<sup>48</sup> Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), pp. 132-4; the only example which does not fit is *clausula in mi* (fourth ex. p. 132, eleventh ex. p. 133, and sixth ex. p. 134).

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be placed discretely and in a beautiful manner in the middle of a composition.<sup>49</sup>

TABLE 2.iv.2

Pedro Cerone (1613), Hierarchy of Cadence Degrees

Mode	<i>clausulas principales</i>	<i>clausulas de passo</i>
1	<i>d', a</i> <sup>1</sup>	<i>f, g, c'</i>
2	<i>a, d</i>	<i>f, c, g</i>
3	<i>e', a</i>	<i>g, b ♯, c</i> <sup>2</sup>
4	<i>a, e</i>	<i>a, c</i> <sup>3</sup>
5	<i>f', c', a</i>	<i>g, d</i> <sup>4</sup>
6	<i>f, c'</i>	<i>a, g, d</i> <sup>5</sup>
7	<i>g', d'</i>	<i>e', f, a, c</i> <sup>6</sup>
8	<i>g, d', c</i> <sup>7</sup>	<i>f, a, b ♯</i> <sup>8</sup>
9	<i>a, e', c'</i>	<i>d', f', g'</i>
10	<i>a, e'</i>	<i>c', d', g</i> <sup>9</sup>
11	<i>c', g</i>	<i>e, f, a</i>
12	<i>g', c</i> <sup>10</sup>	<i>e', f', d'</i>

<sup>1</sup> Cerone remarks that *Dsolre* and the fifth above (*alamire*) and their octaves are the two principal cadences of mode 1, but he shows them as *d'* and the fourth below, *a* (p. 883).

<sup>2</sup> The cadence on *b ♯* is used very seldom and only as a transitional cadence (p.887); *c* is more used because it is the *repercussa* ("la mediacion de su Salmodia"); cadences on *d*—and especially the one on *f*—are rarely employed (compare with Pontio, *Ragionamento di musica* (Parma 1588), p. 106).

<sup>3</sup> Mode 4 can also terminate on *a* (p. 889).

<sup>4</sup> The first part of a composition can also cadence on *c*, and *a* can also be used as a

<sup>49</sup> Tigrini, *Il compendio della musica* (Venice 1588), p. 38:

Nè sarà inconveniente il fare alle volte nel mezo della Compositione qualche Cadenza, che sia fuori di tuono, ma discretamente però, & con bello modo...

[Neither will it sometimes be inconvenient to make a cadence which will be outside the mode in the middle of a composition—but discretely, however, and in a beautiful manner...]

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principal cadence; however, only in the middle of a composition (p. 891).

<sup>5</sup> Cerone remarks that cadences on *e* and *b ♯* are not normal (p. 893). Pontio mentions that *b ♯* can be employed in mode 6 as one of the *cadenze principali*;<sup>50</sup> this is not mentioned by Cerone presumably because he adheres to the 12-mode system where *b ♯* in theory is completely irregular to mode 6 and implies a transposition of mode 11.

<sup>6</sup> Cadences on *e'* and *a* can be used to end a section (p. 896).

<sup>7</sup> For cadences on *c* in modes 7 and 8, see Harold S. Powers, "Tonal Types and Modal Categories in Renaissance Polyphony", *JAMS* 34 (1981): 456.

<sup>8</sup> "verdad es que el diligente Compositor assimesmo tomarà por Clausula principal à la de C solfaut; y servirse ha della, mas que de la otra de D lasolre; y esto afin sea mas facil de conocer, y mas distinto del Septimo:..." (p. 897) [The diligent composer will make more use of the cadence on *Csolfaut* than on *Dlasolre* and therefore it will be more easy to know and [mode 8 will be] more distinct from mode 7...]; *b ♯* is only used as a transitory cadential degree.

<sup>9</sup> The *c* is more used in this mode than mode 9 (p. 902).

<sup>10</sup> The *g* is only used as an intermediate cadence degree (p. 906).

Morley's only explanation of the different cadence degrees is given very briefly when he mentions that each mode has a particular 'air'.<sup>51</sup> If a piece begins in G then it is possible to proceed to either C or D before returning to G; there are no particular rules except the judgement of the composer. Morley seems to differentiate between secular and sacred music, for he mentions that there are specific rules for cadence points within the 8-mode system:

MA. ...if you begin your song in *Gam ut*, you may conclude it either in *C fa ut* or *D sol re*, and from thence come againe to *Gam ut*: likewise if you begin your song in *D sol re*, you may end in are [i.e. *A re*] and come againe to *D sol re*, etc.

PHI. Have you no generall rule to be given for an instruction for keeping of the key?

<sup>50</sup> Pontio, op. cit., p. 113:

Dirò hora delle sue cadenze principali, quali saranno tre, una nella corda di F fa ut, la seconda nella corda di C sol fa ut, la terza in A la mire, & ancora in B fa b mi si potrà fare cadenza, se la cantilena sarà per b mole;

[Now I will tell [you] about its [mode 6] principal cadences of which there are three: one on *Ffaut*, the second on *Csolfaut*, the third on *Alamire*; and it can also make cadence on *Bfabmi* if the *cantilena* is in *b mole* [i.e. *cantus mollis*].]

<sup>51</sup> Cf. Pt. 2.v.

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ILL. 2.iv.2

The third part. 133

134 The third part.

The image displays two pages of a musical manuscript, numbered 133 and 134. Each page contains four systems of music, with each system consisting of four staves. The notation is in a historical style, likely from the 16th century, featuring various note values, rests, and clefs. The title 'The third part.' is written above the first system on each page. The manuscript is part of a collection titled 'Part 2: Methods for the Classification of Modes'.

Morley, *A Plaine and Easie Introduction* (London 1597), pp. 132-4

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MA. No, for it must proceede only of the iudgement of the composer, yet the church men for keeping their keyes have devised certaine notes commonlie called the eight tunes, so that according to the tune which is to be observed, at that time if it beginne in such a key, it may end in such and such others...<sup>52</sup>

Again, it seems that Morley follows Glarean who does not specifically mention cadential degrees when discussing the 12-mode system.

In spite of the declining interest in modes, many English theorists still adhered to the principles of the hierarchy of cadential degrees. Thomas Campion (c.1613) and Charles Butler (1636), for example, use the same hierarchical order as Calvisius and Hoffmann, that is, *finalis*, fifth above, third above, and sometimes fourth or sixth above, depending on whether the harmony based on the third above *finalis* will contain a diminished fifth or augmented fourth. But they do not discuss the concept of *repercussa*; rather, this is referred to as the cadence on the third or fourth degree above the key of a composition.<sup>53</sup>

The cadences and their various degrees—perfect, principal, less principal, foreign, and imperfect—are very significant in distinguishing between modes. Calvisius argues that, when you wish to form cadences, they must follow the mode and must be derived from the *finalis* of the mode; other notions of the mode are the *repercussa* (*regulari inflexione modulationis*) and the *ambitus*. However, the mode should not be judged by the *clausulae peregrinae* for they indicate a move beyond outside the permitted limits of the mode:

Though the cadences greatly embellish the harmony, as we have said, and they are frequently used, they must, however, neither always be continued nor placed where you wish... for it is necessary to establish the harmony following any one of the twelve modes. But as each mode—with a particular *ambitus* and a regular inflection of the melody [i.e. *repercussa*—has its proper cadence originating from the *finalis*, [and] likewise other related [cadences], it also follows that [the composi-

<sup>52</sup> Morley, op. cit., p. 147.

<sup>53</sup> On Campion's approach, see PT. 3.v.

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tion] should be limited by certain cadences and proper *ambitus*; and not to allow an arbitrary melody of each one outside the permitted limits, [i.e.] to create a wandering [of the mode]. Certainly each mode has proper or accidental cadences, and is enclosed within the *ambitus*, as we will indicate shortly...<sup>54</sup>

Calvisius' "accidental cadences" must be the same as his *clausulae impropriae*, that is improper cadences.

Hence, when trying to determine the mode of a composition, various criteria regarding cadences were used:

1. The arrangement of *clausulae tenorizans*, *clausulae cantizans*, and *clausulae basizans* in a polyphonic piece must be determined in order to discern the significance of each cadential structure.
2. The exact pitch of the cadence in relation to the final of the mode must also be determined.
3. Furthermore, one should also distinguish between simple and formal cadential patterns.
4. The hierarchy of cadence degrees must be considered and is one of the most important tools when discerning the mode of a composition.<sup>55</sup>

<sup>54</sup> Calvisius, op. cit., sig. H1<sup>v</sup>:

Etsi Clausulae Harmoniam magnopere exornant, ut diximus, & frequenter usurpantur: tamen nec continuandae sunt semper, nec ubivis collocandae, ...Nam cum Harmoniam secundum aliquem ex duodecim modis institui necesse sit. Modus autem omnis suam propriam Clausulam ex clave finali oriundam, item alias cognatas, cum certo ambitu atq. regulari inflexione modulationis habeat, sequitur Harmoniam etiam certis Clausulis & justo ambitu concludi debere: nec licere ad cuiusq. arbitrium modulationem extra concessos limites, vagabundam instituere, Quas vero quisq. Modus proprias aut accidentales Clausulas habeat, & quo ambitu includatur, paucis indicabimus...

<sup>55</sup> Girolamo Diruta, *Seconda parte del Transilvano Dialogo* (Venice 1609/1622), lib. 3 p. 3, tr. Murray C. Bradshaw and Edward J. Soehnlen (Henryville 1984), vol. 2, p. 100. Diruta sums up the whole discussion regarding the method of discerning the mode of a composition:

*Transylvanian.* When there is some piece that moves through species other than its own, as if the final note is the first tone but the composition is made up of other species, must I decide the tone from the final note, or by the species which determine the melodic movement of the piece?

*Diruta.* The question you ask me is very important seeing that there are some compositions by a few composers without any foundation in the species of the tones... When you have to make a decision on any composition whatever, you must carefully exa-

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Thus Renaissance theorists (and also composers) had a wide variety of cadences which could be arranged into refined hierarchies of importance. The Renaissance cadence should therefore not just be interpreted as a simple dominant-tonic relationship, but as a repose which could be expressed with great subtlety on various levels.<sup>56</sup>

mine it from beginning to end. To see under what species it happened to be composed, if under the first or second or some other tone, you must look at the regular cadences which shed great light on such matters. Then decide in which tone it is composed. Also, consider that the piece might not end on its own proper final step but on intermediate steps or on some others which might be more convenient and more suited to the design. From experience, one can see that the first tone ends at times on an intermediate note, namely on A la mi re, as do all the other tones as well.

<sup>56</sup> For a different view, see Malcolm Boyd, "Structural Cadences in the Sixteenth-Century Mass", *MR* 33 (1972), pp. 1-13.

## Melodic Patterns

Since modal theory is essentially a linear, melodic theory where the harmonic aspects seem to be of secondary importance, the melodic patterns, depending on the fourth, fifth, and octave species, become significant and distinct for each mode. In plainchant, which is monodic, the melodic features are prominent and, because the 8-mode system of the Renaissance stems from the traditional practice of plainchant, the melodic patterns particular to each mode can thus also be found in polyphonic music of the Renaissance.<sup>1</sup> In England the medieval tracts dealing with plainchant practice were known and even copied by many late Renaissance theorists as observed in PT. 1.ii. The present section will seek to review the melodic patterns as found in treatises dealing with plainchant and relate them to the Renaissance theorists. As mentioned in PT. 1.iii, the species of octaves, fourths, and fifths are the essential cornerstones, but also the *repercussa* interval was very often employed in the melodic framework to delineate a characteristic feature of the mode. This is probably more true of the traditional 8-mode system with its roots in plainchant than of the 12-mode system which hardly even recognised the concept of *repercussa*.<sup>2</sup>

In tonaries, dating back to the late eighth century, each chant was categorised according to its mode.<sup>3</sup> These collections confirm that each mode of the traditional

<sup>1</sup> This area is often dealt with in treatises dealing with Palestrina counterpoint, see Knud Jeppesen, *Counterpoint*, tr. Glen Haydon (New York 1939/1992). The subject is also mentioned by Siegfried Hermelink in connection with Palestrina's works (*Dispositiones modorum* (Habilitationsschrift, Tutzing 1960), pp. 100-43); unfortunately, Hermelink does not relate the melodic material particular to each mode with earlier sources; H. K. Andrews, *The Technique of Byrd's Vocal Polyphony* (London 1966), pp. 10-2, briefly mentions melodic patterns; Murray C. Bradshaw, *The Origin of the Toccata* (s.l. 1972), *MSD* vol. 28, relates the melodic framework rigorously to the psalmtone, intonation, mediation, and ending. His arguments are, unfortunately, not convincing as he applies the patterns too strictly; cf. Bernhard Meier, "Die Modi der Toccaten Claudio Merulos", *AfMw* 34 (1977), pp. 180-98; cf. Harold S. Powers, "Mode", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 12, pp. 393-4; cf. Bernhard Meier, *The Modes of Classical Vocal Polyphony*, tr. Ellen Beebe (New York 1988), pp. 171-234 (especially pp. 207-26); Bernhard Meier, *Alte Tonarten. Dargestellt an der Instrumentalmusik des 16. und 17. Jahrhunderts* (Kassel 1992).

<sup>2</sup> Cf. PT. 2.iv.

<sup>3</sup> Tonaries were of practical significance for the singers as they could help in the learning of mode,



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system had particular melodic features. A short mnemonic formula showing these features was usually placed at the beginning of each group of chants of each mode. One particular late medieval manuscript, which contains a tonary inspired by the Sarum, is the *Quatuor principalia musicae*.<sup>4</sup> The MS is of special interest as it is alluded to in several English treatises from the late Renaissance. Thus Morley (1597) mentions the treatise in his list of works consulted; Ravenscroft (1614) seems to have had access to a copy of this particular MS; and Robert Fludd (1617-18) literally copied large sections of *Quatuor principalia musicae* in his "De templo musicae".<sup>5</sup> The composer Thomas Tallis seems to have been in possession of a late medieval collection of manuscript tracts known as the "Waltham Holy Cross", compiled by the precentor of the abbey, John Wylde, around 1460.<sup>6</sup> According to Sir John Hawkins (1776) and the catalogue of British Library, the collection of manuscripts passed into the hands of Thomas Morley from his teacher William Byrd who was a pupil of Tallis.<sup>7</sup>

*differentiae*, and endings (*co-finalis*) belonging to a psalm and antiphon. According to David Hiley, *Western Plainchant: A Handbook* (Oxford 1993), pp. 325 ff., there were more than 3,000 different antiphons used in the liturgical year. For a thorough discussion of tonaries, see Michel Huglo, "Les tonaires: inventaires, analyse, comparaison", *Société française de musicologie* (Paris 1971), ser. 3. tom. 2, on English tonaries, see especially pp. 339-48.

<sup>4</sup> See e.g. *Various Treatises Relating to Music*, collected by John Wylde, Waltham Holy Cross c.1460, GB-Lbl MS Lansdowne 763, fols. 71<sup>v</sup>-84<sup>v</sup>, ending off with "Sequitur recapilatio intonacionum octo tonorum cum differentiis et neumatibus eorum" fols. 85<sup>r</sup>-87<sup>r</sup> (Ex. 2.v.1). A transcription is found in *Hawkins Collection*, vol. 4, GB-Lbl MS Add. 4912; Robert de Brunham, [*Collection of Treatises on Music*], fifteenth century, GB-Ctc Western MS 1441 (O.9.29); *Bury St. Edmunds*, GB-Lbl MS Cotton Tib. ix.3. A transcription of this MS is found in *Hawkins Collection*, vol. 1, GB-Lbl MS Add. 4909. *Quatuor principalia musicae* has been edited by Charles Edmond Henri de Coussemaker, *Scriptorum de musica medii aevi* (Paris 1864-76), vol. 4, pp. 200-98.

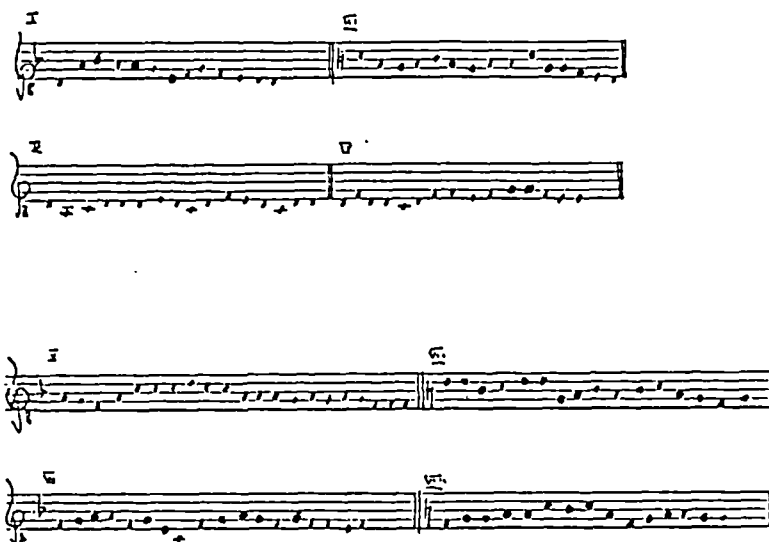
<sup>5</sup> Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), "Authors whose authorities be either cited or used in this booke" (last folio); compare Morley's rules on mutation, op. cit., "The Annotations" sig. ƒ3<sup>v</sup>, with *Quatuor principalia musicae* (Coussemaker, op. cit.), pp. 223-5. Thomas Ravenscroft, *A Briefe Discourse* (London 1614), p. 3; Robert Fludd, *Utriusque cosmi... historia* (Oppenheim 1617-18), vol. 1 "De templo musicae", pp. 159-259; cf. my forthcoming article on Fludd.

<sup>6</sup> GB-Lbl MS Lansdowne 763; Thomas Tallis has written his signature on the last folio. Presumably Tallis acquired the MS when he was at Waltham Abbey.

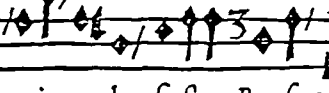
<sup>7</sup> Sir John Hawkins, *A General History of the Science and Practice of Music* (London 1776/New York 1963), vol. 1 p. 132.


## Part 2: Methods for the Classification of Modes

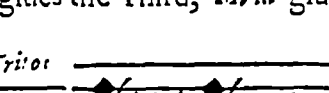
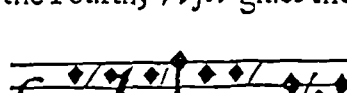
Ex. 2.v.1



ILL. 2.v.1


 Protos — C  
 Re la giues the first, Re fa giues the second,


 Deuterios —  
 Mi mi giues the Third, Mi la giues the Fourth, Vt sol giues the Fift,


 Tritos —  

 Tetartos —  
 The Sixt giues Fa la, Vt sol vneuen Tetartos, vt fa doth giue the last.

Rules

### Section v: Melodic Patterns

English composers made use of the Sarum rite when composing liturgical music and, though the rite was officially abolished in 1559, it was still referred to as is evident from Morley's examples of the 'old modes' which are taken from the Sarum.<sup>8</sup> Andreas Ornithoparchus (1517/1609) provides similar formula, when dealing with the *repercussa*. Beneath the melodic example of each mode, Ornithoparchus gives the solmisation of the *repercussa* (ILL. 2.v.1).<sup>9</sup> On the following page, Ornithoparchus continues his discussion and explains how to recognise the mode of a piece. The introductions of compositions in authentic modes tend to ascend to the fifth above *finalis* rather quickly (often leaping to the fifth), whereas in plagal modes they tend to descend:

...Every Song in the beginning, rising straight beyond the finall Note to a Fift, is *Authenticall*: but that which fals straight way to a Third, or a Fourth, under the finall Key, is *Plagall*.<sup>10</sup>

This observation is mentioned by the majority of theorists dealing with the traditional 8-mode system as well as by theorists addressing Glarean's 12 modes, or even Banchieri, who proposes a 'new' 8-mode system.<sup>11</sup> Thomas Morley, too, echoes the

<sup>8</sup> Thomas Morley, op. cit., pp. 147-8; on Morley's use of the Sarum in his examples, see mdrn. edn. by Alec R. Harman (London 1952), p. 250. Thomas Tallis and William Byrd have made use of the Sarum Rite as *cantus firmi* in their *Cantiones sacrae* (1575). See Byrd's "Libera me Domine de morte aeterna" and "Peccantem me quotidie", *Cantiones sacrae* (London 1575), mdrn. edn. Craig Monson, *The Byrd Edition* (London 1977), vol. 1, nos. 17 and 3; cf. Joseph Kerman, *The Masses and Motets of William Byrd* (Berkeley & Los Angeles 1981), p. 31. However, the Roman Rite begins to take over and Byrd sets music to texts from the Roman Rite after c.1590; Kerman, op. cit., p. 53.

<sup>9</sup> John Dowland, *Andreas Ornithoparcus his Micrologus, or Introduction* (London 1609), p. 12. The formulas are found in numerous short treatises: Balthasar Prasberg, *Clarissima planae atque choralis musicae interpretatio* (Basel 1507), sigs. C1<sup>v</sup>-C3<sup>v</sup>; J. Cochlaeus, *Tetrachordum musices* (Nuremberg 1511), tr. Clement A. Miller (s.l. 1970), *MSD* vol. 23, p. 50, 52 (copied from Nicolaus Wollick, *Opus aureum musicae* (Cologne 1501)); Udalricus Burchardi, *Hortulus musices* (Leipzig 1514), sigs. C1<sup>v</sup>-C3<sup>v</sup>; Nicolaus Roggius, *Musicae practicae* (Nuremberg 1566), sig. D4<sup>r</sup> (similar to Cochlaeus); Seth Calvisius, *Exercitationes musicae duae* (Leipzig 1600), p. 36; Gerolamo Cantone, *Armonia gregoriana* (Turin 1678), pp. 18-9; D. Marzio Erculeo, *Il canto ecclesiastico* (Milan 1686).

<sup>10</sup> Dowland, op. cit., p. 13.

<sup>11</sup> Bartolomeo Ramos de Pareja, *De musica tractatus* (Bologna 1482), lib. 1 tract. 3 cap. 2, tr. Clement A. Miller (Neuhausen-Stuttgart 1993), *MSD* vol. 44; Johannes Cochleus, op. cit., cap. 2; Giovanni Maria Lanfranco, *Scintille di musica* (Brescia 1533), p. 105; Pietro Aaron, *Lucidario in musica* (Venice 1545), lib. 1 cap. 15; Pietro Pontio, *Ragionamento di musica* (Parma 1588), lib. 3, p. 95; Heinrich Glarean, *Dodecachordon* (Basel 1547), tr. Clement A. Miller (s.l. 1965), *MSD* vol. 6.1, p. 68 (discussing the traditional 8-mode system); Gioseffo Zarlino, *Le istituzioni harmoniche* (Venice 1558), 4.15, tr. Vered

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guidelines regarding the ascent and descent of plagal and authentic modes:

To the *autentas* they give more liberty of ascending then to the *Plagale*, which have more liberty of descending then they, according to this verse, *Vult descendere par, sed scandere vult modus impar* [the even-numbered [mode] tends to descend, but the odd-numbered mode tends to ascend].<sup>12</sup>

Once again, Morley seems to distance himself from this by alluding to "they" who must be the "ancients", a manner he uses when discussing the 8-mode system which he does not seem to revere much.

When dealing with ways of how to distinguish one mode from another, Morley goes into more detail and describes the overall melodic framework of a composition. Similar to Ornithoparchus and others, Morley refers to the beginning of a composition and briefly explains the traditional notion that authentic modes tend to ascend to the fifth above final while the plagal modes tend to descend below the final or, as Morley indicates, "if it rise not unto the fifth it is plagall":

Now for the discerning of these tunes one from another, they make three waies, the beginning, middle, and ende: and for the beginning say they, every song which about the beginning riseth a fift above the finall key, is of an authentically tune: if it rise not unto the fifth it is a plagall. And for the middle, every song (say they) which in the middle hath an eight above the final keye, is of an authentically tune: if not it is a plagal. And as for the ende, they give this rule, that every song (which is not transposed) ending in *G sol re ut*, with the sharpe in *b fa b mi*, is of the seventh or eighth tune in *f fa ut* of the fifth or sixth tune, in *elami* of the thirde or fourth tune, in *dsolre* is of the firste or second tune.<sup>13</sup>

It is evident that Morley refers to the traditional system, since he only mentions the

Cohen (New Haven 1983), p. 49; Orazio Tigrini, *Il compendio della musica* (Venice 1588), p. 57; Adriano Banchieri, *Cartella musicale nel canto figurato, fermo, et contrapunto* (Venice 1614), pp. 111-36; see PT. 3.vii.

<sup>12</sup> Thomas Morley, op. cit., "The Annotations. Upon the third part", sig. \*\*\*v (read 'then' as than).

<sup>13</sup> Ibid.

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eight modes. Once again, Morley distances himself from the explanation by referring to the "ancients" and using "they". At first sight, it seems that Morley does not specifically refer to any clear melodic formulas. But it is in quite a different context that he explains that each mode indeed has a melodic pattern particular to that mode only. He observes, when correcting the student's exercise, that the student has gone out of the key:

PHI. What fault is in that?

MA. A great fault, for every key hath a peculiar ayre proper unto it self, so that if you goe into another then that wherein you begun, you change the aire of the song, which is as much as to wrest a thing out of his nature, making an asse leape upon his maister and the Spaniell beare the load. The perfect knowledge of these aires (which the antiquity termed *Modi*) was in such estimation amongst the learned, as therein they placed the perfection of musicke...<sup>14</sup>

When Morley in this case is using the term 'key', he is referring to the final, and the 'air' alludes to the mode.<sup>15</sup> Thus he seems to acknowledge the use of melodic patterns and modes, even correcting the student for not keeping the proper "ayre" in the exercise. Unfortunately, Morley does not provide more specific clues to what the melodic patterns of the modes are; he only follows up the discussion in connection with cadences and refers to the "Eight Tunes" formulated by "the churchmen" which he then provides.<sup>16</sup>

Later Johannes Lippius (1612) strongly emphasised that the modes are distinguished by the triad built on the final. The theorist then adds that

<sup>14</sup> Ibid., p. 147. Later on, in the same paragraph Morley again indicates that "the air of every key [is] different one from the other..."

<sup>15</sup> On the various interpretations of 'aria' and 'air', see Claude V. Palisca, *Studies in the History of Italian Music and Music Theory* (Oxford 1994), pp. 346-63; Palisca, *Humanism in Italian Renaissance Musical Thought* (New Haven & London 1985), pp. 376-8; Tim Carter, "An Air New and Grateful to the Ear: The Concept of *Aria* in Late Renaissance and Early Baroque Italy", *Music Analysis* 12 (1993), pp. 127-45.

<sup>16</sup> Morley, op. cit., p. 147. Even as late as 1664, Birchensha mentions that "according to this Diversity of Tones [i.e. modes], there are also divers melodies..." (*Templum Musicum: Or the Musical Synopsis of... Alstedius* (London 1664), p. 76).

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each simple mode provides a harmonic piece with special ornaments proper to its own harmonic triad, namely, its own primary, secondary, and tertiary fugues and cadences.

...Each mode follows the effect and affect of its triad, intervals, tones, and semitones...<sup>17</sup>

Thomas Campion (c.1613) mentions that "to make the key knowne is most necessary in the beginning of a song, and it is best exprest by the often using of his proper fift, and fourth, and thirds, rising or falling".<sup>18</sup> Charles Butler (1636) mentions that fugues (i.e. melodic patterns) "as Cadences, shoold keepe within the Air of the song; beginning and ending in one of the Fowr Air-notes". By 'Air-notes' Butler means the final, a fifth, a fourth, and a third above the final.<sup>19</sup>

Though melodic patterns also seem to have been a way of determining the mode of a composition, the subject is not discussed nearly as thoroughly as other methods. It is obvious that this method is somewhat subjective and that composers—as creative artists—could choose to follow the traditional melodic patterns or simply avoid them.

<sup>17</sup> Johannes Lippius, *Synopsis musicae novae* (Strassburg 1612), tr. Benito V. Rivera, *Colorado College Music Press* (Colorado Springs 1977), vol. 8, p. 56. The term 'fugue' implies a theme rather than the modern conception of the fugue as an art of imitation; cf. Zarlino, op. cit., 3.51, tr. Guy A. Marco (New Haven 1968), p. 126.

<sup>18</sup> Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. D6<sup>v</sup>.

<sup>19</sup> Charles Butler, *The Principles of Musick, in Singing and Setting* (London 1636), p. 72. These degrees also correspond to the cadence-degrees; see also PT. 2.iv, PT. 3.v.

## Summary

From the discussions on the various subjects in the present part, it becomes apparent that there are many ways in which one can determine the mode of a composition, depending on whether the 8-mode system, stemming from the traditional plainchant, or the 12-mode system, which attempts to distance itself from the ecclesiastical roots, has been used. The distinction between the two systems of modes is important to make as there are subtle differences between them, including the use of final and co-final, *repercussa*, hierarchy of cadence degrees, and melodic patterns.

It is clear that if one wishes to classify music according to Renaissance theory, it is necessary to employ a rather complex set of methods. Each method, as discussed in PART 2, cannot be applied on its own. They must all be employed, creating a synthesis of the information gained before any classification is made. Thus the *ambitus*, the clef combinations, the cadential hierarchy, and the melodic patterns of a polyphonic piece should be considered as a whole and discrepancies revealed and explained.

The discussion is conveniently summed up by the Neapolitan theorist Cerone (1613). He argues that there are four ways of determining the mode of a composition; the first method is by studying the hierarchy of cadences; the second is by comparing with the EUOUAE (Saeculorum Amen), that is, in Magnificats and Psalms where the music has been composed using these formulas; the third method is by looking at the final of the composition, as the lowest note of the final chord will also be the final of the mode; and the last way to determine the mode is by studying the melodic features especially of the tenor part:

Thus we will say that there are four manners in which to determine the mode of any piece: the first is by the rules and the natural and principal cadences of the mode; the second is by the *Saeculorum* when the music is composed over it [i.e. using the *Saeculorum*] as happens in Magnifi-

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cats and in Psalms; the third [method] is by the final. Although the ending has to be observed in the lowest voice, which is the *Contrabasso* the other [parts] usually remain in other consonances; thus, the *Tenor* needs to have the final in a unison or in an octave with the bass. Sometimes they will not do this but instead add a consonance in the middle [parts], making the end more sonorous and harmonious. They [the pieces] appear very empty and imperfect for the composers when the parts join in a unison or in an octave as is proper of the finals. The fourth method, in which one can arrive at a knowledge of the mode, is by the sequence of solmisation, especially in the *Tenor* part.<sup>1</sup>

If one can take Cerone's words as indicating a preference of methods, then it is clear that the hierarchy of the cadential degrees was considered the most essential method followed by the traditional melodic patterns from the EUOUAE. The third method is intriguing, since the final lowest note of a piece will not show whether the mode is authentic or plagal, unless one considers Tigrini's discussion on cadences and clefs.<sup>2</sup>

The only method which Cerone does not approve of is the use of clef combinations together with final and transpositional system. He explains that composers sometimes employ other clefs than those normally found in the high and low clef combination systems. Still, Cerone's discussion is indeed a synthesis of methods to use when classifying music according to the modal systems. While he compiled his comprehensive book, new ideas and new definitions of music-theoretical concepts were

<sup>1</sup> Pedro Cerone, *Melopeo y maestro. Tractado de musica theorica y pratica* (Naples 1613), p. 912: *Para conocer los Tonos por practica.*

Diremos pues, que *para conocer de que Tono sea qualquiera obra*, por una de quatro maneras se conocera: *la primera es*, por los principios y Clausulas naturales y principales del Tono: *la segunda es*, por el Sæculorum, quando la Musica se compone sobre el; como acontece en Magnificas y en Psalmos: *la tercera por la final*; aunque el fenecimiento se ha de mirar en la voz mas baxa, que es en la parte del Contrabaxo; que las de mas, comunmente, quedan en diversas Consonancias. De razon *el Tenor havria de tomar la final en Unisonus con el Baxo ò en Octava*, y avezes no se la hazen tomar por añadir en medio alguna Consonancia, haziendo la terminacion mas sonora y mas harmoniosa: pareciendoles à los Compositores muy vazia y muy imperfeta, quando se juntan las partes en Unisonus ò en Octava, como proprio es de las finales. *La quarta practica* por donde se puede venir en conocimiento del Tono, es por la Sequencia de la Solfa, particularmente por la parte del Tenor.

Also Johann Michael Ravn, *Heptachordum danicum seu nova solsisatio* (Copenhagen, 1646), has a thorough explanation on how to classify music according to the modal systems; see PT. 1.i, note<sup>2</sup>.

<sup>2</sup> PT. 2.iv.



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being developed, ultimately leading to a simplification of the earlier modal classification systems and also to the creation of new, simpler systems.



**PART 3**  
**DEVELOPMENTS AND NEW SYSTEMS**

## Gamut, Hexachords, Solmisation and A New Conception of the Octave

Applying the earlier chapter, "The Ladder of Music" (Pt. 1.iii), as a basis, this chapter will show how the paradox between the hexachordal theory, the solmisation system, and the conception of the octave as containing seven different notes was approached, and finally solved. The discussion is very closely linked with the philosophical and scientific approaches to the problems. Thus in England it was the Royal Society of London which instigated new ways of redefining basic musical concepts such as the octave and the Gamut. According to one of the members of the Royal Society, John Wallis, the Society began its meetings around 1645. They met once a week to discuss various subjects.<sup>1</sup> The scientific approach of the Royal Society seems to have been heavily inspired by the philosopher Francis Bacon, who in his book *Sylva Sylvarum* (1627), set up a list of problems through an extensive discussion of various topics and indicated ways of solving them.<sup>2</sup>

Replacing the Aristotelian doctrine of forms and qualities with quantifiable proportions of matter in motion, Bacon showed new ways of solving intricacies such as acoustics and the properties of sound. Though Bacon is believed by historians of science to have begun this new approach, it is already visible in the works of Robert Fludd (1617-18). Fludd is usually seen as a rather esoteric Neoplatonic philosopher, but also he relies on Aristotelian doctrines. In "De templo musicae", Fludd not only deals with music theory, composition and organology, but also with the nature of sound and hearing. Indeed, his works were used by members of the Society as well as by his oppo-

<sup>1</sup> Thomas Birch, *The History of the Royal Society of London* (London 1756), vol. 1, pp. 1-2. For a brief introduction to the early history of the Royal Society of London and the discussions on music, see Leta Miller and Albert Cohen, *Music in the Royal Society of London, 1660-1806* (Detroit 1987).

<sup>2</sup> Mordechai Feingold and Penelope M. Gouk, "An Early Critique of Bacon's *Sylva Sylvarum*: Edmund Chilmead's *Treatise on Sound*", *AS* 40 (1983), p. 145.

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nents, notably Mersenne and Kepler. It is noticeable that Robert Hooke, an important member whose philosophical discussions on the Universe are very similar to Fludd's conception, actually possessed Fludd's books.<sup>3</sup>

One can sense the growing awareness of the scientists (or rather natural philosophers) who were trying to unite musical theory with practice (or at least, with observable phenomena). All the subtle changes, which gradually occurred at the end of the sixteenth century, consequently meant that the traditional Gamut as it had been known and used for more than 400 years was challenged. As the hexachordal and solmisation systems were intrinsically linked with the Gamut, they also lost their fundamental position in the practice of music. In the traditional Gamut, the octave was interpreted as two separate steps of a ladder. However, the octave equivalency was vigorously promoted, especially by 'members' of the newly created Royal Society, and ruined many of the characteristic features of modal theory. These discussions ultimately led to new definitions of music-theoretical concepts and thus had also a great impact on the system of modes. Instead new ways of understanding the inversions of intervals, the use of the bass, and invertibility of triads were achieved.

The number of musical amateurs that played an instrument (the lute, in particular, became one of the most popular instruments) seems to have grown tremendously during the middle of the sixteenth century. It was now part of the gentleman's education to be able to play the lute as well as being able to sing.<sup>4</sup> As the solmisation system indicates,

<sup>3</sup> Cf. *Bibliotheca Hookiana sive catalogus diversorum librorum... insigne quos Doct. R. Hooke* (London 1703), p. 8 item 305, p. 21 item 590; this connection between Hooke and Fludd has not been noticed by Penelope M. Gouk, "The Role of Acoustics and Music Theory in the Scientific Work of Robert Hooke", *AS* 37 (1980), pp. 573-605; or Jamie C. Kassler and D. R. Oldroyd, "Robert Hooke's Trinity College Musick Scripts, and his Music Theory and the Role of Music in his Cosmology", *AS* 40 (1983), pp. 559-95. Hooke could also study the controversies between Fludd, Kepler, and Mersenne since he also owned copies of these important theorists.

<sup>4</sup> Baldassare Castiglione, *The Courtyer of Count Baldassar Castilio... done into Englyshe by Thomas Hoby* (London 1561), with introd. by W. Raleigh, *The Tudor Translations* (London 1900), p. 88, argues:

And the Counte beginning a freshe: My Lords (quoth he) you must thinke I am not pleased with the Courtyer if he be not also a musicien, and beside his understanding and cousing upon the booke, have skill in lyke maner on sundrye instruments.

On singing, see e.g. Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), sig. B2', where Philomathes is ashamed of himself for not being able to sight sing:

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notes were read as intervals rather than as fixed pitches. For instrumentalists this made the Gamut somewhat complex, and the hexachordal theory and the solmisation system became irrelevant as practical tools. It became necessary to be able to identify the exact pitch by note name in order to be proficient in reading music.

Polyphonic lute music notated in the traditional notational system would make the reading of music very intricate, and the system would also have to be changed to a degree it first achieved in the late eighteenth century. Thus lute tablature was invented making it possible for amateurs to perform music without any knowledge of hexachords, solmisation, fixed pitches or even intervals.<sup>5</sup> William Barley's short treatise from 1596 on how to play the lute confirms this view.<sup>6</sup> Although his title does promise an "Introduction to Pricksong, and certaine familiiar rules of Descant..." as well as the use of the Gamut, he does not, in fact, discuss any of these subjects. The first section, "An Instruction to the Lute," contains only the most basic rules concerning the reading of lute tablatures. The only subject which could be of interest for non-lutenists is the explanation of the notation of note-values. It was, according to John Dowland, common that musicians and even teachers lacked knowledge of music theory. Therefore Dowland highly recommends the students (of lute) also to understand the theoretical issues of music and explains that this was his reason for translating Ornithoparchus' book on the subject.<sup>7</sup> Also Thomas Ravenscroft criticises, in his apology to *A Brieffe*

But supper being ended, and Musicke bookes, according to the custome being brought to the table: the mistresse of the house presented mee with a part, earnestly requesting mee to sing. But when after manie excuses, I protested unfainedly that I could not: everie one began to wonder. Yea, some whispered to others, demanding how I was brought up: so that upon shame of mine ignorance I go nowe to seeke out mine olde frinde master *Gnorimus*, to make my selfe his scholler.

Robert Burton, *The Anatomy of Melancholy* (London 1621/1838), p. 542:

...A thing nevertheless frequently used, and part of a gentlewomans bringing up, to sing, dance, and play on the lute, or some other such instrument, before she can say her *Pater Noster*, or ten commandments.

p. 577:

Amongst other good qualities, an amorous fellow is endowed with, he must learn to sing and dance, play upon some instrument or other.

<sup>5</sup> "Tablature", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 13, p. 407; Tim Carter, *Music in Late Renaissance and Early Baroque Italy* (London 1992), p. 241.

<sup>6</sup> William Barley, *A New Booke of Tabliture* (London 1596).

<sup>7</sup> Robert Dowland, *Varietie of Lute Lessons: Necessarye Observations* (London 1610), sig. E1<sup>v</sup>. Though

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*Discourse* (1614), the contemporary music teacher or "Maister" for not knowing anything about the "Nature of Sound, or the Difference of Propertie; the Distinction of Tones, the Division of Numbers and Measures, the inæqualiti of Proportions, nay, scarce Defining the nature of that Instruments, Maisters whereof they professe themselves to be".<sup>8</sup>

Although the growing popularity of instrumental music, that is, composers begin to write idiomatically for instruments, played an important part in the process of outdating the hexachords and solmisation, it was not the sole catalyst. As mentioned in PT. 1.iii, the Gamut was seen as a ladder where every step of the ladder corresponded to one specific note only. This meant that two notes an octave apart were not immediately recognised as being of the same nature. The sound resembled the unison, but the octave as interval was the largest whereas the unison was the smallest.<sup>9</sup> That there were some problems with this aspect of the traditional Gamut is apparent from the many discussions and proposals to extend the hexachords from six syllables to seven or even eight as Pareja (1482) recommends. Pareja wanted to replace the traditional set of solmisation syllables with the new syllables *psal-li-tur per vo-ces is-tas* basing them on the *c-c'* octave.<sup>10</sup> He argues that the traditional hexachordal system is absurd unless one

the author of this book seems to be Robert Dowland, the text indicates that John Dowland at least wrote this section of the book, for sig. E1<sup>r</sup> says "for which purpose I did lately set forth the Worke of that most learned Andreas Ornithoparcus, his *Micrologus*, in the English tongue". John Dowland was the translator of *Micrologus*.

<sup>8</sup> Thomas Ravenscroft, *A Briefe Discourse* (London 1614), sig. A1<sup>r</sup>.

<sup>9</sup> The unison as an interval created a controversy between Robert Fludd and Johannes Kepler, who argued that it should not be defined as an interval (*Apologia adversos demonstrationem... R. de Fluctibus* (Frankfurt 1622), ed. Max Caspar, *Johannes Kepler: Gesammelte Werke* (Munich 1940), vol. 6, p. 392).

<sup>10</sup> Bartolomeo Ramos de Pareja, *De musica tractatus* (Bologna 1482), "Capitulum Septimum (prima pars)" [2nd and 3rd page]:

Nos igitur qui circa huius artis veritatem inquirendam lucubrando atque vigilando diu laboravimus dictiones singulis chordis imponimus novas et effectus totius denotantes concentus ita ut in graviori dicatur psal in sequenti li. in tertia tur. in quarta per in quinta vo in sexta ces. in septima is: [et] in octava tas. et sic erit conclusio syllabarum: psalitur per voces istas. quoniam octo vocibus fit totus concentus locamus autem eas a littera c gravi in litteram c acutam quoniam perfecte canere docent.

[Therefore, because we have worked for a long time in the night and watchful enquiring about the truth of this art, we introduce new names for each string, indicating the effect of the whole *concentus* [i.e. Gamut]. *Psal* is named on the lower [note], *li* on the following, *tur* on the third, *per* on the fourth, *vo* on the fifth, *ces* on the sixth, *is* on the seventh, and *tas* on the eighth; thus the complete sentence of syllables

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analogously recognises that there is only one size of whole tones and not two (10:9 and 9:8) as was normally argued.<sup>11</sup> Using two different sizes of whole tones in connection with the hexachord theory would mean that the soft, natural, and hard hexachords were not identical and therefore did not make sense as a transpositional device. Ramos de Pareja tries to argue in favour of equal temperament or to change the solmisation system. In this way Ramos de Pareja's proposal would also mean that the complex system of mutations between hexachords could be avoided. The solmisation system would, furthermore, be simplified as all the diatonic steps would have one—and only one—specific name. Pareja's proposition is indeed very close to a modern conception of the scale; however, he does seem to create a new paradox. The theorist clearly separates the notes *c* and *c'* by giving them two different names (*psal* and *tas*, respectively), and consequently he still must have thought in terms of intervals rather than specific pitches.<sup>12</sup> Pareja's proposal did not provoke any profound changes to the traditional Gamut, hexachords, and solmisation.

One of the first English music teachers to doubt the value of the old Gamut was William Bathe. Bathe, who is said to have taught mnemonics to Queen Elizabeth, published around 1596 a short treatise in which he strongly encourages a new, more simple and easy method on how to learn to sing. First he explains the old way where it was necessary to learn the complete Gamut with all the note names, including all the possible solmisation syllables, hexachords and their mutations, all the clefs, solmising both upwards and downwards:

...Olde Musitions laid downe for Song, manifold and crabbed, confuse,

will be: *psalitur per voces istas*, for the whole *concentus* is made of eight syllables. However, we arrange them from low C to high c because they teach [us] to sing perfectly.]

<sup>11</sup> Ramos de Pareja, op. cit., tr. Clement A. Miller (Neuhausen-Stuttgart 1993), *MSD* vol. 44, pp. 46-8, 162-5; for an interesting discussion of these two subjects, see Frieder Rempp, "Bemerkungen zum Selbstverständnis der italienischen Musiktheorie im 16. Jahrhundert", *Mth* 4 (1989), pp. 100-12.

<sup>12</sup> Ramos de Pareja, op. cit., pp. 49-55. Similar to Ramos de Pareja, Pierre Maillart (*Les tons ou discours sur les modes de musique et les tons de l'église* (Tournai 1610)) also uses a syllable for the note an octave above *ut* (named *o*); see Christiaan Huygens, "Musique et mathématique musicale", *Oeuvres complètes publiées par la société hollandaise des sciences* (The Hague 1940), vol. 20, pp. 118-9.



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tedious rules, as for example: though there be in all but sixe names, Ut, Re, Mi, Fa, Sol, La, having amongst them an easie order, yet could not they by rule declare, whether of these should be attributed to every Note, unlesse they had first framed the long ladder or skale of Gam-ut, to which some added, thinking the ladder too short, some hewed off a peece, thinking it too long. They would then have the learner be as perfect in coming downe backward, as in going up forward, least in his practise he should fall, and breake his neck. Then must he learne, Gam-ut, in rule, Are, in space, b my in rule, C faut in space, &c. Then must he know Gamut, how many cleves, how many notes. Are, how many notes, &c... And when all have done, after their long circumstances of time, whereby they should be often driven to millibi, for Notes standing in diverse places of Gam-ut, have names that the place where they stand comprehend not. Touching all the prolix circumstances, & needlesse difficulties, that they use, it loathes me greatly that heere I should write them: & much more would it grieve the Reader to learne them...<sup>13</sup>

Bathe ends his preface mentioning that one of his pupils, a small boy, was taught by his method to sing even the most difficult songs in just one month. In the above quotation, Bathe observes that the Gamut was seen as a ladder—that is, a vertical concept. Also, the way of ascending and descending the ladder indicates that the notes *A* (or *Are*) and *a* (or *alamire*) were considered two entirely different steps.

Even later in the seventeenth century it appears that the traditional solmisation system and the hexachords were still very much taught. Christopher Simpson (1665) tells that when he was a boy (he was born around 1605), he had to start learning the Gamut with all the difficulties just as Bathe mentioned: the meaning of the words (syllables) and the ascending and descending in the Gamut.<sup>14</sup> Another music teacher and theorist complaining about the old Gamut and the six syllables is John Birchensha

<sup>13</sup> William Bathe, *A Briefe Introduction to the Skill of Song* (London s.d.), "To the Reader", sig. A2<sup>v</sup>.

<sup>14</sup> Christopher Simpson, *The Principles of Practical Musick... For the Instruction of Beginners, either in Singing or Playing upon Instruments* (London 1665), "To the Reader", sig. A3<sup>r</sup>:

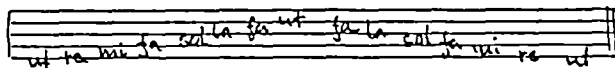
...When I was a Boy and learn'd to sing, the first thing proposed to me was the Gamut, Are, Bmi, &c. which my Master told me was the Scale of Musick, and must be got by Rote, to say it readily, as well backward as forward. This seemed a hard task, and the rather, because I did not understand the meaning of those words: neither did I (then) conceive how such words could any way conduce to the Tuning of a Song...

This method of learning how to sing is also mentioned by Thomas Ravenscroft, *Treatise of Musick*, c.1610, GB-Lbl MS Add. 19.758, fols. 2<sup>v</sup>-3<sup>r</sup>.

(1664). He, too, notices the complexities in using the hexachordal mutations.<sup>15</sup>

While William Bathe is aware of the difficulties in using the traditional solmisation, he is also extremely aware of the importance of the octave. He explains that the octave is the basis of all music; but even so, the conception of the octave as an entity (i.e. as a circle) is, though recognised, only implied. When explaining the hexachordal system, Bathe, in an example of "The order of ascension & descention", indicates that the octave is indeed a circle. His solmisation of the octave *c-c'* or *g-g'* is certainly untraditional:

Ex. 3.i.1



Instead of solmising the octave above *ut* as *sol* he names it *ut*, thus clearly showing that the low *ut* is the same as the note an octave above. This is also explained in the text:

When you have in this sort found out the *ut*, you must understand that every note that standeth in the next place above is named *re*,... *mi*,... *fa*,... *sol*, then *la*, then *fa*, ascending up alwaies orderly, counting the rules, and spaces: then next above that againe is *ut*: for you shall finde that place, which is the eight place from that wherein your other *ut* stood, to begin with the same letter...<sup>16</sup>

<sup>15</sup> John Birchensha, *Templum Musicum: Or the Musical Synopsis of... Alstedius...* (London 1664), pp. 35-6:

These six Notes were so invented, do shew their use every where among Musicians, but very slow and difficult. For what impediment is there of Mutations, confusion of Keyes, substitution of Voices? You may see most (whether with indignation or no) to have spent a good part of their Age upon this Art and yet to have profited very little, though perfect many years before in the *Lecton* thereof...

This book is a translation of *Encyclopaedia septem tomis distincta* (Herborn 1630), lib. 20 "Musica", pp. 1195-211, by Johann Heinrich Alsted. Alsted is merely paraphrasing Johannes Lippius, *Synopsis musicae novae* (Strassburg 1612). Thomas Salmon, a student of Birchensha, makes a similar complaint in *An Essay to the Advancement of Musick* (London 1672), p. 11:

That which first of all verifies a beginner, is a long discourse of Gibberish, a Fardle of hard names and fictitious words called the Gamut, presented to him perfectly to be learned without book, till he can readily repeat it backwards and forwards; as though a man must be exact in the Art of Conjuring before he might enter upon Musick...

<sup>16</sup> Bathe, op. cit., sig. A4<sup>v</sup>.

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The scale which Bathe is discussing—and of which he gives an example—is the octave scale from *g* to *g'*; it is not the G major scale, since he does not use *f#'* but *f♯'*. Thus Bathe is discussing the octave species and not the major or minor scale (Ex. 3.i.2). Bathe believes that the use of the eight notes of the octave scale rather than the whole Gamut, and being able to sing them, would greatly help singers:

There be eight notes, whose ascention, and descension doe comprehend all tunes, as the roote doth the tree, be they never so difficult, with flats and Sharps, who so knew how to use them, the notes are common, the use is rare, or not yet found, which being knowen, will give great light to Musitions, & breed great ease to Singing men...<sup>17</sup>

Around 1600 more and more theorists began to propose a new solmisation system with seven syllables instead of six. Perhaps it was suggested not just because of the usefulness; it could also have been generated by the idea that the octave was symbolised in the circle—the circle of eternity: the unison repeated by the octave infinitely. A very interesting and so far unnoticed diagram is found in Giovanni Maria Lanfranco's *Scintille di musica* (1533). The author has illustrated the Gamut (*G-g''*), together with the solmisation syllables and *cantus durus* and *cantus mollis*, as a circle (ILL. 3.i.1). The circle is divided into seven sections corresponding to the octave divided into seven different notes.<sup>18</sup>

<sup>17</sup> Ibid., sig. B1<sup>v</sup>.

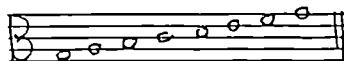
<sup>18</sup> Giovanni Maria Lanfranco, *Scintille di musica* (Brescia 1533), p. 124. Though Lanfranco is presumably the first music theorist to draw attention to the circularity of the octave, it was already hinted at by the Renaissance Neoplatonic philosopher Marsilio Ficino (1433-1499). He provides a very thorough explanation of the musical intervals and mentions that the octave is only a repetition of the unison:

Octava denique in primam feliciter restituitur, qua quidem restitutione dum octavam cum prima iterum repetita componit...

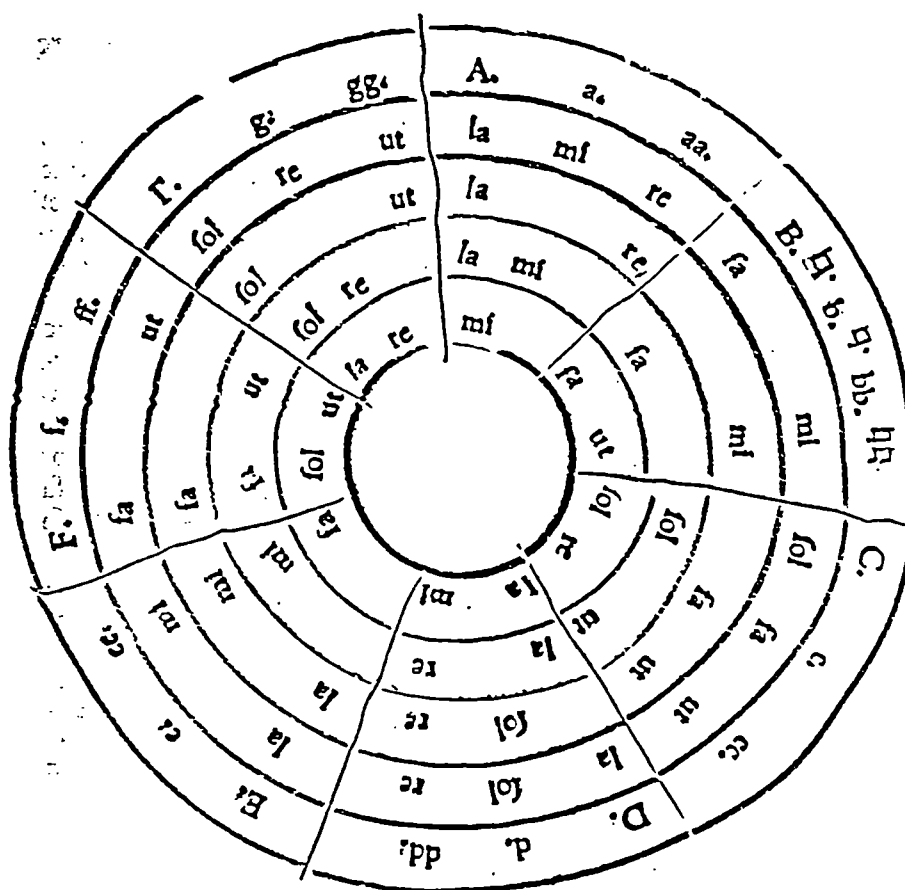
[Finally, the octave is happily restored to the unison [prima], and by this restoration, it completes the octave together with the repetition of the unison...]

("Epistola de rationibus musicae", *Supplementum Ficinarum*, ed. Poul O. Kristeller (Florence 1937), vol. 2, p. 52; I am grateful to Dr. Angela Voss for drawing my attention to Ficino's discussions on music. In a chapter concerning the names of the modes, Glarean has a curious diagram showing each octave as a circle. Though Glarean does not mention the octave as a circular principle, he does, nevertheless, briefly allude to the octave as merely a repetition of the unison (*Dodecachordon* (Basel 1547), tr. Clement A. Miller (s.l. 1965), *MSD* vol. 6.1, pp. 118-9).

Ex. 3.i.2



ILL. 3.i.1



Lanfranco, *Scintille di musica* (Brescia 1533), p. 124

### *Section i: Gamut... and a New Conception of the Octave*

Inspired by the theorist David Mostart (1598), numerous German theorists (notably Calvisius (1600), Burmeister (1601), Puteanus (1602), and Lippius (1612)) began to advocate the seven-syllable system known as *Bocedisation*.<sup>19</sup> In England the new method of solmisation does not seem to have gained very much ground; one of the earliest English music theorists to discuss *Bocedisation* is Ravenscroft. It is not mentioned in his book, but only in an autograph manuscript pre-dating his treatise. In this MS, which mainly deals with practical aspects of music, Ravenscroft mentions that there are two methods of solmisation: the English one which uses six or four syllables, and the Belgian which employs the seven syllables *bo*, *ce*, *di*, *ga*, *la*, *ma*, and *mi* in *cantus durus*. In *cantus mollis* the *mi*-syllable is replaced with the syllable *pa* (Ex. 3.i.3). The reference to the "Belgiol method" is probably made because Mostart's treatise was published in Amsterdam.<sup>20</sup> The English method, using only six or four different syllables, is the traditional procedure based on *cantus durus* and *cantus mollis*. It was common in England to use only *ut* on the lowest note of the Gamut, *G*, and *re* on *A*.<sup>21</sup> Thomas Campion (c.1613) explains that, though the traditional Gamut was an appropriate tool for its time, it is now creating many obstacles for the beginner, mainly because of the extended *ambitus*. Also Campion observes that it is easier to employ only

<sup>19</sup> Mostart's *Korte onderwysinghe van de musykkonste* (Amsterdam 1598), is unfortunately lost, but the method is referred to in several books on *Bocedisation*, among others Seth Calvisius, *Exercitationes musicae duae* (Leipzig 1600); Joachim Burmeister, *Musica autoschediastike* (Rostock 1601); Eric Puteanus, *Musathena* (Hannover 1602); Lippius, op. cit.; cf. Benito V. Rivera, *German Music Theory in the Early Seventeenth Century: The Treatises of Johannes Lippius* (Ann Arbor 1980), p. 103. Also Johannes Kepler advocates the use of *Bocedisation* in his *Harmonices mundi* (Linz 1619), lib. 3 cap. 10. Mostart is quoted in Birchensha (op. cit., pp. 35-6) and is referred to as the inventor of the *Bocedisation*. The first Italian treatise to discuss a new method using seven syllables (with *ba/bi* on the seventh step) was Adriano Banchieri's *Cartella musicale* (Venice 1614), pp. 21-4. The first French theorist to use a seventh syllable (naming it 'si') was Marin Mersenne, *Harmonie universelle* (Paris 1636-37).

<sup>20</sup> Thomas Ravenscroft, *Treatise of Musicke*, c.1610, GB-Lbl MS Add. 19.758, fol. 5<sup>v</sup>. However, Ravenscroft refers to Calvisius and not Mostart, indicating that his source of information was Calvisius. Also Lippius refers to the Belgian method, op. cit., tr. Benito V. Rivera, *Colorado College Music Press* (Colorado Springs 1977), vol. 8 p. 31.

<sup>21</sup> Regarding the use of *ut* only on the lowest note of the Gamut: Ravenscroft continues the development initiated by Bathe (c.1596) and followed by Morley (1597). This was also advocated by Descartes in 1618 and translated into English by William Brouncker, *Renatus Des-cartes Excellent Compendium of Musick: With Necessary and Judicious Animadversions Thereupon* (London 1653). Descartes prefers the six syllable method to the four syllable method (p. 39). Also Charles Butler, *The Principles of Musick, in Singing and Setting* (London 1636), p. 15 (b), refers to *Bocedisation*.

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*ut* and *re* on the two lowest notes of the Gamut:

It is most true that the first invention of the *gam-ut* was a good invention, but then the distance of Musicke was cancelled within the number of twenty Notes, so were the sixe Notes properly invented to helpe youth in vowelling, but the liberty of the latter age hath given Musicke more space both above and below, altering thereby the former naming of the Notes: the curious observing whereof hath bred much unnecessary difficultie to the learner, for the Scale may be more easily and plainely exprest by foure Notes, then by sixe, which is done by leaving out *Ut* and *Re*.<sup>22</sup>

But neither Ravenscroft nor Campion link the new way of solmising (either the English method or *Bocedisation*) with a different conception of the Gamut or of the octave. This connection was, however, already achieved by Thomas Robinson, a lutenist, who in 1603 published a treatise not only on lute-playing but also on how to be "your owne instructor for Prick-song".<sup>23</sup> In his short treatise, Robinson interprets the octave both from a philosophical point of view in the same sense as Ficino had done (see note<sup>18</sup>, above), and from a practical point of view, explaining the consequences of the new interpretation. After discussing the symbolism of the unison, third, and fifth ("unity", "Trinity", and "the atonement between God and man"), Robinson arrives at the octave:

His eight (which as it is, but as his unison) representeth his Alpha and Omega; & as what is above his eight, is but as a repetition, as from his unison, as it were a new beginning...<sup>24</sup>

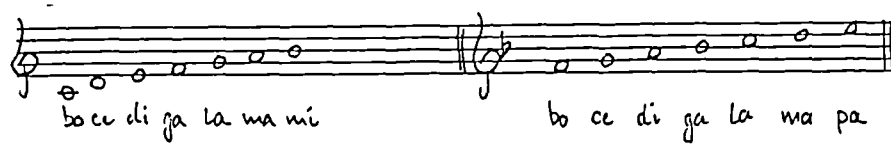
<sup>22</sup> Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. B4'. As Morley indicates (op. cit., p. 16), solmising outside the Gamut was not uncommon and does not necessarily create further obstacles.

<sup>23</sup> Robinson, *The Schoole of Musicke* (London 1603), title page.

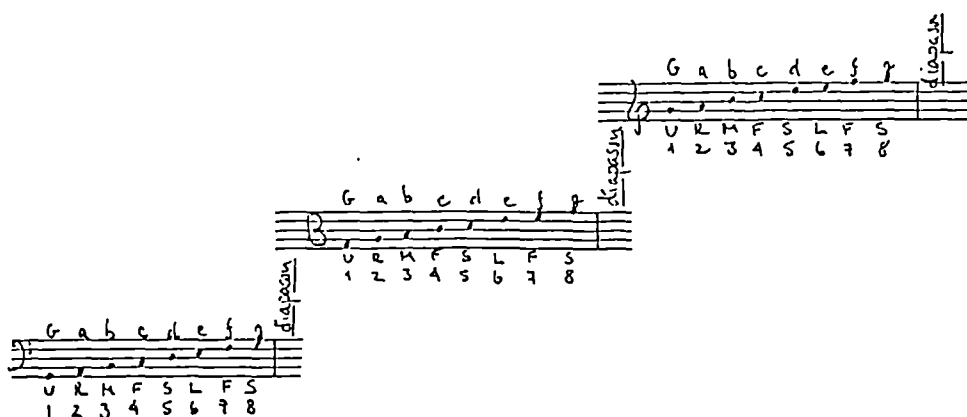
<sup>24</sup> Robinson, op. cit., "Preface". The symbolism could have been inspired by Cyriacus Schneegass, *Isagoges libri duo* (Erfurt 1591), "Praefatio", sig. A5<sup>v</sup>; the symbolism is also briefly mentioned by Simpson, *The Division-Viol, or the Art of Playing ex tempore upon a Ground* (London 1659/1665), p. 24; and Thomas Mace, *Musick's Monument; or, A Remembrancer of the Best Practical Musick* (London 1676), p. 269.

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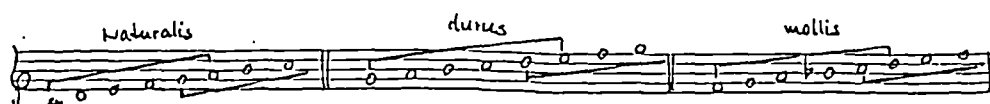
Ex. 3.i.3



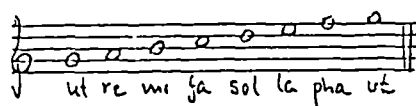
Ex. 3.i.4



Ex. 3.i.5



Ex. 3.i.6



### Part 3: Developments and New Systems

Thus the philosophical viewpoint that the octave is circular is also argued in English music theoretical and practical treatises. Later in his treatise, when considering the rules on how to sing, Robinson indicates that the Gamut is nothing else than three octaves starting on the lowest note, *G*, and proceeding up to *g*" (Ex. 3.i.4). Though Robinson does employ solmisation syllables in some examples, there is no explanation other than that they correspond to the notes. The syllables are notated as if the author is thinking in terms of fixed pitches rather than intervals. Only indirectly does Robinson show the *cantus mollis*. The recognition of the octave as circular—and subsequently the Gamut as three circles—was later observed by Lippius (1612). For Lippius this recognition had wide implications for the understanding of the inversive relationships between intervals.<sup>25</sup>

The *Bocedisation* is also mentioned by the scientist and member of the Royal Society, John Pell, in a manuscript from around 1635 containing notes on music. Here he implies that the octave contains seven different notes which are repeated above and below. After illustrating all the 21 possible combinations within the octave of the five whole tones and the two semitones he depicts the octave as a circle.<sup>26</sup> Pell's notes are interesting because they indicate that he, as a musical amateur, did not seem to be aware of the history of the Gamut and its implications as both Bathe and Campion were. They explicitly acknowledged the function of the old Gamut and showed it due respect, although they advocated some changes to the system.<sup>27</sup> Pell, on the other hand, seems to have been somewhat puzzled, especially by the meaning of the hexachordal terms *naturalis*, *durus*, and *mollis*.<sup>28</sup>

<sup>25</sup> See PT. 3.iii.

<sup>26</sup> John Pell, *Portions of Treatises etc. Relating to Music*, c.1635-66, GB-Lbl MS Add. 4388, fol. 48'. Some of the notes which closely correspond to Butler (1636) would indicate a later date of the first part of this manuscript (compare Butler's discussion of the hexachords (p. 9) with Pell's fol. 48').

<sup>27</sup> Campion remarks: "It is most true that the first invention of the gam-ut was a good invention" (see also note<sup>22</sup>); and Bathe (op. cit., sig. A3'): "...I doe affirme that they deserved greater commendations above mee, for finding out the long way, then I above others for laying down the short way...". See also John Birchensha, op. cit., p. 36 (see note<sup>15</sup>).

<sup>28</sup> John Pell, op. cit., fol. 51'; Pell even went so far as to try and classify the tunes of "the Psalmbooke printed at London 1621" according to the three scales: sharp, flat or natural, and flat-flat (fol. 95'). The book in question is *The Whole Booke of Psalmes... by Sundry Authors* (London 1621), ed. Thomas Ravenscroft.



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*Cantus durus* and *cantus mollis*, which most often were notated as octave scales, caused some confusion later in the seventeenth century when the terms had gone so much out of fashion that they became obsolete (Ex. 3.i.5).<sup>29</sup> John Pell, who read the musical treatises of the time, most interestingly wrote some questions on musical subjects which he did not understand. On one page he has copied

Scala duralis sharpe in B mi, naturalis the flat Γ ut, Mollaris flat-flat,<sup>30</sup>

and on the following page he asks why the musicians only use three different scales when there must be seven different ones, as each scale starts on a different step and there are seven different steps. What has happened to the other four scales? This indicates that Pell did not think in terms of hexachords, nor did he know how the names of the three scales had derived. Pell does not seem to be aware of the fact that what he copied are the three different hexachords and extended their range from a sixth to an octave.

In a note dated August 18th, 1635, Pell also argues against the new solmisation system which employs seven syllables instead of the usual six and explains that it is

arbitrary, if you could keepe right in tune, it were no matter how you named any note.<sup>31</sup>

This last quote also reveals that the solmisation could not retain its popularity in spite of the addition of a seventh syllable, and that Pell was not thinking in terms of intervals,

<sup>29</sup> See Pr. 3.ix.

<sup>30</sup> Ibid., fol. 50<sup>r</sup>. Pell has copied various paragraphs from, amongst others, Morley (1597), Calvisius (1600?), Campion (c.1613), Kepler (1619), Mersenne (1636-37) and probably also Butler (1636). It is interesting to notice that the hexachordal system with the three hexachords, one on C, one on G, and one on F, in the early seventeenth century in England were transposed a fourth upwards: thus the natural begins on F, the hard on C, and the soft on B $\flat$ , the effect being that E $\flat$  becomes part of the *musica recta* system. This fact seems to escape Lillian M. Ruff as she claims that Ravenscroft (c.1610), Butler and Playford (1654) misunderstood these terms and presumably copied their information from an incorrect source (*The Seventeenth-Century English Musical Theorists* (unpubl. Ph.D diss., University of Nottingham 1961-62), p. 101). It is possible that these three theorists did take their hexachords from the same source, but they did not misunderstand the definitions.

<sup>31</sup> John Pell, op. cit., fol. 45<sup>r</sup>.

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but in terms of fixed pitches.

One obvious source which Pell certainly knew—he possessed a transcript of it—was the treatise on music by René Descartes.<sup>32</sup> This work was written as early as 1618 though not published until 1650. Pell could have obtained a copy of the treatise through Mersenne with whom he corresponded while he stayed in Breda in Flanders between 1646 and 1652.<sup>33</sup> In the treatise Descartes explains the circularity of the octave: instead of dividing a straight line into the consonant proportions which had been the normal procedure since Boethius, Descartes now chooses a circle. He mentions that if one part of the circle is a consonance then the rest must also be a consonance;<sup>34</sup> thus, in effect, Descartes recognises the complementarity of intervals. This leads Descartes to change the traditional diagram of the Gamut as a ladder and also the 'Guidonian Hand' into circles.<sup>35</sup> However, he has also tried to insert the three hexachords into this new interpretation (ILL. 3.i.2).

Charles Butler (1636) proposes a different solmisation derived from the traditional method. Thus the original solmisation in the *cantus durus* scale with *G* as *ut* (i.e. *ut re mi fa sol la fa sol*) has been changed so the scale has seven different solmisation names, but retains the same sound: *ut re mi fa sol la pha* (pronounced as *fa*) *ut*; hence *pha* becomes the seventh step (Ex. 3.i.6).<sup>36</sup> Similar to Robinson (1603), also Butler gives the octave above *ut* the same syllable. From Butler's discussion of the Gamut and his 'new' method of solmising, it becomes clear that he saw the octave as a circular concept. He illustrates the seven different notes in the octave, but at the same time he makes it possible to discern the intervallic relationships within the octave scale, that is, the two semitones will always be found on the steps *mi-fa* and *la-pha*. This conception

<sup>32</sup> *Compendium musicae* is found among Pell's papers, GB-Lbl MS Add. 4388, fols. 70<sup>r</sup>-83<sup>r</sup>.

<sup>33</sup> Cf. [Letters to John Pell, Theodor Haak, and Marin Mersenne], c.1630-40, GB-Lbl MS Add. 4278 and Add. 4279.

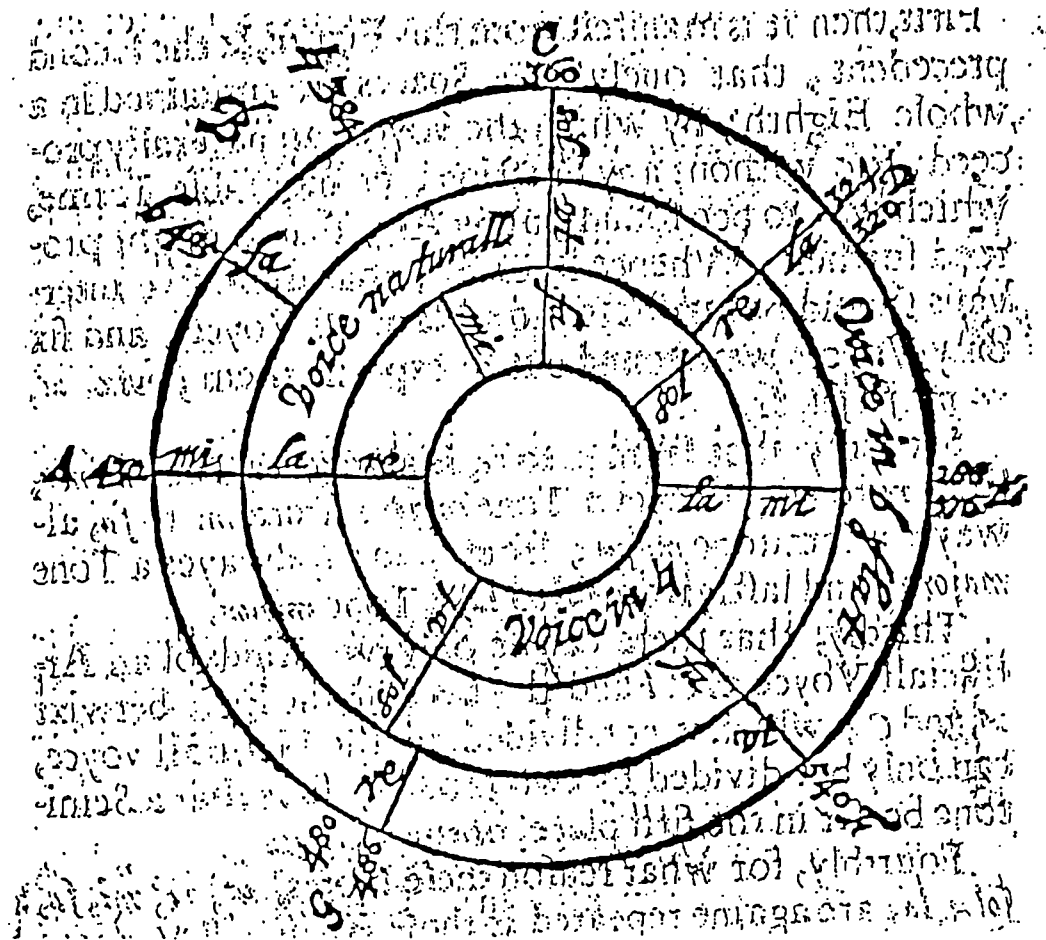
<sup>34</sup> William Brouncker, *Renatus Des-cartes Excellent Compendium of Musick* (London 1653), pp. 16-7. Descartes' circle is somewhat similar to Lanfranco's though he only illustrates the octave and not the whole Gamut. Descartes never refers to Lanfranco or even seems to have known his tract. Zarlino, whom Descartes had read, shows neither the Gamut nor the octave as circles. Though Lanfranco's circle in principle also shows the complementarity of intervals, this aspect is not mentioned in his tract.

<sup>35</sup> *Ibid.*, pp. 34-5.

<sup>36</sup> Butler, op. cit., p. 12.

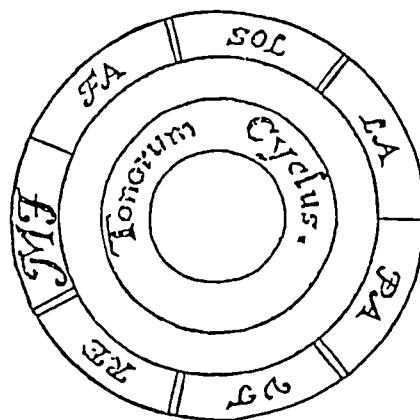
Section i: Gamut... and a New Conception of the Octave

ILL. 3.i.2



Brouncker, *Renatus Des-cartes Excellent Compendium of Musick* (London 1653), pp. 34-5

ILL. 3.i.3



Butler, *The Principles of Musick, in Singing and Setting* (London 1636), p. 13

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of the octave is, according to Butler, "most fitly exemplified in that Figure, which hath no end", whereafter the circle follows (ILL. 3.i.3).<sup>37</sup>

The diagram is indeed very similar to Descartes' and it is likely that Butler in some way had access to a manuscript copy of Descartes' treatise. Though the Royal Society was not founded until around 1645, it is curious that Charles Butler was interested in the 'scientific' discussions on music and seems to have known at least Francis Bacon's *Sylva sylvarum* (1627) and perhaps even René Descartes' *Compendium musicae* (MS c.1618). The Royal Society was heavily influenced by the ideas of these two natural philosophers and members also made use of Butler's musical treatise.<sup>38</sup>

Christopher Simpson (1659) devotes an entire section on the philosophical mysteries concerning the octave as a circular principle and also the triad.<sup>39</sup> Simpson even provides a diagram showing the octave and its seven different steps in correlation with the planetary spheres within a large circle (ILL. 3.i.4). The diagram also shows that the note names are those we use today (A, B, C, D, E, F, and G); the usual hexachords and the solmisation syllables are not shown at all in the diagram. Nor does Simpson mention the transpositional systems *cantus durus* and *cantus mollis*. Nowhere in either treatise does the author discuss the traditional Gamut.<sup>40</sup> Simpson does, however, mention that in singing it is preferable to use some kind of syllable and provides the traditional six syllables and, similar to Thomas Campion, he observes that only four of them are now used:

Before we come to the practice of these Tones or Degrees of Sound, you may observe, that the Voyce expresses a Sound best when it pronounces some word or syllable with it: For which, and for Order and Distinction sake, six syllables were used in former times, viz. *Ut, Re, Mi, Fa, Sol, La*. Four of these, to wit, *Mi, Fa, Sol, La*, (taken from in their Significancy) are necessary Assistants to the right Tuning of those Gradual

<sup>37</sup> Ibid., p. 13 "Tonorum cyclus".

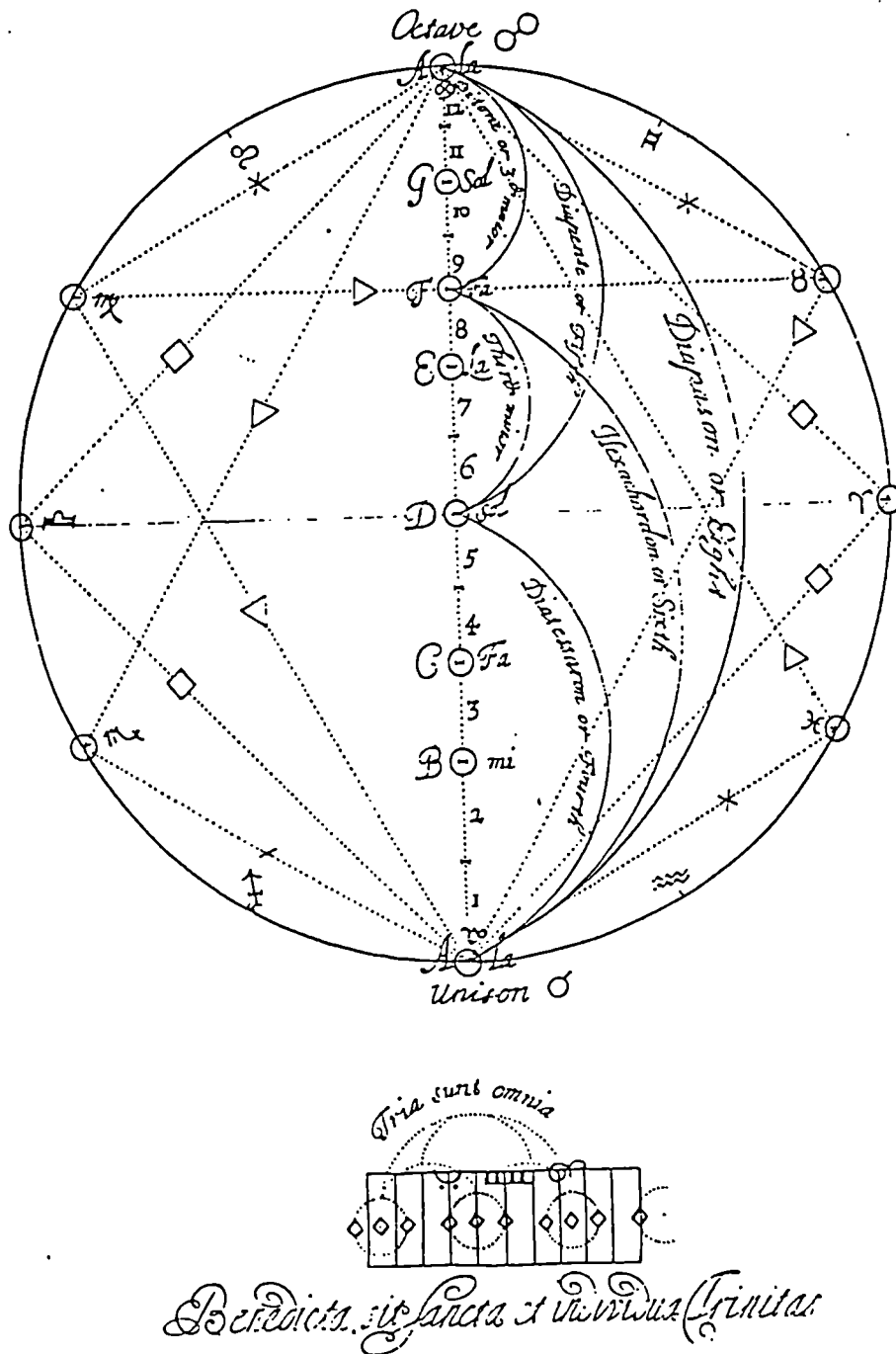
<sup>38</sup> For Pell and Butler, see above note<sup>26</sup> and note<sup>30</sup>; Robert Hooke, also a member, owned a copy of Butler's tract (*Bibliotheca Hookiana sive catalogus diversorum librorum* (London 1703), p. 144 item 146).

<sup>39</sup> Simpson, *The Division-Viol* (London 1659/1665), pp. 23-5.

<sup>40</sup> *The Division-Viol* (London 1659/1665), and *The Principles of Practical Musick* (London 1665).

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ILL. 3.i.4



Simpson, *The Division-Viol* (London 1659/1665), p. 25

### Part 3: Developments and New Systems

Tones,... The other two, *Ut* and *Re*, are laid aside, as superfluous, by our Modern Teachers.<sup>41</sup>

John Birchensha, a theorist, instrumentalist, and a teacher of composition, was very active as a consultant for the Royal Society in the 1660s. He proposed, among other things, a new and more scientific method of composition. In a manuscript on musical matters, found among the Boyle Papers at the Royal Society and written around 1664, Birchensha provides a rather curious diagram containing the Gamut.<sup>42</sup> He proceeds further than other English theorists and does not use the solmisation syllables *ut* and *re* at all. Instead his scales begin with *sol*, a fifth above *ut*, and combine the hard and natural hexachords (*cantus durus*). It is clear from Birchensha's table that the solmisation system no longer has any practical value and does not yield an intervallic conception. The *cantus mollis* and mutations between soft and natural hexachords is not shown. Birchensha presents a list of rules indicating the importance of using flat accidentals when some of the degrees are solmised as *sol*, thus, in fact, providing several transpositions of the diatonic scale *G-g*. Birchensha's new method is certainly not less complex than the traditional Gamut.<sup>43</sup> His new propositions created a stir in the Royal Society and it was agreed to set down a committee in order to examine the ideas more thoroughly.<sup>44</sup>

<sup>41</sup> Simpson, *The Principles of Practical Musick* (London 1665), pp. 5-6.

<sup>42</sup> *A Compendious Discourse of the Principles of the Practicall & Mathematicall Partes of Musick for the Use of the Honorable Robert Boyle. Esqu.*, c.1664, GB-The Royal Society of London, MS Boyle Papers BP.41.1, fols. 1-21 (the Gamut appears in "Chap. 4", fol. 4<sup>r</sup>). However, it seems probable that Birchensha began writing this treatise around 1662 as the minute of the Society, dated 2 July 1662, states: "A new method of music was recommended to the lord viscount Brouncker, Sir William Petty, Mr. Boyle, Mr. Brooke, and Mr. Balle..." (quot. Thomas Birch, *The History of the Royal Society of London* (London 1756), vol. 1, p. 87). This would also explain why the treatise is dedicated to Robert Boyle, who was one of the members of the committee. The main thoughts of the MS have been discussed in Leta Miller, "John Birchensha and the Early Royal Society: Grand Scales and the Scientific Composition", *JRMA* 115 (1990), pp. 63-79.

<sup>43</sup> Birchensha, op. cit., chap. 4, fol. 4<sup>r</sup>; for a discussion of the transpositions, see PT. 3.vi.

<sup>44</sup> Birch, op. cit., vol. 1, p. 418 (27 April 1664):

...Mr. Birchensha's paper on music was read, wherein he gave an account of the *desiderata* in music, and undertook to bring the art of music to that perfection, that even those, who could neither sing nor play, should be able, by his rules, to make good airs, and compose two, three, four, or more parts artificially. He was called in, and thanked for his respect to the Society, and assured, that the committee appointed at the last meeting to hear him, and to discourse with him upon this subject, should rather

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The criticism of the earlier method of solmisation and the hexachordal theory becomes more and more relentless and Thomas Salmon, a musical amateur and a student of John Birchensha, gives no credit at all to the old method. In his first short book, *An Essay to the Advancement of Musicke, by Casting away the Perplexity of Different Cliffs...* (London 1672), which was reviewed and even recommended by the Royal Society, he complains that the method is time-consuming, particularly because of the variety of clefs. Already in the preface "To the Reader" the 'crusade' begins:

*There is not any Art which at this day is more Rude, Unpolish'd, and Imperfect, in the Writings of most of the Ancient and Modern Authors, than Musick; for the Elementary part thereof, is little better than an indigested Mass, and confused Chaos of impertinent Characters, and Insignificant Signs.*

*It is intricate and difficult to be understood; it afflicts the memory, and consumeth much time, before the knowledge thereof can be attained: Because of the Cliffs are divers; and their Transposition frequent; the Order and places of Notes very mutable, and their denominations alterable and unfixed.*<sup>45</sup>

The problems with the traditional Gamut which Salmon mentions are those which have also been expressed by earlier musicians and theorists. The obstacles that Salmon encounters, led him to propose numerous alterations to the old Gamut. The author argues that when the Gamut is interpreted as several circular octaves, each octave containing seven different notes, it becomes unnecessary to learn the Gamut both "backwards and forwards".<sup>46</sup> To make this new system even easier Salmon proposes the use of just one

consider of it, and of ways to encourage and promote his design and study.[copied from the Letter-book of the Royal Society, vol. 1. p. 143]

According to the minutes of the Society, Birchensha's proposals were discussed regularly from 2 July 1662 until 17 August 1664. Sir John Hawkins, *A General History of the Science and Practice of Music* (London 1776/New York 1963), vol. 2, p. 725, reveals that Birchensha was famous for being able to teach anybody to compose, and quotes Shadwell (*Humourists*, act 3) for saying: "Birchenshaw is a rare fellow, give him his due; for he can teach men to compose that are deaf, dumb, and blind".

<sup>45</sup> Thomas Salmon, *An Essay to the Advancement of Musick* (London 1672), sigs. A3<sup>v</sup>.

<sup>46</sup> Ibid., sig. A5<sup>v</sup>:

*The Scale of Musick reduced to seven Notes, encircling themselves in several Octaves expressed by the seven first Letters of the Alphabet... Whence it follows, That the hard names of the Gamut, and its conjuring repetition backwards and forwards, become*

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universal clef instead of the usual G-, C-, and F-clefs. Hence, it is now only necessary to learn to read one clef. The clef is placed on one particular line only. Instead, one can transpose either an octave above or below the notated, depending on in which register one wishes to play or sing. Salmon's reasoning implies that he saw the notes as fixed pitches and did not read music in terms of intervals.<sup>47</sup> Solmisation is also attacked, merely showing that Salmon did not understand this system thoroughly. Even the traditional Gamut, which Salmon illustrates, contains mistakes which could have been avoided had he consulted an earlier source.<sup>48</sup> The author ends the section by saying that he has now proved that the letters A, B, C, D, E, F, and G are just as sufficient as the old system of note names.

Salmon's ideas were reviewed by the Royal Society of London.<sup>49</sup> The renowned Savilian professor of geometry John Wallis, who was very active in the Society, wrote an acknowledging letter to Salmon which was later published in *A Vindication of an Essay...* (1672). But at least one eminent composer and musician heavily opposed Salmon's suggestions and the controversy created one of the most celebrated musical pamphlet wars of the time.<sup>50</sup> Matthew Locke replies immediately to the treatise of Salmon in 1672. Locke presents the traditional Gamut with the three hexachords (*duralis*, *naturalis*, and *mollaris*), and mutations together with the solmisation syllables and defends the use of it.<sup>51</sup> Locke replies that Salmon apparently does not know how to

unnecessary...

<sup>47</sup> Ibid., p. 22:

For Musick-masters, that their Lesson may fall best within the compass of five lines, place the Cliffs in any line; by which means there are, in truth, as many Cliffs as lines; and as many alterations, as both lines and spaces can make.  
Perhaps some will say, they only observe the Intervalls of following Notes, and so care not upon what lines and spaces they are situated; which, indeed, is the best way as things are; but this won't do...

<sup>48</sup> Ibid., p. 17. The system of mutations and the *scala duralis* and *mollis* are completely mixed up.

<sup>49</sup> The Royal Society of London, *The Philosophical Transactions*, vol. 6, no. 80 (February 1671/72), 3095; cf. Sir John Hawkins, op. cit., vol. 2, p. 717; and Leta Miller and Albert Cohen, *Music in the Royal Society of London, 1660-1806* (Detroit 1987), p. 53. However, one scientist closely connected with the Society, Christiaan Huygens, had his doubts regarding Salmon's propositions (Huygens, "Musique et mathématique musique", *Oeuvres complètes...* (The Hague 1940), vol. 20, p. 136).

<sup>50</sup> A discussion of this controversy is found in Lillian M. Ruff, op. cit., pp. 92-8 et passim.

<sup>51</sup> Matthew Locke, *Observations upon a Late Book Entitled, "An Essay to the Advancement of Musick," etc., Written by Thomas Salmon* (London 1672), p. 10.



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use the old Gamut with regard to vocal music:

...From this fixedness (for so he'l have it) ariseth the destruction of his whole design, and indeed, makes it appear that he either understands not, or wilfully mistakes the proper use of the old Scale as to Vocal Musick...<sup>52</sup>

Furthermore, that Salmon advocates the recognition of the octave as circular or the Gamut as being several circles instead of a ladder, does not solve anything. Locke finds it confusing that the octaves are divided in this manner:

His new Scale of A. B. C. D. E. F. G. confusedly divides it self at every Octave Note or Tone, and consequently Tinker-like instead of mending one hole makes two or three, imposing a necessity of more mutability and perplexity, where each part enjoys its own latitude, than was or could be in the old; and (by not planting the beginning of his second Octave inclusive to the first) making that same Note or Tone to be in several places or distances at the same time.<sup>53</sup>

Locke's rather severe criticism of Salmon's propositions forces Salmon to reply and explain his ideas more thoroughly. In *A Vindication of an Essay to the Advancement of Musick* (London 1672), Salmon, referring to Morley's treatise, argues that the previous solmisation system with only six syllables does not agree with the circular octave and that foreigners added an extra syllable making it circular.<sup>54</sup> Salmon continues his argumentation and remarks that he only wants to combine the nature of music with theory and practice:

By which discourse I have not only endeavoured to clear my *Hypothesis*, to vindicate my Reputation for circulating in an *impertinent*

<sup>52</sup> Ibid., p. 12.

<sup>53</sup> Ibid., p. 11.

<sup>54</sup> Thomas Salmon, *A Vindication of an Essay* (London 1672), p. 14:

...Forreigners who retain *Ut* and *Re*, have generally added the seventh Monosyllable *Bi*; and therefore I doubt are somewhat guilty of circulation, which is thereby brought to pass at every Octave.

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*Octave* (which, let the *Observer* say what he will, is the very nature of Musick, both to its division, and the return of the Similar Notes into the same places) but also attempted to unite the Theory and Practise.<sup>55</sup>

The author observes that when recognising "the circulation of the Capital Letters", then the old Gamut is useless and there is, therefore, no need to use ten lines. Hence he proposes a new universal clef.<sup>56</sup>

The following year Locke is inclined to answer Salmon's attacks and responds very fiercely. Locke agrees that there are only seven different notes within an octave which are then repeated. However, the author argues that this is more easily discerned in the old Gamut than in the new one proposed by Salmon. Locke explains that it is possible to distinguish the octaves in the old Gamut, since each note is characterised by different names.<sup>57</sup> Locke is supported by the publisher John Playford, who wrote a short answer in Locke's pamphlet. Also Playford ridicules Salmon's concept of the circular octave and Gamut; but neither Locke nor Playford seem to disagree with Salmon that there are only seven different notes and those an octave above or below are the same. It is the interpretation of the Gamut as a continuous scale or as interlocking octaves which seems to be to crux of disagreement. Playford compares the "New Gamut" with a "whirligig," that is, Salmon's "Cart Wheel with Seven Spokes".<sup>58</sup>

It must be said that neither Salmon's nor Locke's criticism is very constructive and there seems to lie more behind the discussion than just the conception of the Gamut. That Locke does oppose the use of seven letters only, skipping all the syllables, seems rather peculiar: already Simpson claimed that the notes are distinguished by the letters A, B, C, D, E, F, and G which are then repeated:

All Musick, whether Vocal or Instrumental, is formed of Seven Gradual Tones, or Degrees of Sound... These Seven Tones or Degrees, are

<sup>55</sup> Ibid., p. 28.

<sup>56</sup> Ibid., pp. 37-40.

<sup>57</sup> Matthew Locke, *The Present Practice of Musick Vindicated against the Exceptions and New Way of Attaining Musick Lately Publish'd by Thomas Salmon* (London 1673), pp. 81-2.

<sup>58</sup> Ibid., p. 84.

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marked or distinguished in the Scale of Musick by the same seven Letters which, in the Kalendar, denote the seven dayes of the Week, viz. A, B, C, D, E, F, G, after which follow A, B, C, &c. over again...<sup>59</sup>

In *Observations upon a Late Book* (London 1672), Locke mentions that he was asked by Salmon for instruction in composition, but Locke declined and advised Salmon to read Simpson's "Compendium of Practical Musick".<sup>60</sup> Hence Locke must have known Simpson's interpretation of just employing the seven letters. The whole controversy between the musician and composer Locke and the consultant to the Royal Society, Salmon, might in reality have been concerned with the difference between vocal and instrumental practices. In instrumental music there would be no need to know about the traditional Gamut; on the other hand, interpreting the octave as circular is much more of an advantage. In vocal music solmisation, and hence the reading of intervals rather than of fixed pitches, was considered of paramount importance.

It is interesting to notice that those supporting Salmon are the natural philosophers or scientists belonging to the Royal Society of London and musical amateurs. Perhaps it is because of the growing desire to explain the physical aspects of sound—including the octave, leading to the new interpretation of the octave and the Gamut—that creates a controversy between the scientist of music and the creator of music. Salmon does explain that he is trying to unite theory and science of music with practice (i.e. performance),<sup>61</sup> and maybe it was this aspect in particular which Locke opposed so vehemently.<sup>62</sup> The argument concerning the unification of theory and

<sup>59</sup> Simpson, *The Division-Viol* (London 1659/1665), pp. 3-4.

<sup>60</sup> Matthew Locke, op. cit., p. 3.

<sup>61</sup> Salmon, op. cit., p. 28.

<sup>62</sup> However, one could suspect the controversy was due to personal matters since Locke seems to have known quite a few of the members of the Society. Thus Robert Hooke mentions in his diary (28 October 1672):

Dind at Lord Salisbury's in Shandoes street with Dr. Barrow, Dr. Whitchcot, Mr. Firman, Mr. Hill... Discoursd after dinner of ... new theory of musick... Mr. Lock, Dr. Holder, Dr. Outram, Dr. Beltz there.

Quot. Jamie C. Kassler and D. R. Oldroyd "Robert Hooke's Trinity College *Musick Scripts*, his Music Theory and the Role of Music in his Cosmology", *AS* 40 (1983), p. 579. The "new theory of musick" could be Salmon's *An Essay*... Both Robert Hooke and Dr. Holder (William Holder) were members of the Society. Another very active member whom Locke knew intimately was Silas Taylor who, in fact, promoted Birchensha to the Royal Society; cf. Hawkins, op. cit., vol. 2, p. 717, and Birch, op. cit., vol.

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practice was an idea which was considered of great relevance by the Royal Society, and was probably inspired by the philosophical thoughts of Francis Bacon.<sup>63</sup> Many of the experiments conducted by the Royal Society are clearly based on Bacon's discussions. In *Sylva sylvarum*, "2nd Century", Bacon deals extensively with music and sound and states that

Musicke in the Practise, hath bin well persued; And in good Variety;  
But in the Theory, and especially in the Yielding of the Courses of the  
Practique, very weakly; Being reduced into certaine Mysticall subtilities,  
of no use, and not much Truth. We shall therefore, after our manner,  
ioyne the Contemplative and Active Part together.<sup>64</sup>

Salmon's teacher, friend and publisher, John Birchensha, also emphasised the necessity of combining science and practice of music in the preface to his translation of Alsted's treatise.<sup>65</sup> It becomes even more obvious in his MS dealing with the mathematical (scientific) as well as the practical aspects of music composition and in his letters read at the meetings at the Royal Society.<sup>66</sup>

1, p. 416, "20 April 1664".

<sup>63</sup> Hawkins, op. cit., vol. 2, p. 724; and Penelope M. Gouk, "Acoustics in the Early Royal Society 1600-1680", *Notes and Records of the Royal Society* 36 (1982), p. 158. That Bacon's approach to the nature of sound and the philosophy of music theory was indeed very influential is especially apparent in Edmund Chilmead's manuscript treatise *An Examination of the... 'Natural History'* [i.e. *Sylva sylvarum*] written around 1645 (Mordechai Feingold and Penelope M. Gouk, "An Early Critique of Bacon's *Sylva sylvarum*: Edmund Chilmead's Treatise on Sound", *AS* 40 (1983), pp. 139-57). Chilmead dares to criticise Bacon's conclusions and in order not to be attacked from pro-Baconians, he argues that his aim is only to review and correct some aspects of Bacon's conclusions (ibid., p. 145).

<sup>64</sup> Francis Bacon, *Sylva sylvarum, or a Naturall History*. In *Ten Centuries* (London 1627), p. 35. As mentioned above, Bacon seems to have played an eminent role instigating experimental procedures at the Royal Society. It is interesting to notice that Bacon wrote an important work, *The Advancement of Learning* (London 1605/Oxford 1640), which could be what Salmon 'refers' to when using *An Essay to the Advancement of Musick* as a title for one of his tracts. For a short abstract of Bacon's musical ideas (experiments) in the *Sylva sylvarum*, see Peter Cahn, "Quellentext: Francis Bacon (1561-1626) *Sylva sylvarum* II, 101-114", *Mth* 1 (1986), pp. 171-83.

<sup>65</sup> John Birchensha, *Templum Musicum: Or the Musical Synopsis, of... Alstedius...* (London 1664), "To all Ingenious Lovers of Musick", sig. [unnumbered]<sup>r-v</sup>.

<sup>66</sup> Cf. Birch, op. cit., vol. 1, p. 87 (2.7 1662), p. 125 (12.11 1662), p. 418 (27.4 1664), and p. 425 (18.5 1664); Hawkins, op. cit., vol. 2, p. 726. Birchensha does not seem to have been able to fulfil the idea of combining the science and practice of music in his teaching. In a letter to Robert Boyle of the Royal Society (5.7 1664), Robert Hooke mentions:

There is a gentleman [i.e. Birchensha] here in town, that has a better way of teaching

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The lutenist Thomas Mace, born in the 1620s and therefore presumably educated according to the old Gamut, must certainly have witnessed these discussions and especially those between Locke and Salmon. In 1676 Mace published a lute treatise.<sup>67</sup> In a section called "Musick's Mystical, and Contemplative Part", Mace discusses the symbolism of the triad and Trinity, the symbolism of the number seven and the seven different tones in an octave, and also "What is the Certainty, or Ground of that Mystery of an 8th. in Musick".<sup>68</sup> In the very long explanation Mace implies that the Gamut is infinite and instead of being a ladder or three circles he shows the Gamut as a spiral. Mace considers, however, the octave as a circular concept when mentioning that the octave is nothing but a return to the unison (ILL. 3.i.5).<sup>69</sup> The Gamut was consequently slowly transformed from a ladder into a circle (or three circles) and finally to a spiral, showing that the *ambitus* is infinite and, at the same time, contained within a circle.

It seems that in England the intellectual musical amateur (natural philosophers) played an important role by asking inquisitive questions and often by misunderstanding the old terms (Pell, Birchensha, and Salmon, for example). This creates a new ground, able to fertilise new ideas concerning the conception of the octave, triads and inversions, but which are futile for the old traditional hexachordal theory, solmisation system and the two modal systems. The most conservative and those who were against the new ideas were seemingly the musicians, composers and the theorists themselves. However, the new interpretation of the octave ultimately led to new, simpler classification systems of which the major/minor keys is the most important one.

musick than what Kircher causelessly enough vaunted his *Ars Combinatoria* [*Polygraphia nova*, Rome 1663] to be, whereby he has presently taught the duke of Buckingham to compose very well, though he knows nothing of the practick of musick.

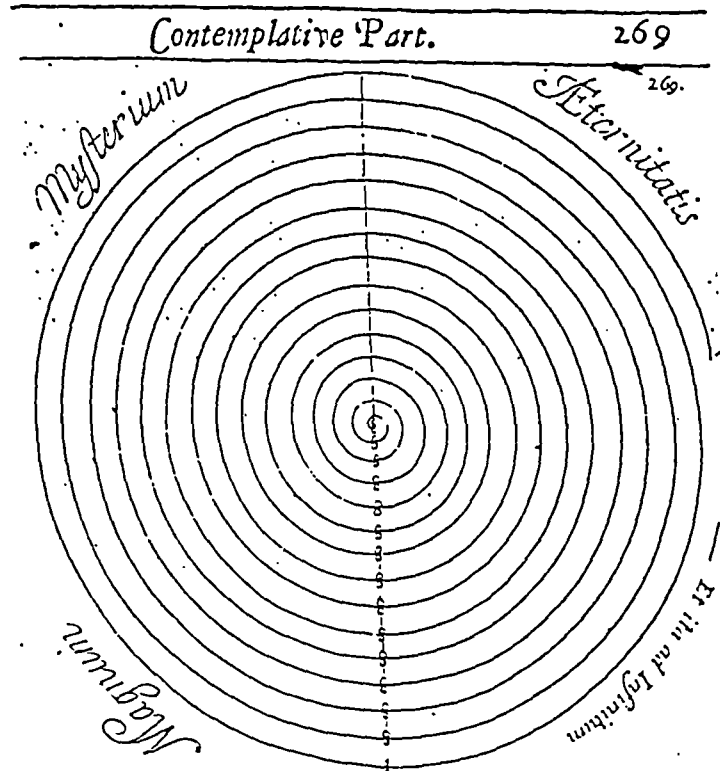
Quot. Jamie C. Kassler and D. R. Oldroyd, op. cit., p. 594.

<sup>67</sup> Thomas Mace, *Musick's Monument; or, A Remembrancer of the Best Practical Musick* (London 1676).

<sup>68</sup> Ibid., p. 267.

<sup>69</sup> Ibid., p. 269.

ILL. 3.i.5



### Great GOD.

MYSTERIOUS Center of All Myserie;  
 All Things Originate Themselves in Thee;  
 And in Their Revolution, wholly tend  
 To Thee, Their Ouse, Their Most Happy End.  
 All Things (what ere) in Nature, are Thus Rounded,  
 Thus Mystically Limited, and Bounded;  
 Some Harmonize in Diapasons Deep,  
 Others again, more Lofty Circles Keep.  
 But Thou, the Moving Cause in every Thing;  
 The Mystick Life, from whence All Life doth Spring.  
 That Little Spark of Life, which I call Mine,  
 It came from Thee; (a Precious Gift of Thine)  
 I Bless Thy Name, I Daily feel It move,  
 And Circulate towards Thee, Its Highest Love.  
 I've almost Run my Round; 'tis wellnigh past,  
 I Joy to think of Thee, (My First; My Last)  
 A Unison (at First) I was in Thee;  
 An Ouse (now at Last) I hope shall be,  
 To Round Thy Praises in Eternity,  
 In th' Unconceiv'd Harmonious Mystery.

A Per

Mace, *Musick's Monument* (London 1676), p. 269

## Bass and New Counterpoint Tables

The changing function of the bass from being a part filling in and supporting the upper parts to becoming the harmonic fundament of a composition instigated changes to other concepts such as inversions, the understanding of the invertibility of triads, and even the definition of the cadence. It became more and more popular to use the bass part for *continuo* realisation, and it was therefore essential for the players to be able to locate the cadence and to use the appropriate intervals. The term 'harmonic fundament', which was often employed by theorists of the time, was defined as the fundament upon which a harmony (*concentus*, the use of appropriate intervals) could be built. It did not signify any particular chordal progression or even define inversions of chords. The counterpoint tables also changed character due to a redefinition of the function of the bass. This section deals with the bass and briefly with the counterpoint tables, showing how the tenor could maintain its design and function in one aspect, while the bass gained importance in other aspects.

### BASS

The tenor was considered the mode-bearing part. Because the tenor was most often paired with the cantus, these two parts outlined the mode of a polyphonic piece. The two remaining parts, bassus and altus, were composed in the collateral mode. This order was sometimes also reflected when music theorists discussed the framework of a polyphonic composition. However, this does not imply that the bass was unimportant. It is obvious when reading Renaissance treatises that even theorists of that time argued the importance of the bass as the fundament of harmony.<sup>1</sup> The bass also begins to play an

<sup>1</sup> Seth Calvisius, *Melopoia seu melodiae condendae ratio* (Erfurt 1592), "De partibus Harmoniae", sig. C1<sup>r</sup>:

Bassus cum basis et fundamentum sit Harmoniae, lentiorum motum exoptat, ampliorum ambitum, et intervalla majora, facilia tamen, ne si error in candendo Basso committatur, Consonantiarum reliquarum in reliquis vocibus fiat confusio, cum Bassus ut Basis, illas omnes sustentet, roboret et augeat. Tenor modi observatissimus est.

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interesting role in that it changes function from just being the fundament to being a part which is essential in the new classification systems. Thus it was this part which was used when trying to determine the final of the mode of a piece, since the tenor very often would end on the fifth above or on the third above rather than on the final in order to produce a more full harmony.<sup>2</sup>

Theorists still maintain that the tenor is the leading part in terms of modal classification. There is no paradox between considering the bass as the fundament and the tenor as the mode-bearing part as their function is entirely different. Descartes (1618/1650), employs these definitions of tenor and bass. In the chapter on "the reason of composing," Descartes indicates that the bass is an important part, using larger leaps than the other parts; however, the tenor, he explains, is the principal part connecting all parts to one whole composition:

...The First and most Grave of all these Voices, is that which Musicians call Bassus. This is the chiefe, and ought principally to fill the ears, because all the other Voices carry the chieftest respect to the Basse... The Second, being the next to the Basse, they call Tenor; this being also in its kind, the chieftest, because it contains the Subject of the whole Modulation, and is comparatively the Nerve, which extended through the body of the Tune, doth sustain and conjoyn all the rest of its Members.<sup>3</sup>

[Because *Bassus* is the basis and the fundament of Harmony, it chooses a slower movement, a larger range, and larger yet more nimble intervals; lest a fault is committed to sing a bass [lit.: in a singing bass], a confusion of the other consonances in the remaining voices will happen as the bass as basis both supports, strengthens, and enriches all the other [parts]. The *Tenor* is most observant of the mode.]

See also Heinrich Glarean, *Dodecachordon* (Basel 1547), tr. Clement A. Miller (s.l. 1965), *MSD* vol. 6.1, p. 122; Gioseffo Zarlino, *Le institutioni harmoniche* (Venice 1558), 3.58, tr. Guy A. Marco (New Haven 1968), p. 179; and Johannes Lippius, *Synopsis musicae novae* (Strassburg 1612), tr. Benito V. Rivera, *Colorado College Music Press* (Colorado Springs 1977), vol. 8, p. 48. However, all merely echo Merlinus Cocaius (pseud. for Teofilo Folingo), *Opus Cocaii Mantuanii Macaroneacorum* (Venice 1513), lib. 10, Macaronea 20, "De musica".

<sup>2</sup> Seth Calvisius, *Exercitationes musicae duae* (Leipzig 1600), p. 37, affirms that one must look at the final of the bass to discern the mode of a composition. Also Pedro Cerone, *El melopeo y maestro. Tractado de musica theórica y práctica* (Naples 1613), p. 912, explains that one can observe the mode of a composition by looking at the final note of the bass part since the tenor, which is the mode-bearing part, very often ends on a consonance above the bass thereby "making the end [final chord] more sonorous and harmonious"; for quot., see PT. 2 SUMMARY.

<sup>3</sup> William Brouncker, *Renatus Des-cartes Excellent Compendium of Musick: With Necessary and*



## Section ii: Bass and New Counterpoint Tables

At first sight it does seem peculiar that Descartes names both the tenor and bass the most important part ("chiefest"), but the author does distinguish their importance on different grounds: the tenor is essential because it contains "the subject of the whole Modulation," that is, the mode and its particular features, whereas the bass is important, since the other parts are related to the bass which therefore must "fill the ears".<sup>4</sup>

### NEW COUNTERPOINT TABLES

Many of the Renaissance treatises dealing with counterpoint contain tables or diagrams in order to help the student to select the right intervals between the parts, thereby creating the most perfect harmony. These, often very detailed tables, reveal a desire for triadic realisation.<sup>5</sup>

Ornithoparchus (1517/1609) observes that one can begin with whatever part one wishes.<sup>6</sup> Then follows a discussion from which it is evident that Ornithoparchus first judges the interval between the tenor and cantus before proceeding to the interval between the tenor and bass.<sup>7</sup> The last part to be considered is the *altus* which doubles one of the notes in one of the other parts. Basically, the intervals considered are combinations of the perfect and imperfect intervals. Ornithoparchus also gives a very simple diagram (ILL. 3.ii.1) that shows the placement of the parts if the distance

*Judicious Animadversions Thereupon* (London 1653), p. 51.

<sup>4</sup> Later Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. B6<sup>v</sup>, claims that in former times the tenor was used as the part to determine which intervals to use in counterpoint, but now the bass has taken over this role since

[the bass] contains in it both the Aire and true iudgement of the Key, expressing how any man at the first sight may view in it all the other parts in their original essence...

<sup>5</sup> This is closely connected with framework, i.e. those parts that hold a polyphonic composition together. On various approaches to framework, see in particular Ernst Apfel, "Wandlungen des Gerüstsatzes vom 16. zum 17. Jahrhundert", *AfMw* 26 (1969), pp. 81-104, 209-35; but see also Helen E. Bush, "The Recognition of Chordal Formation by Early Theorists", *MQ* 32 (1946), pp. 227-43; Benito V. Rivera, "Harmonic Theory in Musical Treatises of Late Fifteenth and Early Sixteenth Centuries", *Music Theory Spectrum* 1 (1979), pp. 80-95; Benito V. Rivera, "The Two-Voice Framework and Its Harmonization in Arcadelt's First Book of Madrigals", *Music Analysis* 6 (1987), pp. 59-88; Rolf Dammann, *Der Musikbegriff im deutschen Barock* (s.l. 1984), p. 181 ff.; Bonnie J. Blackburn, "On Compositional Process in the Fifteenth Century", *JAMS* 40 (1987), pp. 210-84.

<sup>6</sup> John Dowland, *Andreas Ornithoparcus his Micrologus, or Introduction* (London 1609), p. 80, 87; for quot. see PT. 2.ii, note<sup>10</sup>.

<sup>7</sup> *Ibid.*, pp. 86-7.

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between cantus and tenor is a unison.

ILL. 3.ii.1

Exim. Prim.	Secundi.	Tertij.	4 <sup>u</sup> .membri.
Altus ◊	Altus ◊	Altus ◊	Altus ◊
Discā: Tenor ◊	Discā: Tenor ◊	Cantus: Tenor ◊	Dis: Tenor ◊
Bassus ◊		Altus ◊	Altus ◊
Bassus ◊	Bassus. ◊		Altus ◊
		Bassus ◊	
			Bassus ◊

Dowland, *Andreas Ornithoparcus his Micrologus* (London 1609), p. 86

A similar discussion, now including a detailed table, is found in Pietro Aaron's *Thoscanello* (1523). Aaron's discussion is more thorough than previous discourses on the subject. He mentions that one can use the tenor as basis, but at the same time he remarks that one can also use the bassus or altus if one wishes:

If you prefer to compose the *cantus*, *tenor*, or *contrabass* first, this is at your discretion, as one may observe that some composers at present begin many times with the *contrabass*, sometimes with the *tenor*, and sometimes with the *alto*.<sup>8</sup>

<sup>8</sup> *Thoscanello in musica* (Venice 1523), lib. 2, cap. 16 sig. I1<sup>v</sup>, tr. Peter Bergquist, *Colorado College Music Press* (Colorado Springs 1970), vol. 4.2, pp. 27-8. The table and discussion: lib. 2 cap. 21, pp. 35-41. According to Alfred Mann, *The Study of Fugue* (New York 1958/1987), p. 12, Aaron prefers the cantus and bassus as the basis of a composition; thus Mann concludes that this "shows that a new concept of harmony had begun to rule theoretical thinking". First of all, Aaron indicates nowhere a preference for the cantus and bassus; if any, then it is the tenor. Secondly, Mann's conclusion demonstrates how deeply the modern way of thinking is rooted in terms of harmony. Nevertheless, it is important to notice that Aaron does say "many times with the bass" and "sometimes with the tenor and alto".

## *Section ii: Bass and New Counterpoint Tables*

Aaron indicates that earlier composers thought that the cantus should be composed first, then the tenor, the bassus, and finally the altus. This order, however, created many obstacles for composers, for in using this procedure there would often be no space left for the bass-part or even the altus. Aaron therefore argues that it is better—especially for beginners—to consider all four parts simultaneously.<sup>9</sup> It must be emphasised that considering a hierarchy of importance of parts does not imply that the important ones in practice were composed first and the remaining parts added. A simultaneous conception, which was already described by Tinctoris (*Liber de arte contrapuncti*, 1477), is equally possible as Bonnie J. Blackburn (1987) has established.<sup>10</sup>

In the middle of the sixteenth century the tables gain in importance. Also Zarlino (1558) has a table of consonances. He indicates the hierarchical order as cantus, tenor, bassus, and altus, and concludes:

From these combinations anyone may compute the proper distance for the alto to be above the bass, given a certain relationship between soprano and tenor, and tenor and bass...<sup>11</sup>

The rules which Zarlino observes are essentially the same as those given by earlier theorists. In the same chapter, nevertheless, Zarlino mentions that the bass must be composed without being difficult to sing and that the "other parts may be placed to best advantage in the composition".<sup>12</sup>

In England, William Bathe (c. 1596) explains how to compose, employing a diagram showing the consonances and dissonances. Bathe claims that his diagram is a

generall Table comprehending two parts in one, of all kindes upon all plaine Songs, upon all pricke Songs, and in all wayes that may be found, one part beginning, th'other following, the plaine Song or ground being sung beneth them: all which are found by the present table, with such

<sup>9</sup> Aaron, op. cit., pp. 27-8.

<sup>10</sup> Bonnie J. Blackburn, op. cit., pp. 210-84.

<sup>11</sup> Zarlino, op. cit., 3.58, p. 183.

<sup>12</sup> Ibid.

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facilitie, that the upper part is made, and ever booked, as heere followeth.<sup>13</sup>

Bathe indicates that one can compose upon a ground or a plainsong which could be the tenor, cantus, altus, or even the bassus. He does not indicate which part one should begin with, but only mentions that one can also compose freely, using no pre-composed part (i.e. "prick-song") as opposed to plainsong.<sup>14</sup> An extensive discussion and a detailed table can be found in Thomas Morley's *Plaine and Easie Introduction* (1597) (ILL. 3.ii.2).<sup>15</sup> Morley's section is literally copied from Zarlino.<sup>16</sup> But contrary to Zarlino, Morley supplies his discussion with numerous examples showing the principles of the table.

The most interesting diagram of the late Elizabethan period is without doubt "The Triangle of Consonances" found in Robert Fludd's *Utriusque cosmi... historia* (1617-18) (ILL. 3.ii.3). This triangle, which has never been dealt with in detail before, contains squares with numbers, indicating the consonances, and black squares symbolising the dissonances, that is, intervals not to be used. Along the edges of the triangle there are lines of letters corresponding to the notes of the traditional Gamut.<sup>17</sup> In a very extensive description on how to use the triangle, it becomes evident that Fludd regarded the bass as the fundament and that the other parts should correspond to this part. Fludd claims that it is possible to build a piece by composing the bass first and then using the triangle to determine which consonances to use in the upper parts:

First, the bass is composed according to your wishes. The bass is like a fundament upon which all the other melodic parts are built, observing

<sup>13</sup> William Bathe, *A Briefe Introduction to the Skill of Song* (London s.d.), sigs. B8<sup>r-v</sup>.

<sup>14</sup> On the divergent interpretations of "prick-song", see Morley, *A Plain and Easy Introduction to Practical Music* (London 1952), ed. Alec R. Harman, p. 17 note<sup>3</sup>; "prick-song", *Oxford English Dictionary* (Oxford 1987), vol. 8, p. 1350.

<sup>15</sup> Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), pp. 126-7.

<sup>16</sup> Cf. Morley, op. cit., pp. 129-30, and Zarlino, op. cit., 3.58, pp. 182-3.

<sup>17</sup> The diagram certainly fascinated the doctor of medicine Nathaniel Highmore who copied it together with some of Fludd's compositional rules (*Notes Relating to Music*, c. 1630, GB-Lbl MS Sloane 581, fol. 1). Highmore also corresponded with the Royal Society of London; cf. Thomas Birch, op. cit., vol. 2, p. 418 (Feb. 3 1669/70).

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ILL. 3.ii.2

OF THE VNISON.	
If the treble be and the bafe your <i>Alto</i> or meane ſhal be	an vnifon with the tenor a third vnder the tenor a fifth or ſixth aboue the bafe.
But if the bafe be the <i>Alto</i> ſhal be	a fifth vnder the tenor a third or tenth aboue the bafe.
Likewiſe if the bafe be then the <i>Alto</i> may be	a ſixt vnder the tenor, a 3 or tenth aboue the bafe
And if the bafe be the other parts may bee	an eight vnder the tenor, a 3, 5, 6, 10. or 12. aboue the bafe.
But if the bafe be the meane ſhal be	a tenth vnder the tenor, a ſitt or twelfth aboue the bafe.

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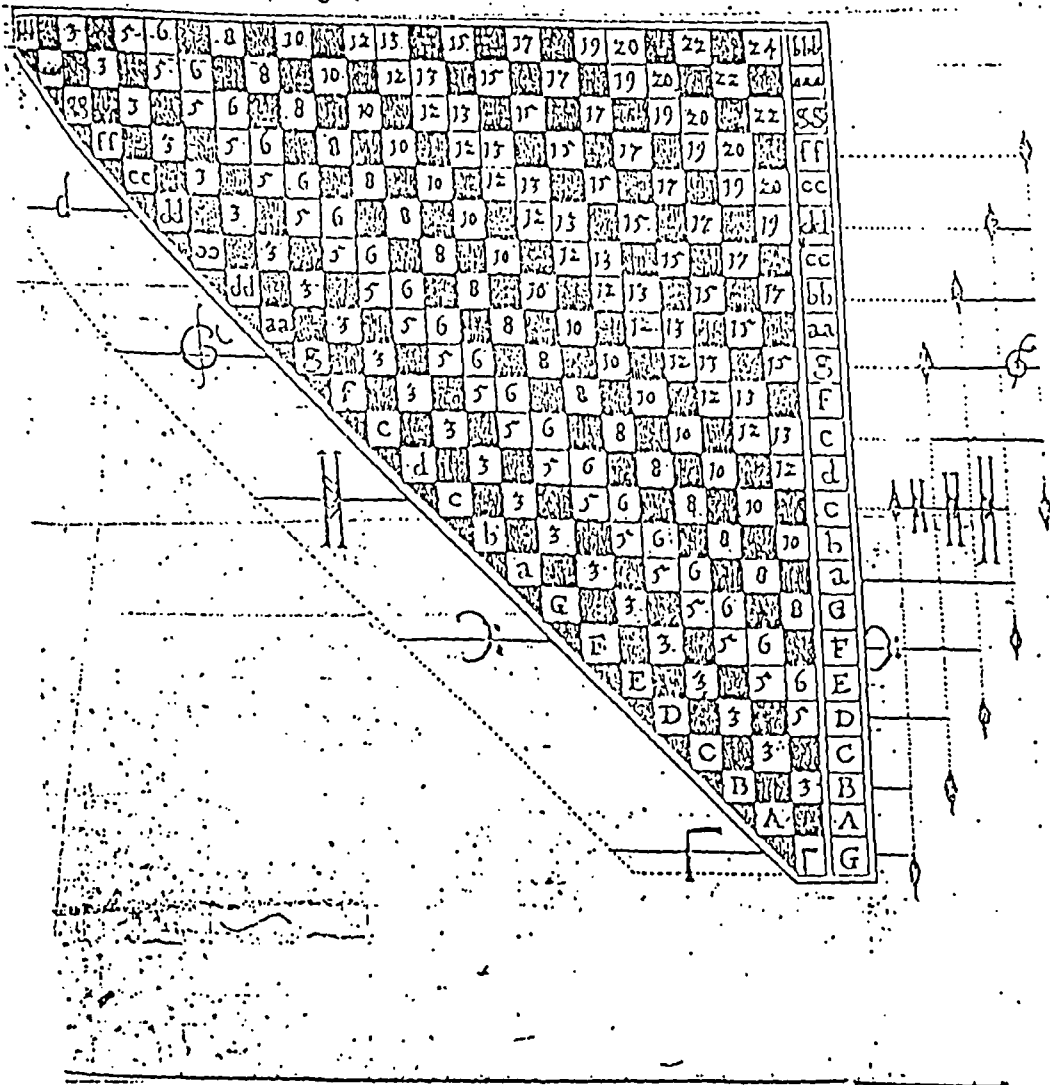
But if the bafe be the <i>Alto</i> may be made	a twelfth vnder the tenor, a 2. or 10. aboue the bafe.
<i>Alto</i> the bafe being a the other parts may be	ſitteenth vnder the tenor, a 3. 5. 6. 10. 12. and 13. aboue the bafe.
OF THE THIRD.	
If the treble be and the bafe the <i>Alto</i> may be	a third with the tenor a third vnder it an vnifon or 8. with the parts.
If the bafe be the <i>Alto</i> may be	a ſixt vnder the tenor, a third or tenth aboue the bafe.
But if the bafe be then the <i>Alto</i> ſhal be	an eight vnder the tenor, a ſitt or ſixt aboue the bafe.
And if the bafe being then the parts may be	a tenth vnder the tenor, in the vnifon or eight to the tenor or bafe.
OF THE FOVRTH.	
When the treble ſhal be and the baffe then the meane ſhal be	a fourth to the tenor a fifth vnder the tenor a 3, or 10. aboue the bafe
But if the bafe be the <i>Alto</i> ſhal be	a 12. vnder the tenor a 10. aboue the bafe
OF THE FIFTH.	
But if the treble ſhal be and the bafe the <i>Alto</i> may be	a fifth aboue the tenor an eight vnder it a 3 or tenth aboue the bafe
And if the bafe be the <i>Alto</i> ſhal be	a ſixt vnder the tenor, an vnifon or 8 with the parts
OF THE SIXTH.	
If the treble be and the bafe the <i>Alto</i> may be	a ſixt with the tenor a ſitt vnder the tenor, an vnifon or eight with the partes
But if the bafe be the <i>Alto</i> ſhal be	a third vnder the tenor, a fifth aboue the bafe.
Likewiſe if the bafe be the meane likewiſe ſhal be	a tenth vnder the tenor, a fifth or 12. aboue the bafe.
OF THE EIGHT.	
If the treble be and the bafe the other parts ſhal be	an 8. with the tenor. a 3. vnder the tenor a 3. 5. 6. 10. 12. 13. aboue the bafe
So alio when the bafe ſhal be the other parts may bee	a 5. vnder the tenor a 3. aboue the bafe.
And if the bafe be the other parts ſhal bee	an eight vnder the tenor a 3 5 10. 12. aboue the bafe.
Laſtly if the bafe be the parts ſhal make	a 12. vnder the tenor a 10. or 17. aboue the bafe.

Morley, *A Plaine and Easie Introduction* (London 1597), pp. 126-7

ILL. 3.ii.3

DE SYMPHONICÆ MELOD. PARTIBUS. . 217

duarum ad veros concentus pariendo collocandæ sunt. Hinc igitur dilucidè  
percipitur, quomodo à systematis basi melodia Symphoniaca sursum ascendendo  
generetur, partesque melodiæ harmoniacum concentum ab unico fundas-  
mento habuisse ferantur. In hac, inquam, Trianguli descriptione universali-  
tantum & melodiæ compositio exprimitur, veræque intervallorum sedes de-  
signantur, hoc est, loci primarum concordantiarum & discordantiarum, & quæ  
ab illis oriuntur, cui cantui concordantiæ simplices, & cui geminatae convenient.  
Hujus autem Trianguli descriptionem, & quomodo partibus cantus, hoc est,  
ipsarum lineis & spatiis comparatur, luculenter hîc depinximus.



Fludd, *Utriusque cosmi... historia* (Oppenheim 1617-18), p. 217

## Section ii: Bass and New Counterpoint Tables

diligently the principles and rules needed for its composition...

Having done this, the concords must be selected from the above-mentioned Triangle, and from these—by putting them together—we can build higher concords...

The melodies of the remaining parts must be placed above the bass or fundament so that all of them correspond appropriately to the bass-part, and are supported proportionally by the lower support.<sup>18</sup>

Fludd adheres strongly to the bass-derived way of composing; for him the bass was the most essential part, completely determining the features of the higher voices. However, it must be emphasised that Fludd argues that it is the lowest note which decides which consonances to use in the other parts:

It is therefore clearly perceived how a harmonised melody is produced from the system's base by ascending [to the other parts], and how the melodic parts are said to have a harmonic *concentus* from a single fundament. In this description of the Triangle the setting of all songs and melodies is formed, and the true places of the intervals are described; that is, the places of the first concords and discords, and those which proceed from them.<sup>19</sup>

<sup>18</sup> Robert Fludd, *Utriusque cosmi... historia* (Oppenheim 1617-18), "De templo musicae", lib. 5, cap. 7, pp. 217-8:

Primum pro libitu tuo componatur *Bassus*, qui est quasi fundamentum, super quod omnes aliae melodiae partes aedificantur, observando diligenter leges & regulas ad ejus compositionem requisitas...

Hoc facto eligendae sunt ex Triangulo praedicto concordantiae, quarum unione concordantias superiores aedificare possimus; super lineam ergo Hypothenusam Trianguli literae diligenter observandae sunt & praecipue graves, quae sunt quasi signa, a quibus proportionales Musicae derivantur...

Super hanc Basin sive fundamentum reliquarum partium scalae sunt elevandae, ita ut qualibet ipsarum pars apte Basi correspondeat, & quasi proportionaliter sustineatur ab inferiori illo sustentaculo...

However, Fludd seems to contradict himself, for when giving the rules for composing, he claims (p. 216) that "Omnes concordantiae Symphoniacae melodiae supra planum cantus seu Basim exprimuntur" ["All concords of harmonised melody are formed above a plainsong or a bass"].

<sup>19</sup> Ibid., p. 217:

Hinc igitur dilucide percipitur, quomodo a systematis basi melodia Symphoniaca sursum ascendendo generetur, partesque melodiae harmonicum concentum ab unico fundamento habuisse ferantur. In hac, inquam, Trianguli descriptione universalis cantuum & melodiae compositio exprimitur, veraeque intervallorum sedes designantur, hoc est, loci primarum concordantiarum & discordantiarum, & quae ab iis oriuntur,...

The description of the diagram occurs on pp. 216-20.

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Therefore, if the tenor is lower than the bass, it is of course the tenor that governs the other parts and the choice of harmonies:

And it must be observed that sometimes the tenor will occupy the position of the bass, and the bass the position of the tenor. But in this case, you must diligently consider that all the parts are governed by the lower voice...<sup>20</sup>

Nevertheless, Fludd is not the first to consider the bass as the harmonic fundament of a composition and the first part to be composed. One of the earliest and most clear statements is found in a very little known treatise, *Isagoge* (1581), by Johannes Avianius. Also Avianius remarks that it is the lowest note of a composition which should be defined as the true bass, for in some cases the tenor could descend below the bassus, or the bassus could ascend above the tenor. The tenor would in this situation act as the fundament:

We call *Basis Harmoniae* that voice which at any given moment has the lowest note. Since the voices are so variously intertwined that to the unskilled they seem to be confused, and since the bass voice can sometimes become silent, it follows that the *basis* is not always to be found in the same voice, but sometimes found even in the highest voice. The *basis* rules the entire harmony and is not ruled by any other...<sup>21</sup>

It becomes clear that Avianius and Fludd use the fundament (the lowest note) to build the harmony of the composition. This view indicates that the recognition of the 'real

<sup>20</sup> Ibid., p. 221:

Atque hoc observandum est, quod aliquando Tenor locum Bassi occupabit, & Bassus Tenoris: Sed tunc diligenter considerandum est, quod in hoc casu omnes partes gubernentur a voce graviori...

<sup>21</sup> Johannes Avianius, *Isagoge in libros musicae poeticae* (Erfurt 1581), cap. 1:

Basin vocamus Harmoniae eam vocem, quae in momento, considerando habet Clavem gravissimam. Quoniam igitur varie micentur, ut imperitis etiam confundi videantur voces, & Bassus interdum tacere potest, consequens est, non modo Basin in eadem voce non semper reperiri, verum etiam aliquando ad acutissimam pertinere. Basis autem regit universam Harmoniam, nec aliunde regitur...

Tr. Benito V. Rivera, "The *Isagoge* (1581) of Johannes Avianius: An Early Formulation of Triadic Theory", *JMT* 22 (1978), p. 47.



## Section ii: Bass and New Counterpoint Tables

bass line' is not possible. Hence they are unable to recognise inversions as containing the same harmony. Only when it is acknowledged that the lowest sounding note is not necessarily the harmonic fundament, will inversions of chords be recognised.<sup>22</sup> It is possible that Fludd had come to the new approach towards a more harmonic way of thinking through Avianius, whose treatise, however, does not seem to have been very popular.

Nowhere does Fludd mention the framework of a composition. He hardly mentions the other parts at all, except indicating that one begins with the lowest voice proceeding upwards to tenor, altus, and finally cantus. Fludd's procedure is more homophonic where a more chordal structure is sought rather than a polyphonic, and which certainly seems to have been inspired by the growing popularity of the *basso continuo*. If so, he must be considered the first English theorist ever to make use of the new approach towards the bass as a fundament and as the first part to be composed.<sup>23</sup>

Also for Thomas Campion (c. 1613) the bass was the fundamental part of a composition, since the part contains the "Aire..., expressing how any man at the first sight may view in it all the other parts in their originall essence".<sup>24</sup> Furthermore, since Campion also recognises the octave equivalency,<sup>25</sup> he cleverly sees the possibility of reducing the traditional counterpoint table into three numbers arranged in three ways:<sup>26</sup>

<sup>22</sup> See PT. 3.iv.

<sup>23</sup> Shortly after Fludd had finished his MS for the voluminous *Utriusque cosmi... historia* around 1610, Lippius published his *Synopsis musicae novae* (Strassburg 1612), which contains an example (p. 48) demonstrating the use of the bass as a fundament, also showing all the possible combinations of intervals. Johannes Lippius, op. cit., p. 48, observes that the student should start with the lowest part ascending to the tenor, altus, and cantus:

One gathers from all this that the most compendious method for the serious student of composition is first to establish... the fundamental melody, namely, the bass... To this fundamental melody one should next... notate the principal or ruling melody of the tenor. Then he should add the alto and finally the discant...

However, Lippius (ibid., p. 48) continues explaining that when the above process has been learned then one should choose to begin with the tenor or cantus:

When one has learned to do the above he can soon very easily start with the ruling melody of the tenor or discantus and the remaining voices.

<sup>24</sup> Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. B6<sup>v</sup>.

<sup>25</sup> Ibid., sig. B7<sup>r</sup>; see PT. 3.iii.

<sup>26</sup> Ibid., sig. B7<sup>r</sup>; Silas Domvill als Taylor (*Miscellaneous Works Relating to Music*, c. 1650-1700, GB-Lbl MS Add. 4910, fol. 49<sup>v</sup>) has copied Campion's table, naming it "Regula Aurea Bassi" and claiming that it is Birchensha's. However, neither in Birchensha's *Templum Musicum* nor in his MS (*A Compendious*

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TABLE 3.ii.1

8	3	5
3	5	8

The numbers indicate the intervals to be employed above a given bass-line. Because of the octave equivalency he does not have to indicate the compound intervals. Campion provides an extensive discussion on how to use this simple table and also numerous examples (EX. 3.ii.1):<sup>27</sup>

Ex. 3.ii.1

The musical notation for Example 3.ii.1 consists of four staves, each with a key signature of one flat (B-flat) and a common time signature (C). The notes are written in a style that suggests a lute or similar fretted instrument, with some notes having a 'v' (virga) below them. Above the notes, numbers indicate the intervals to be employed. The intervals are as follows:

- Staff 1: 8, 3, 8, 3, 8, 3, 5, 3, 8, 3, 8
- Staff 2: 5, 8, 5, 3, 5, 8, 3, 2, 5, 8, 5
- Staff 3: 3, 5, 3, 5, 3, 5, 8, 5, 3, 5, 3
- Staff 4: (No numbers indicated)

John Coprario, *Rules How to Compose* (1610-14), is very clear in his discussion of the method of composition. He demonstrates that when one wishes to use "chords...

*Discourse*), is this table found. On the other hand, a foreign source could have been Kircher's *Musurgia universalis* (Rome 1650) which has a similar discussion and table ("Rabdologia Musurgia, seu Abaci Musurgici descriptio", vol. 2, pp. 190-3).

<sup>27</sup> Campion, op. cit., sig. C2<sup>r</sup>.

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in Contrapoint" ("chords" meaning intervals), one looks at the bass which is the first part to be composed, adds the cantus, and first then one fills in the inner voices.<sup>28</sup> Coprario's discourse closely follows the earlier discussions; however, the essential parts are the highest and the lowest voices, and the tenor and altus have a secondary function. Thus there is a clear change in the basic framework away from interpreting the tenor as pivot and placing all the emphasis on the outer parts.

Reckoning intervals from the lowest note became so common a procedure that even the philosopher Francis Bacon mentions (1627) that the usual harmony in four parts consists of an octave, a fifth, and a third reckoned from the bass:

In Harmony, if there be not a Discord to the Base, it doth not disturbe the Harmony, though there be a discord to the Higher Parts; So the Discord be not of the Two that are Odious; And therfore the ordinary Conccent of Foure Parts consisteth of an Eight, a Fifth, and a Third to the Base.<sup>29</sup>

Christopher Simpson, writing in 1659, argues the same procedure as Coprario and Fludd, using the bass as the fundament:

I must propose unto you the Bass, as the Groundwork or Foundation upon which all Musical Composition is to be erected; and from it we are to reckon or compute all those distances or Intervalls which we use in joyning Parts together.<sup>30</sup>

<sup>28</sup> John Coprario, *Rules How to Compose*, 1610-1614, US-HU MS EL. 6863, "What chords are to be used in Contrapoint", fols. 4<sup>v</sup>-9<sup>r</sup>.

<sup>29</sup> Francis Bacon, *Sylva sylvarum, or a Naturall History. In Ten Centuries* (London 1627), "Century 109", p. 37. Though it seems that theorists were now advocating a cantus-bassus framework, Charles Butler, *The Principles of Musick, in Singing and Setting* (London 1636), p. 89, observes that one composes a bass, fitting it to the cantus (mean) or the tenor, thus implying that the cantus or tenor were to be considered before the bass part:

...according to the rules of Art, studdi to set a formal Base unto the Mean or Tenor: and after that, make the other two Parts as formal likewise and melodious as you may...

At the same time, Butler also indicates that all parts must agree with the bass as well as among each other.

<sup>30</sup> Christopher Simpson, *The Division-Viol, or the Art of Playing ex tempore upon a Ground* (London 1659/1665), p. 13.

### Part 3: Developments and New Systems

Simpson explains that when composing polyphonic music then the procedure is bass, treble, alto, and last the tenor.<sup>31</sup> It becomes clear that the inner voices of a polyphonic piece are of secondary importance and that the outer voices, cantus and bassus, receive all the attention.

Also Birchensha (1664), in his translation of Alsted's treatise (1630), observes that the bass must "be first composed. Because it is the foundation of the Triads...".<sup>32</sup> In fact, Birchensha (or Alsted) is merely paraphrasing Lippius (1612) who also mentions that "the bass, lying in the lowest place, should always strictly maintain the *prima, ima*, or *basis* of the harmonic triad", that is, triads in root position. This, Lippius claims, is his new method of composition.<sup>33</sup> On the other hand, Lippius, too, observes that the bass may, though seldom, use the third or fifth of the triad.<sup>34</sup>

These tables or diagrams of counterpoint were devices used for more than a century. During this period their main purpose, which was to indicate various combinations of intervals to be employed in counterpoint, did not change. In the Renaissance the diagrams gained very much in importance until the popular device began to fade away during the transition to the Baroque when the *basso continuo* with its figures took over the role.<sup>35</sup>

The discussion of counterpoint tables in the work of Ornithoparchus (1517) is brief when compared with Aaron (1523), Zarlino (1558) and his followers such as Morley (1597); and the discussions found in the treatises by Coprario (1610-14) and Campion (c.1613) change character and once again are drastically reduced in length. Also the idea of the tenor as the fundamental voice, according to the tradition of *ars*

<sup>31</sup> Ibid., pp. 18-9.

<sup>32</sup> John Birchensha, *Templum Musicum: Or the Musical Synopsis of... Alstedius...* (London 1664).

<sup>33</sup> Lippius, op. cit., p. 47; see Pt. 3.iv.

<sup>34</sup> Ibid., p. 51.

<sup>35</sup> See e.g. Peri's and Bianciardi's discussion tr. F. T. Arnold, *The Art of Accompaniment from a Thorough-Bass* (London 1931), vol. 1, p. 36, 74-5. On the other hand, it is of the greatest importance to remember that the continuo figures above the bass line only indicate the progression of intervals to be used in counterpoint, and that the bass was not yet considered a harmonic fundament in the modern sense. It is more likely that these figures above the bass should be compared with the numerous tables found in treatises discussing counterpoint where one part determined which intervals were appropriate for the other parts. Theorists and composers on continuo realisation all discuss the intervals to be used above the bass and never mention the harmonic aspects.

## *Section ii: Bass and New Counterpoint Tables*

*perfecta*, gradually changed to "the tenor or whichever voice you wish"; and finally Fludd's diagram (1617-18), which is one of the last of these 'consonance diagrams', now indicating that the bass, defined as the basis (i.e. the lowest sounding note) was the important and fundamental part determining which chords to use when writing upper parts.<sup>36</sup>

The counterpoint tables with their numerous examples of combinations of intervals seem to suggest that chords were not considered as a whole entity. Consequently, it was difficult to recognise the invertibility of chords. Indeed, Morley's example of how to use the table would seem to imply that he—and presumably many with him including Zarlino—categorised an F major chord in root position as being of the same affect as a D minor sixth chord. This combination of chords is presumably due to the fact that Morley states that one most often must employ the third, fifth, and octave when making a harmony, but that sometimes the sixth can be used instead of the fifth.<sup>37</sup> Hence in an F major chord, the fifth (C) can be replaced by the sixth (D) changing it into a D minor sixth chord. When recognising the invertibility of chords, that is, reducing the number of chords according to harmony, the counterpoint tables lose their importance.

<sup>36</sup> John Pell, *Portions of Treatises etc. Relating to Music*, c. 1635-66, GB-Lbl MS Add. 4388, who copied some of Campion's comments concerning the bass (fol. 50<sup>v</sup>), also tried to compose a piece which, however, is incomplete because "I did not well to build upon the Cantus. It had been better to have begun with the Bassus and to have ascended" (fol. 84<sup>v</sup>).

<sup>37</sup> For Morley's example, see op. cit., p. 131; on the replacing of the fifth with the sixth, see p. 127, 143; cf. PT. 3.viii.

## Inversions of Intervals

The recognition of the bass as having a more important role consequently meant that inversions of intervals slowly began to be defined more clearly from a vertical aspect. But the bass was not the only catalyst. The whole conception of inversions is closely related to the concept of the traditional Gamut where the octave was conceived as part of a ladder: *G*, *g*, *g'*, and *g''* were not the same notes, as they were conceived as four different steps of the ladder.<sup>1</sup> The only way of dividing the octave was into a fifth and a fourth, the thirds were generated by the division of the fifth, and the sixth by adding a third to a fourth.<sup>2</sup> At the same time, it was realised that fifths were complementary to fourths long before the discussion of the Gamut really became important. The complementarity of sixths and thirds was recognised through the art of counterpoint, but it was never used in the sense we know today.<sup>3</sup> According to the theory of modes this function did not, however, have any immediate relevance. It would make the distinction between plagal and authentic modes as well as their cadential hierarchy more vague, since the distinction between cadences a fifth above and a fourth below the final would disappear. According to theorists a cadence a fourth below a final would most often indicate a plagal mode, and a cadence a fifth above would expose an authentic mode.<sup>4</sup> Consequently, the recognition of the Gamut and octave as a circular concept was an important and different impetus and had, ultimately, wide implications for the understanding of the inversive relationships between intervals.<sup>5</sup>

The manner in which the majority of Renaissance theorists paired intervals in an apparent contradictory way has led to confusion among modern scholars such as

<sup>1</sup> Cf. PT. 1.iii.

<sup>2</sup> Cf. PT. 3.viii.

<sup>3</sup> "Counterpoint, §8 16th century", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 4, p. 843.

<sup>4</sup> Cf. PT. 2.iv.

<sup>5</sup> Cf. PT. 1.iii, PT. 3.i.

### Section iii: Inversions of Intervals

Wienpahl (1959), Kent (1961), Lester (1974), and Cohen (1984). The Renaissance method of pairing intervals can be divided into two distinct categories:

[A] *The horizontal category*, usually explained in tracts in the part dealing with modes, is divided into two: one containing the major imperfect intervals (thirds and sixths); and a second with the minor imperfect intervals. This classification arises from the conception of the *senario* and the definition of the sixths as being composite intervals. Major imperfect intervals, i.e. major third, major sixth (perfect fourth plus major third), were believed to yield one affect; minor imperfect intervals, i.e. minor third, minor sixth (perfect fourth plus minor third) contained the opposite affect.

[B] *The vertical category* is usually discussed in connection with counterpoint; this category explains the invertibility of intervals, pairing the major third with the minor sixth and the minor third with the major sixth.

Wienpahl, Lester, and others fail to divide these two seemingly opposite conceptions into two separate categories. Instead they combine the very different statements of the two categories and claim that the invertibility of intervals could not have been recognised because of the theorists' clear statements concerning the horizontal category, [A].<sup>6</sup> The present section will deal with the recognition of the invertibility of intervals mentioned as the vertical category, [B], and the influence on the conception of inversions through the new circular principle of the octave and the Gamut. Category [A] will be discussed in a later section.<sup>7</sup>

Although the octave was not divided according to inversionsal relationships between intervals, the idea was certainly considered as early as 1482 by Bartolomeo Ramos de

<sup>6</sup> For Wienpahl and Lester, see below; H. F. Cohen, *Quantifying Music: The Science of Music at the First Stage of the Scientific Revolution, 1580-1650* (Dordrecht 1984), does not realise the eminent difference there is between the two categories. He only regards the problem in connection with a general "threefold subdivision" of the main characteristics of the scientific revolution (Mathematisation, Experiment, and Mechanisation), in which Zarlino's definition of the *senario* does not fit (*ibid.*, pp. 7-9). The new way of defining the octave as a circle and the consequences which this leads to are not mentioned at all. However, Cohen does mention very briefly the octave as a repetition, but does not realise the importance of this statement (*ibid.*, p. 35). For Charles Kent, see his introd. and notes to René Descartes, *Compendium of Music*, tr. Walter Robert (s.l. 1961), *MSD* vol. 8; see also note<sup>33</sup>, below.

<sup>7</sup> Pt. 3.viii.

### Part 3: Developments and New Systems

Pareja in his *De musica tractatus*. He observes that notes above and below a *cantus firmus* are complementary to others, that is, a third and a sixth are complementary, and a fourth and a fifth are complementary. Later, in the same chapter, he mentions that a minor interval, when inverted, creates a major interval and vice versa. This is not only the case with consonances, but also with dissonances.<sup>8</sup> Gaffurio, in 1496, in his chapter on the similarities and differences between thirds and sixths also mentions that the one is complementary to the other.<sup>9</sup> Not only does Gaffurio realise the complementarity between thirds and sixths, but he is also aware that a major third is an inversion of the minor sixth and that the minor third is an inversion of the major sixth. Gaffurio's discussion is very similar to Ramos de Pareja's and it is highly possible that Gaffurio is echoing Ramos de Pareja's observations. The awareness of inversions of intervals is of no consequence in the understanding of the harmonic implications, for inversions were considered part of the art of counterpoint; hence Gaffurio (as well as Pareja) reflects on this problem in his third book, "The Art of Counterpoint". It should not come as a surprise that complementarity between intervals was acknowledged and used in counterpoint. Employing a tenor as *cantus firmus* and adding a lower part or parts above would

<sup>8</sup> Bartolomeo Ramos de Pareja, *De musica tractatus* (Bologna 1482), "Secunda pars idest contrapunctus", tr. Clement A. Miller (Neuhausen-Stuttgart 1993), *MSD* vol. 40, pp. 117-8:

It should be said that a sixth comes from a third, a third from a sixth, and a fourth from a fifth, and so a third and a sixth have the same rank because they are imperfect... But at present it may be enough to know that as much perfection a fifth has, so much a fourth approaches dissonance and recedes from consonances. Likewise, when a sixth is formed from a third and the opposite, if the creating interval is greater, a smaller interval results, and the opposite [i.e. an inversion of a major sixth gives a minor third]. The same is true of the dissonances, for a seventh is formed from a second, and the opposite...

ibid., p. 133:

One should also notice that a species or consonance which is major as a third above the tenor or below the cantus, when inverted becomes minor, as a sixth and vice versa...

One could question whether this recognition was due to his new solmisation system with eight different syllables thereby interpreting the octave as 'circular'.

<sup>9</sup> Francesco Gaffurio, *Practica musicae* (Milan 1496), tr. Clement A. Miller (s.l. 1968), *MSD* vol. 20, p. 132:

Thirds and sixths, first imperfect consonances of the simple order, can be inverted within an equisonant octave. When two notes are an octave apart, as tenor and cantus, if cantus is lowered a sixth it will become a third above the tenor; if the lower tone is raised a sixth it will reach to a third below the cantus.

For other theorists on the subject, see also Benito V. Rivera "Harmonic Theory in Musical Treatises of Late Fifteenth and Early Sixteenth Centuries", *Music Theory Spectrum* 1 (1979), p. 93.



### Section iii: Inversions of Intervals

mean observing inversions relationships. Thus in the practice of descant, which is dealt with in several late medieval English manuscript tracts, invertibility of intervals seems to be implied. However, it must be emphasised that these tracts only mention it as a practical advice for those learning to perform descant singing and does not consequently lead to the interpretation of the octave as a circle, or even for the division of the octave.<sup>10</sup> Due to the diminishing importance of writing and improvising polyphony based on *cantus firmus*, later Renaissance theorists do not discuss this subject to the same extent as Ramos de Pareja and Gaffurio, and this led Wienpahl (1959) and Lester (1974) to postulate that inversions relationships were not realised until the early Baroque.<sup>11</sup> Thus Zarlino (1558), for example, does not directly mention the invertibility of intervals, but very briefly reflects on the subject in connection with the theory of double counterpoint.<sup>12</sup>

<sup>10</sup> Thus one of the tracts (*Various Treatises Relating to Music*, Waltham Holy Cross, GB-Lbl MS Lansdowne 763, fol. 114<sup>v</sup>), compiled by John Wylde around 1460, mentions:

...the 3 benethe the plain song in sight is a 6 above in vois. the 4 benethe in sight is a 5 above in vois. the 6 benethe in sight is a 3 above in voice. the 8 benethe in sight is a unisoun in voice.

For other English sources on descant, see Manfred Bukofzer, "Geschichte des englischen Diskants und des Fauxbourdons nach den theoretischen Quellen", *Sammlung Musikwissenschaftlicher Abhandlungen* (Strassburg 1936), vol. 21, pp. 132-60. See also Sir John Hawkins, *A General History of the Science and Practice of Music* (London 1776/New York 1963), vol. 1, pp. 248-50; and Charles Burney, *A General History of Music* (London 1789/New York 1957), vol. 1, pp. 692-701. It is obvious that in this instance these theorists' approach is practical, that is, related to adding parts to a *cantus firmus*. Furthermore, music practice and theory, dealing with inversions of intervals, were two separate areas and did not necessarily influence each other. Thanks are due to Jean-Yves Haymoz for some interesting discussions on these aspects and for drawing my attention to this area.

<sup>11</sup> Robert W. Wienpahl, "Zarlino, the Senario, and Tonality", *JAMS* 12 (1959), pp. 27-41, does not notice the important statements made by Ramos de Pareja and Gaffurio or even the earlier discussion on descant. See also Joel Lester, "Root Position and Inverted Triads in Theory around 1600", *JAMS* 27 (1974), pp. 110-9; Lester, *Between Modes and Keys: German Theory 1592-1802* (New York 1989), p. 16.

<sup>12</sup> Zarlino, *Le istituzioni harmoniche* (Venice 1558), 3.62, tr. Guy A. Marco (New Haven 1968), p. 205 ff.; see also Zarlino, *Dimostrazioni harmoniche* (Venice 1571), "Ragionamento ii, Definitione x":

Given an interval, be it consonant or dissonant, it will retain the same nature if its lower note is transferred an octave higher or if its upper note is transferred an octave lower...

Tr. Benito V. Rivera, *German Music Theory in the Early Seventeenth Century: The Treatises of Johannes Lippius* (Ann Arbor 1980), p. 97. This way of reasoning is also found in Seth Calvisius, *Exercitationes musicae duae* (Leipzig 1600), pp. 63-5, and Heinrich Baryphonus, *Pleiades musicae* (Halberstadt 1615), pp. 11-2; however, these theorists can be seen as merely paraphrasing Ramos de Pareja and Gaffurio. Also Wienpahl, op. cit., pp. 33-4, though referring to a wrong *Ragionamento*, believes that Zarlino "may have understood the invertibility of intervals" (my italics). At the same time Wienpahl argues (p. 31):

It is unfortunate, perhaps, that Zarlino, as well as others both ancient and modern, be-

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It is interesting to notice that Morley (1597), when discussing inversions, does so in connection with 'Bass descant', that is, composing a melody under a given theme or plainsong. He explicitly claims that the fifth above a note is also found a fourth beneath that same note, and that a sixth above is the same as a third below and vice versa:

...but you must take heed that your cords [i.e. intervals] deceive you not, for that which above your plainsong was a third, will bee under your plainsong a sixth: and that which above your plainsong was a fourth, will bee under your plainsong a fifth: and which above was a fifth, will under the plainsong be a fourth: and lastlie, that which above your plainsong was a sixth, will under it be a third. And so likewise your discords, that which above your plainsong was a second, will be under it a seventh: and that which above the plainsong was a seventh, will be under the plainsong a second.<sup>13</sup>

Morley does not explicitly specify the minor/major relationships between inverted intervals. The master (Morley) indicates that the intervals in bass-descanting are reckoned from the lowest part and the student is rather surprised by this statement because usually the tenor was reckoned as the most important part, in this case where the *cantus firmus* was placed. Morley explains, nevertheless, that one can generate the intervals either from the bass or the upper part which is a clear indication of the diminishing importance of the tenor as the basis for deciding which intervals to employ.<sup>14</sup> It is obvious that Morley does not consider the inversion of intervals by the division of the octave or even sees the octave as a circular principle.

came enamored of the *Senario* system, because it blinded him to certain fundamental principles of inversion which otherwise might have been obvious. The minute that he considered sixths as composite intervals, he banished the idea that they were also inversions of thirds.

<sup>13</sup> Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), p. 86.

<sup>14</sup> *Ibid.*, p. 86:

PHI. But in descanting I was taught to reckon my cords from the plainsong or ground. MA. That is true: but in base descant the base is the ground, although wee are bound to see it upon the plainsong: for your plainsong is as it were your theme, and your descant (either base or treble) as it were your declamation, and either you may reckon your cordes from your base upwardes, or from the plainesong downwardes, which you list. For as it is twentie miles by account from London to Ware, so is it twenty from Ware to London.

### Section iii: Inversions of Intervals

Thomas Campion (c. 1613), in his section on counterpoint, recognises the inversional relationships between intervals "for a fourth above [the bass], is the same as that a fifth is underneath, and a fourth underneath is as a fifth above".<sup>15</sup> And indirectly he also acknowledges the relationship between sixths and thirds, for he notices that when an F#, for example, occurs in the bass it is not the fundamental note; rather, the fundamental note is the third below (D).<sup>16</sup> On the other hand, Campion, presumably ultimately relying on Zarlino (1558), still interprets the sixth as a compound of the perfect fourth and either a minor or a major third. This implies that he saw neither the octave nor the Gamut as circular.<sup>17</sup> Similar to Zarlino and others, Campion only uses the definition of the sixth (perfect fourth plus third) as a theoretical concept with no immediate consequences. However, the inversional relationships are defined and used from a practical point of view as part of the art of counterpoint. Campion's recognition of the invertibility of intervals, and using the *senario* system with its definition of sixths as composite intervals, contradicts Wienpahl's statement that acknowledging both would not be possible.<sup>18</sup> It does seem peculiar that Campion recognises the inversions not using the octave. Campion claims instead that the bass is the fundamental part of a composition and, consequently, this leads him to a recognition of inversions. Campion's realisation can ultimately be interpreted as a further development of Morley's observation that intervals may be reckoned from the bass part. Since the theorists mentioned so far do not see inversions as part of the circular octave, they can still distinguish between cadences occurring a fourth below or a fifth above a given note.

Although Robert Fludd, in his "De templo musicae" (1617-8), strongly advocates a different view of the bass, he does not instantly indicate the inversions of intervals.<sup>19</sup> This does not immediately imply that Fludd did not recognise the concept.

<sup>15</sup> Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. B7<sup>r</sup>.

<sup>16</sup> Campion, op. cit., sigs. C4<sup>v</sup>-C5<sup>r</sup>; see PT. 3.iv.

<sup>17</sup> *ibid.*, sig. C8<sup>v</sup>:

...Besides, the sixth is of it selfe very imperfect, being compounded of a third, which is an imperfect Concord, and of a fourth, which is a Discord...

Compare with Zarlino, op. cit., lib. 1, cap. 13.

<sup>18</sup> Wienpahl, op. cit., p. 31; quot. in note<sup>11</sup>.

<sup>19</sup> See PT. 3.ii.

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Central to Fludd's method of composition is the "De templi triangulo" which is used when composing parts upon a bass, for, as Fludd remarks, the bass is the fundament of a composition and the first part to be composed.<sup>20</sup> It is possible to use the diagram without any knowledge of the inversions of intervals. Nevertheless, Fludd does make an important observation which seems to suggest a wider reaching recognition of inversions than seen by previous theorists. In one of his rules, implying how to compose a cadence in the bass, the author remarks that the bass must either ascend a fourth or descend a fifth from the penultimate to the final note.<sup>21</sup> However, as Fludd avoids mentioning that an ascending fourth is the same as a descending fifth, this could also imply that the use of inversions still had cadential implications. As mentioned above, arguing that an ascending fourth is the same as a descending fifth renders the distinction between authentic and plagal modes much more vague. It is clear that Fludd's discussions are a synthesis of a practical approach to the art of composing. He simply avoids as much as possible any intricate theoretical topic in his "De templo musicae". This also explains the intense controversies that Fludd had with theorists writing on music, such as Marin Mersenne and Johannes Kepler. Though Mersenne, and to a greater extent Kepler, are known and dealt with by scholars today for their intriguing theoretical discussions and analyses, it is Robert Fludd who reveals new approaches to musical composition. Both Mersenne and Kepler are far more conservative when it comes to practice.<sup>22</sup>

<sup>20</sup> Robert Fludd, *Utriusque cosmi... historia*, (Oppenheim 1617-18), "De templo musicae", p. 212, 217, 218; see PT. 3.ii.

<sup>21</sup> Ibid., p. 213:

De Basi. Regula I. Basis penultima notula solet ut plurimum ascendendo distare ab ultima per quatuor intervalla, descendendo vero per quinque.

[Concerning the bass. First rule. The penultimate note of the bass usually ascends by a fourth or descends by a fifth to the final note.]

<sup>22</sup> That this was indeed part of the controversy is indicated by Johannes Kepler, *Apologia adversos demonstrationem... R. de Fluctibus* (Frankfurt 1622) "Ad Analysin x", ed. Max Caspar, *Johannes Kepler: Gesammelte Werke* (Munich 1940) vol. 6, p. 396:

Propterea, inquam, quod ille praxi magis indulget, ego Theoriae; ipsi quidem picturae sunt commodae, mihi theoremata.

[Therefore, I say, as he [i.e. Fludd] indulges more in practice, I [indulge] in theory.

Certainly, for him the pictures are appropriate, for me theorems.]

This is not, unfortunately, the place to deal with the interesting controversies between Fludd, Mersenne, and Kepler. The subject has briefly been dealt with by Peter Dear, *Mersenne and the Learning of the*

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Contrary to Campion, the influential theorist Johannes Lippius (1612), who had conferred with and was encouraged by Seth Calvisius, demonstrates the inversionsal relationships between all intervals by considering the octave as circular and the Gamut as three inter-related circles.<sup>23</sup> Hence Lippius is able to divide the octave not only into a fourth and a fifth, but also into a sixth and a third, a second and a seventh:

The primary dyadic root governing the simple, perfect consonances of the octave and the fourth is the fifth. The secondary root governing the imperfectly consonant major and minor sixth is the major and minor third. Thus the octave and the fourth can be radically referred back to the fifth; the major sixth to the minor third; the minor sixth, to the major third... The root of the simple dissonant dyads is the major and minor second, to which the minor and major seventh can be reduced... This matter is expedited by observing the circular octave.<sup>24</sup>

Inversionsal relationships are still interpreted in terms of two parts in counterpoint, but the sixths are now judged within the range of the octave, that is, they are not any longer considered as composite intervals.<sup>25</sup> Although Lippius mentions that the bass is the first to be composed as it is the fundamental melody and that the other parts are subsequently added, it is only a learning process for when learned, one starts with the ruling melody of the tenor or cantus, adding the remaining parts.<sup>26</sup> Lippius is still relying on traditional theory.

It becomes apparent that Campion's and Lippius' interpretation of inversions are very different. Campion acknowledges the bass as the most essential part and consequently sees the paramount importance of inversions. Furthermore, he relies on music

*Schools* (Ithaca & London 1988); Peter J. Amman, "The Musical Theory and Philosophy of Robert Fludd", *Journal of the Warburg and Courtauld Institutes* 30 (1967), pp. 198-227; and William H. Huffman, *Robert Fludd and the End of the Renaissance* (London 1988). See also my forthcoming article on Robert Fludd.

<sup>23</sup> Johannes Lippius, *Synopsis musicae novae* (Strassburg 1612), tr. Benito V. Rivera, *Colorado College Music Press* (Colorado Springs 1977), vol. 8, p. 3.

<sup>24</sup> *Ibid.*, p. 40.

<sup>25</sup> The *senario* argument is not valid any longer; see Pt. 3.viii. However, Lippius does mention the *senario* as a symbolic quality but it does not influence his conception of the circular octave (op. cit., p. 36).

<sup>26</sup> Lippius, op. cit., p. 48.

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practice, i.e. the art of counterpoint. Lippius, on the other hand, echoes the traditional theoretical view, but because he defines the Gamut as three circular octaves he also acknowledges the inversions of intervals. The difference in approach between Campion and Lippius might indicate the growing division between scientist, philosopher, and musician which took place during this period. Campion's approach is more practically orientated (though a doctor of medicine he was also a gifted composer and poet) than that of Lippius which is based more on theory and philosophy. Lippius is usually regarded as revolutionary in his discussion on some of the theoretical concepts of music.<sup>27</sup> He could have derived most of these ideas from Zarlino and even the Gamut and octave as circles he could have taken from Lanfranco (1533). The treatise by Lippius is much more far-reaching than Zarlino's philosophical discussions. But when it comes to musical practice Lippius relies heavily on the teachings of Zarlino and Calvisius.

The treatise on music by René Descartes, written in 1618, circulated widely among intellectuals at the Royal Society of London well before its publication in 1650.<sup>28</sup> When discussing the consonant proportions smaller than an octave, Descartes chooses a circle and mentions that if one part of the circle is a consonance then the remainder must also be a consonance.<sup>29</sup> Thus, in effect, Descartes recognises the complementarity of intervals, and this leads him to change the traditional diagram of the Gamut as a ladder and also the 'Guidonian Hand' into circles.<sup>30</sup> Whereas the author very early in the treatise does seem to acknowledge the inversional relationships between intervals,<sup>31</sup> later on he insists that the nature and affects of the major sixth is the same as the major third and therefore he also pairs the minor sixth with the minor third. This fact, Descartes claims, has been "observed by Practicall Musicians".<sup>32</sup> What

<sup>27</sup> Rivera, op. cit., passim; Joel Lester, *Between Modes and Keys* (New York 1989), pp. 37-45.

<sup>28</sup> Cf. PT. 3.i.

<sup>29</sup> William Brouncker, *Renatus Des-cartes Excellent Compendium of Musick: With Necessary and Judicious Animadversions Thereupon* (London 1653), pp. 16-7.

<sup>30</sup> Ibid., pp. 34-5; see ILL. 3.i.2.

<sup>31</sup> Ibid., p. 14:

...in regard it may be educed from what hath been sayd of an Eighth, from which if a Diton [major third] be cut off, the remainder will be a Sixth Minor...

<sup>32</sup> Ibid., pp. 24-5:

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Descartes is using here is the concept of composite intervals. Descartes does not provide any new interpretation of inversions but relies on previous discussions. Though he does illustrate the inversions as a division of the circular octave, it is most possible that he was inspired by Lippius or perhaps even Lanfranco. According to the editor of Descartes' *De musica*, Charles Kent, the philosopher failed to recognise the invertibility of intervals.<sup>33</sup> This is due to the fact that Charles Kent is unable to distinguish between the two fundamentally different categories, the horizontal [A] and the vertical [B]. Like other scientists of the period who were not "practicall musicians", Descartes is daring when discussing the more scientific and philosophical aspects of music, but when it comes to theory and practice he relies heavily on previous musical sources such as Zarlino. The natural philosophers could much more easily, without being burdened by tradition and musical education, ask intriguing questions and formulate new ideas in the search for a more profound understanding of the physical aspects of music, such as acoustics and the mystery of the octave.

Francis Bacon also discussed aspects of music. Having dealt with and defined sound as a concept in his *Sylva sylvarum* (1627), Bacon continues with the octave and concludes that it "is the Returne to the same Sound" as the unison whereof "the reason has still not been explained."<sup>34</sup> In the "109. Century", Bacon mentions that a four-part composition consists of an octave, a fifth, and a third reckoned from the bass and he explains that the third is merely an inversion of a sixth and the fourth of a fifth.<sup>35</sup> But

A Sixth Minor proceeds from a Third Minor, in the same Manner as a Sixth Major doth from a Ditone, and so borrows the nature and affections of a Third Minor:... a Ditone and a Sixth Major are more gratefull, more spightfull, and exhilarating than a Third and a Sixth Minor; as hath been observed by Practicall Musicians, and may be easily deduced from hence, that a Third Minor is generated from a Ditone only by Accident, but a major Sixth per se, because it is no other but a Ditone Compound.

As Descartes has quoted Zarlino in other instances, he is probably also, in this instance, referring to Zarlino as the practical musician. For a discussion of the quotation, see PT. 3.viii.

<sup>33</sup> René Descartes, *Compendium of Music*, tr. Walter Robert, introd. and notes by Charles Kent (s.l. 1961), *MSD* vol. 8, p. 20 note<sup>21</sup>, p. 25 note<sup>28</sup>, p. 27 note<sup>32</sup>.

<sup>34</sup> Francis Bacon, *Sylva sylvarum, or a Naturall History. In Ten Centuries* (London 1627), p. 36, 53.

<sup>35</sup> *Ibid.*, p. 37:

...And therefore the ordinary Concent of Foure Parts consisteth of an Eight, a Fifth, and a Third to the base; But that Fifth is a Fourth to the Treble, and the Third is a Sixth. And the cause is, for that the Base striking more Aire, doth overcome and drowne the Treble (unlesse the Discord be very Odious;)...

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this is the only aspect of music theory which Bacon mentions; he is more concerned with the mechanical aspects of music and especially the sources of sound.

Yet, since Bacon had an enormous influence on the ideas and experiments conducted at the Royal Society, it is indeed likely that his statements concerning the octave were recognised. Certainly the Society's experiments were very much based on the ideas described in the *Sylva sylvarum*.<sup>36</sup> The influence of Bacon is apparent in the works of Charles Butler (1636); not only is the philosopher quoted in Butler's musical treatise (p.54), but especially Butler's interest in the music of the bees about which he wrote a book, seems to stem from Bacon's discussion in the query "What the Cause is, of the Humming of Bees...".<sup>37</sup> Charles Butler also discusses inversional relationships between intervals. In the section on consonances and dissonances, after defining the various intervals, he continues in the same vein as Morley, mentioning that thirds and sixths are related, for, as he explains, a third above a bass note is the same as a sixth beneath the bass note. Hence the author considers inversions from the vertical point of view (category [B]). At the same time, it becomes evident that Butler sees the octave as a circular principle. But in the following paragraph, Butler combines the major sixth with the major third and the minor sixth with the minor third, thus using the horizontal viewpoint (category [A]):

Betweene the Third and the Sixt, and betweene the Fift and the Fowrth, is soom affiniti: for a Third to the Base, is a Sixt to his Eight; and a Sixt to the Base, is a Third to his Eight. Likewise a Fift to the Base, is a Fowrth to his Eight; and a Fowrth to the Base, is a Fift to his Eight. A Sixt beeing joined with a Third, must bee always such as the Third is:

Cf. Pt. 3.ii.

<sup>36</sup> Penelope M. Gouk, "Acoustics in the Early Royal Society 1660-1680", *Notes and Records of the Royal Society* 36 (1982), p. 158.

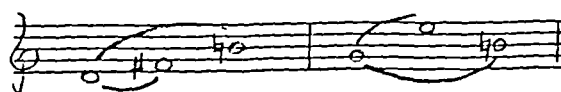
<sup>37</sup> Bacon, again, was probably inspired by Aristotle, whose philosophy played an important role in the so-called Scientific Revolution; see Mordechai Feingold and Penelope M. Gouk, "An Early Critique of Bacon's *Sylva sylvarum*: Edmund Chilmead's Treatise on Sound", *AS* 40 (1983), p. 152. Hooke and Pepys, also members of the Royal Society, took great interest in the humming of flies; Robert Latham and William Matthews (eds.), *The Diary of Samuel Pepys* (London 1974), vol. 7 [1666], p. 239; Penelope M. Gouk, "The Role of Acoustics and Music Theory in the Scientific Work of Robert Hooke", *AS* 37 (1980), p. 589; Jamie C. Kassler and D. R. Oldroyd, "Robert Hooke's Trinity College *Musick Scripts*, his Music Theory and the Role of Music in his Cosmology", *AS* 40 (1983), p. 585.



### Section iii: Inversions of Intervals

if either bee perfect, the other must not bee imperfect: as becaus from *Re* to *Fa* sharp is a perfect Third; therefore *Pha* which is a Sixt, must bee likewise sharped, that it may also bee Perfect: becaus from *Sol* to *Mi* is a perfect Sixt: therefore *Pha*, beeing to *Sol* a Third, must bee sharped, that it may likewise bee Perfect.<sup>38</sup>

#### Ex. 3.iii.1



The perfect intervals, which Butler mentions, are the major thirds and sixths and the imperfect are the minor thirds and sixths, probably stemming from the *senario* concept where the major imperfect consonances preceded the minor imperfect consonances in perfection. But Butler's statement is formulated with slightly different words avoiding the definition of the sixths as composite intervals; instead the horizontal category [A] has become part of the diatonic scale.<sup>39</sup>

Butler's notion that inversional relationships between two parts, the bass and an upper part, is based on the traditional art of counterpoint. On the other hand, the pairing of major thirds and sixths etc. is interpreted from the melodic point of view and belongs to the classification of modes. Butler does not, as previous theorists such as Zarlino and even Campion, connect it with the concept of composite intervals. In the chapter dealing with the definitions of the intervals, the minor sixth is simply described as consisting of three tones and two semitones, and the major sixth is the same as four tones and a semitone.<sup>40</sup> Butler's book was the last most comprehensive English treatise on music

<sup>38</sup> Charles Butler, *The Principles of Musick, in Singing and Setting* (London 1636), p. 50. Regarding the solmisation system, see PT. 3.i. One could argue that, in this instance, Butler is dealing with the vertical category [B], showing how to avoid tritones in chords, that is, changing them from diminished chords to sixth chords. However, it becomes evident that Butler indeed refers to the melodic aspect in the same way as Zarlino and Morley, since on the next page he specifically deals with the use of the perfect and diminished fourth in chords.

<sup>39</sup> See PT. 3.viii.

<sup>40</sup> Butler, op. cit., p. 47.

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theory published in the seventeenth century; no other treatise is nearly as thorough. The recognition of the Gamut and the octave as a circular concept—and thus also the inversions of intervals—now became common concepts and did not instigate further profound discussions.

Christopher Simpson (1659) mentions very briefly that when playing diminutions, it is important to remember that a descending seventh is the same as an ascending second or that a descending sixth is the same as an ascending third.<sup>41</sup> Simpson's diagram, illustrating the circular octave, shows the inversions of all intervals except the dissonant seventh and second. Here the connection between inversions and the circular octave is made obvious:

The outmost Circle represents the Zodiack, and the Aspects of the Planets, to which you see the *Diapason* with its Intersections exactly agreeing; as *viz.* The Two Terms thereof, to a Conjunction and Opposition; The middle Section (which generates a Fifth on one side and a Fourth on the other)... A Third and a Sixth completing also the Compass of an Octave...<sup>42</sup>

The interpretation of inversions is no longer made in connection with the art of counterpoint, now it is part of the new infinite Gamut and the definition of intervals.

At the end of the seventeenth century an important member of the Royal Society, William Holder (1694), describes in great detail the inversions of intervals by considering the octave as a circle, that is, a whole entity. Similar to Descartes, Holder explains the invertibility of thirds and sixths as being consonances found within the octave:

The System of an Eighth, containing seven Intervals, or Spaces, or

<sup>41</sup> Christopher Simpson, *The Division-Viol, or the Art of Playing ex tempore upon a Ground* (London 1659/1665) p. 32:

...you are to consider that a Seventh or Sixth falling, is the same as a Second or Third rising, and so you may consider all other distances, with their opposite Octaves.

See ILL. 3.i.4.

<sup>42</sup> Ibid., p. 25; Simpson discusses the diagram on p. 24.

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Degrees, and eight Notes reckoned inclusively, as expressed by eight Chords, is called Diapason, *i.e.* a System of all intermediate Concords, which were anciently reputed to be only the Fifth and the Fourth, and it comprehends them both, as being compounded of them both: And now, that the Thirds and the Sixths are admitted for Concords, the Eighth contains them also: *Viz.* a Third *Major* and a Sixth *Minor*, and again a Third *Minor* and a Sixth *Major*. The Octave being but a Replication of the Unison, or given Note below it, and the same, as it were in Minutire, it closeth and terminates the first perfect System, and the next Octave above it ascends by the same Intervals, and is in like manner compounded of them, and so on, as far as you can proceed upwards or downwards with Voices or Instruments, as may be seen in an Organ, or Harpsichord.<sup>43</sup>

Nevertheless, when dealing with the ratios, Holder relies entirely on the concept of *senario* where "...all Concords are in the Rations within the Number Six...".<sup>44</sup> He admits that the minor sixth (8:5) does not fit into this argument, but similar to Zarlino he explains the minor sixth as consisting of the perfect fourth and the minor third which are both contained within the *senario*.

The natural scientists, beginning with Lippius followed by Descartes and the members of the Royal Society, heavily relied on music theorists such as Zarlino when discussing the two distinct ways of looking at intervals [A] and [B]. Thus even as late as 1694, William Holder explains the definition of the *senario*. On the other hand, the practical treatises by Butler and Simpson do not define the minor sixth as a composite interval, since this definition is not relevant when acknowledging the octave as a circular principle. It must be remembered that the new conception of invertibility of intervals had a profound consequence on one particular aspect of modal theory: the subtle difference between a cadence occurring on the fourth below *finalis* and one occurring on the fifth above has vanished. The plagal and authentic distinction, in terms of the cadence, together with the much wider *ambitus* of notes available in instrumental music, has thus become obscure.

<sup>43</sup> William Holder, *A Treatise of the Natural Grounds and Principles of Harmony* (London 1694), pp. 52-3.

<sup>44</sup> *Ibid.*, p. 67; see PT. 3.viii.

## Inversions of Triads

One of the reasons why it was difficult to recognise inverted chords as representing the same harmony is due to the conflict there is when arguing that the bass is always the lowest note of a composition, whether it be in the bassus or in the tenor part. This argumentation suggests a conception of the Gamut as a ladder. Only when the Gamut—and hence also the octave—is seen as a circular principle, is it possible to recognise the invertibility of intervals in theory.<sup>1</sup> Consequently, when it is acknowledged that the lowest sounding note is not necessarily the fundament (i.e. the real bass-line), it will be logical to define inversionsal relationships between triads. However, as seen in PT. 3.iii, dealing with the counterpoint tables, this is not enough. In order to acknowledge the invertibility of triads, it is necessary to define a triad as an entity (i.e. as one harmony) and not as a particular combination of intervals as found in the counterpoint tables.

During the late sixteenth century, it became popular to interpret the triad from a more philosophical point of view. The triad was seen as an expression of Trinity, that is as an entity, but also as a concept which could be divided into the basic units and explained. One of the first to discuss this is the otherwise little known German poet and philosopher Rudolph Schlick (1588); he was followed by Schneegass (1591), Burmeister (1601), the English Thomas Robinson (1603), and Lippius (1612).<sup>2</sup> Thus Robinson compares the intervals of the triad with God, the Holy Trinity, and the relationship between man and God:

<sup>1</sup> That inversions of triads were not related to a fundamental triad could also partly be due to the concept of the *senario* in which, for example, the sixth was defined as the combination of a third and the perfect fourth. See PT. 3.viii.

<sup>2</sup> Rudolph Schlick, *Exercitatio qua musices origo prima* (Speyer 1588); Cyriacus Schneegass, *Isagoges musicae libri duo* (Erfurt 1591); Joachim Burmeister, *Musica autoschediastike* (Rostock 1601); Johannes Lippius, *Synopsis musicae novae* (Strassburg 1612); Thomas Robinson, *The Schoole of Musicke* (London 1603); on Schneegass, see Carl Dahlhaus, "Der Dreiklang als Symbol", *Musik und Kirche* 25 (1955), pp. 251-2; on German sources, see Benito V. Rivera, *German Music Theory in the Early Seventeenth Century: The Treatises of Johannes Lippius* (Ann Arbor 1980), pp. 138-53.

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...for Musicke is none other than a perfect harmonie, whose divinitie is seene in the perfectnesse of his proportions, as his unison sheweth the unitie, from whence all other, (concorde, discorde, consonancies, or other whatsoever) springeth, next his unitie, his third: (which is the perfectest concord that is in all Musicke) representeth the perfect, & most holie Trinitie; his fift (the most perfect consonance in all Musicke, for that it is the verie essence of all concords) representeth the perfection of that most perfect number five, which made the perfect atonement, betweene God, and man...<sup>3</sup>

Robinson's mention of the importance of the triad does not have any practical consequences. It is merely a philosophical view, trying to explain why the triad has such soothing qualities and must be striven after. Instead of seeing it as an entity and explaining it as such, Robinson divides the triad into its basic units and discusses those.

Elway Bevin's treatise on how to compose canons (1631) contains an epigram (written by Thomas Palmer), expounding upon the mystery of the triad as one single conception, though containing three different notes.<sup>4</sup> There can be no doubt that the triad was now a very important concept and received special attention, and that the purpose of counterpoint was to establish various combinations of triads. Accordingly, Charles Butler (1636) discusses the rules of counterpoint in his section on "Of the Ornaments of Melodi and Harmoni", connecting the horizontal procedures with the vertical and making sure that they both create an agreeable sound.<sup>5</sup>

Christopher Simpson (1659) reveals that two thirds above one another "constitute one entire Harmony", and continues:

This I cannot but think a significant Embleme of that Supreme and

<sup>3</sup> Thomas Robinson, op. cit., Preface.

<sup>4</sup> Elway Bevin, *A Briefe and Short Instruction in the Art of Musicke* (London 1631), sig. A4<sup>r</sup>:

...But Musicke climbs as high as *Jacobs* Scale,  
Out-vies a *Jacobs* Staffe: it doth unvaile  
Three for her in one, are no Trichotomy  
Of one in three, but a sweet Trinity  
Combin'd in one. This may (with wonder) make  
Sing Trinity in Unity, when he shall  
Heare that (which he thought harsh) prove musicall.

<sup>5</sup> Charles Butler, *The Principles of Musick, in Singing and Setting* (London 1636), pp. 55-64.

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incomprehensible THREE in ONE, Governing, Comprising, and Disposing the whole Machine of the world with all its included parts, in a most perfect and stupendious Harmony.<sup>6</sup>

Seventeen years later, the lutenist Thomas Mace explains that the Holy Trinity is symbolised in the three concords, unison, third, and fifth:

*That Profound Mystery of Mysteries, viz. of the Holy Trinity, is Perspicuously made Plain, by the Connection of Those 3 Harmonical Concords, viz. 1, 3, 5...*<sup>7</sup>

Though these English tracts explain the philosophical aspects of the triad as an entity, they do not connect it with the practical aspects of harmony in which the inverted triads contain the same notes as the triad in root position.

Rivera (1978) has drawn attention to a little tract by Johannes Avianius (1581) who, besides being one of the first to discuss the bass as the fundament, seems also to be one of the first to discuss triads in root position and inversion of triads and relate them to one another.<sup>8</sup> Avianius can accomplish this recognition because he distinguishes between the bass as the foundation of harmony and as the lowest part in a composition.<sup>9</sup> In his *Isagoge*, Avianius implies that the three notes of the triad can be arranged in three different combinations, naming the first—apparently a chord in root position—perfect; the second category with the third in the bass: imperfect; and the third (sixth-fourth chords) is named absurd:

The three notes can be arranged in three ways, and any other [combination] will only cause discord, as we will demonstrate elsewhere. There is a great difference among these three ways. The first we usually call

<sup>6</sup> Christopher Simpson, *The Division-Viol, or the Art of Playing ex tempore upon a Ground* (London 1659/1665), p. 24.

<sup>7</sup> Thomas Mace, *Musick's Monument; or, A Remembrancer of the Best Practical Musick* (London 1676), p. 265.

<sup>8</sup> Benito V. Rivera, "The *Isagoge* (1581) of Johannes Avianius: An Early Formulation of Triadic Theory", *JMT* 22 (1978), pp. 43-64.

<sup>9</sup> Cf. Pt. 3.ii.

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an arrangement of perfect consonances, the second that of imperfect, and the third that of absurd consonance.<sup>10</sup>

Hence, Avianius' approach does not explicitly show that inversions are basically of the same harmony as the root positioned chord. Contrarily, he distinctly mentions that there is a great contrast between these chords. The chords are linked not so much because they are of the same harmony but more because they contain the same notes, arranged in a different order between the parts.

In three diagrams, Joachim Burmeister (1606), who does not seem to have had any great influence on English music theory, classifies the triads according to whether they are in root position; these are then divided into two categories:<sup>11</sup>

[1] with a minor third above the bass ("Perfecti cum semiimperfectis"), a second with a major third above the bass ("Perfecti cum plenè imperfectis"),

[2] triads in first inversion which, furthermore, are divided into two sub-categories: one with a major third, and a second with a minor third (ILL. 3.iv.1).

These two main categories of triads in root position and first inverted triads are built on the diatonic scale including the degrees B $\sharp$  and B $\flat$ , i.e. the traditional Gamut. In addition, Burmeister also provides a table with triads built on the chromatic steps, E $\flat$  and G $\sharp$  (which in the table is the same as A $\flat$ ), in triads in root position; and first inverted triads built on C $\sharp$ , F $\sharp$ , and G $\sharp$ . Similar to Avianius, Burmeister explains that the bass can have either the root, third, or fifth, but neither does he seem to recognise relationships between inversions and root position triads.<sup>12</sup>

<sup>10</sup> Johannes Avianius, *Isagoge in libros musicae poeticae* (Erfurt 1581), cap. 2:

Tribus igitur modis tres Claves collocari possunt, ut nulla aliam attingat, quam causam discordiae esse alibi demonstramus. Verum magna est inter hos ipsos differentia, & primum solemus appellare Consonantiarum Perfectarum, alterum Imperfectarum, tertium absurdarum.

Tr. Rivera, op. cit., p. 48-9.

<sup>11</sup> Joachim Burmeister, *Musica poëtica* (Rostock 1606), pp. 19-22.

<sup>12</sup> Ibid., p. 22. For a list of errors in Burmeister's tables, see Joel Lester, "Root-Position and Inverted

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ILL. 3.iv.1

## Schema Primum.

Perfecti cum semiperfecti						Perfecti cum plene imperfecti					
Consoni & conjugati sui iuxta ordinem sonorum.	Para-	c	*f	*g	a		c	*f	*g	a	
	me-	c	*f	*g	a		c	*f	*g	a	
	son	a	t b	*b	t c	b	a	t b	*b	t c	b
	Me-	c	*f	*g	a		c	*f	*g	a	
		a	t b	*b	t c	b	a	t b	*b	t c	b
	son	c	*f	*g	a		c	*f	*g	a	
	Par-	E	F	G	A		E	F	G	A	
		C	*C	*D	*E	F	C	*C	*D	*E	F
	hyp-	A	t B	*B	C	D	A	t B	*B	C	D
	son	C	*C	*D	*E	F	C	*C	*D	*E	F
	Hyp-										

## Schema Secundum.

Pleni imperfecti cum semi-im-						Puri imperfecti pleni					
Consoni & conjugati sui iuxta ordinem sonorum.	Para-	*f	a	*g			*f	a	*g		
	me-	*f	a	*g			*f	a	*g		
	son	a	t b	*b	t c	b	a	t b	*b	t c	b
	Me-	*f	a	*g			*f	a	*g		
		a	t b	*b	t c	b	a	t b	*b	t c	b
	son	*f	a	*g			*f	a	*g		
	Par-	F	G	A			F	G	A		
		C	*C	*D	*E	F	C	*C	*D	*E	F
	hyp-	A	t B	*B	C	D	A	t B	*B	C	D
	son	C	*C	*D	*E	F	C	*C	*D	*E	F
	Hyp-										

Consoni sui Ordini	Para-	a					a				
	me-	a					a				
	son	t b	t c	b			t b	t c	b		
	Me-	a					a				
		t b	t c	b			t b	t c	b		
	son	a					a				
	Par-	E	F	G	A		E	F	G	A	
		C	*C	*D	*E	F	C	*C	*D	*E	F
	hyp-	A	t B	*B	C	D	A	t B	*B	C	D
	son	C	*C	*D	*E	F	C	*C	*D	*E	F
	Hyp-										

Burmeister, *Musica poetica* (Rostock 1606), pp. 19-22

Triads in Theory around 1600", *JAMS* 27 (1974), p. 113 note<sup>12</sup>.



#### Section iv: Inversions of Triads

Two years after the publication of Burmeister's *Musica poëtica* another musical theorist, Otto Siegfried Harnisch, proceeds further. First of all, Harnisch distinguishes between the real bass-line and the lowest part of a composition. Secondly, he considers the triad as a whole entity—as one sound. Thus the theorist, by combining the notes of the triad in different ways, can link the triad in root position with the first and second inverted triads:

This compound concordance [i.e. the triad], varied by the addition of the octave, is either perfect or imperfect.

Perfect [is that] in which the base [i.e. *basis*] or the lower note of the fifth is expressed in its own position or an octave lower.

Imperfect [is that] in which the base is expressed only an octave higher, and the lower voice or note of the concordance is relinquished. That [note] which is the mediant between the upper and lower [notes] of the fifth, that is, is now [the lowest note]. Where it is observed that the lower third be absent, the fourth which is left in the lower position is considered a dissonance.<sup>13</sup>

Harnisch thus notices that triads are either perfect or imperfect. The perfect are those with the bass having the lowest note of the fifth; the imperfect are those triads which have a third in the bass and those which have a fourth in the bass. When the fourth is in the bass it must be considered a dissonance.

Lippius seems to have been inspired by Harnisch, for in the *Synopsis musicae novae* (1612), Lippius remarks that

the bass may sometimes, albeit rarely, employ the *ultima* or *media* of the radical triad.<sup>14</sup>

<sup>13</sup> Otto Siegfried Harnisch, *Artis musicae delineatio* (Frankfurt 1608), p. 54 f.; Latin quot. in Eckhard Nolte, *Johannes Magirus (1558-1631) und seine Musiktraktate* (Marburg 1971), pp. 146-7; tr. Joel Lester, *Between Modes and Keys: German Theory 1592-1802* (New York 1989), p. 31.

<sup>14</sup> Johannes Lippius, *Synopsis musicae novae* (Strassburg 1612), tr. Benito V. Rivera, *Colorado College Music Press* (Colorado Springs 1977), vol. 8, p. 51; by "radical triad" Lippius means the original or basic triad or, that is, a triad in root position; "ultima" means the highest note; and "media" the middle note of the triad.

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It is obvious that Lippius, who defined both the Gamut and the octave as circular principles, recognised the function of the real bass-line. He also saw the triad as a whole entity and linked inversions of triads with the same triad in root position, as it contains the same notes. Furthermore, Lippius mentions that melodies should move stepwise and only the bass should use larger leaps; this part is the foundation of the triad, for

in this way various kinds of triads will more elegantly, more easily, and more wonderfully be mixed, combined, and arranged in proper order.<sup>15</sup>

Lippius does not give any explanation of what he means by the "proper order", but in a previous paragraph he does indicate that if the melodic parts are varied then their combination of consonances will also be mixed. Consequently, there will be a variety of different kinds of triads:

Since the portions [of consonant combinations] are varied, they demand not just one type of triad but a variety of *naturales*, *molles*, simple, "diffused," and "enlarged" triads, which can and ought to be intermingled.<sup>16</sup>

It has generally been assumed that Thomas Campion (c. 1613) is the first in England to mention and treat inversions of chords.<sup>17</sup> In the section on counterpoint, Campion explains very thoroughly how to utilise the bass to create the remaining upper parts. Similar to previous theorists, especially those dealing with *basso continuo* realisation, Campion observes that when the notes E, A, or B ♯ occur in the bass-part then one must not use the fifth above but the sixth instead.<sup>18</sup> But most important, the author

<sup>15</sup> Ibid., p. 47.

<sup>16</sup> Ibid., p. 46.

<sup>17</sup> Robert W. Wienpahl, "English Theorists and Evolving Tonality", *ML* 36 (1955), p. 386; Carl Dahlhaus, *Untersuchungen über die Entstehung der harmonischen Tonalität* (Kassel 1968), p. 104, quoting from Wienpahl; Joel Lester, "Root-Position and Inverted Triads...", *JAMS* 27 (1974), p. 113; Barry Cooper, "Englische Musiktheorie im 17. und 18. Jahrhundert", *Geschichte der Musiktheorie*, ed. Frieder Zaminer (Darmstadt 1986), vol. 9, p. 163, quoting from Lester.

<sup>18</sup> Theorists dealing with *basso continuo* realisation explain that not only the note B ♯, but also the notes E and A should use a sixth above instead of a fifth. According to the hexachordal system these three

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observes that if an F♯, for example, occurs in the bass it is not the fundamental note; rather, the fundamental note is the third below—in this case D:

...Moreover, if the Base shall use a sharpe, as in F. sharpe; then must we take the sixt of necessity, but the eight to the Base may not be used, so that exception is to be taken against our rule of Counterpoint: To which I answer thus, first, such Bases are not true Bases, for where a sixt is to be taken, either in F. sharpe, or in E. sharpe, or in B. or in A. the true Base is a third lower, F. sharpe in D. E in C. B. in G. A. in F. ...<sup>19</sup>

##### Ex. 3.iv.1



It is evident that Campion acknowledges and uses the concept of the real bass-line ("the true Base"). At the same time, it must be emphasised that though Campion simplifies the counterpoint table to combinations of a third, a fifth, and an octave above a bass, he does not deal with chordal inversions. His statement must be considered a practical device arising from "our rule of Counterpoint" so as to avoid parallel octaves. As long as Campion does not consider the harmony between chords, a full recognition of the invertibility of chords is not possible.

Butler (1636), who quotes many theorists, avoids mentioning Campion. Even later treatises, such as Simpson's (1659), do not discuss inversions of triads as being of

notes are called *mi*: B♯ belonging to the hard hexachord; E to the natural; and A to the soft hexachord. But in the *musica recta* system neither the fifth above E nor A is a diminished interval. Therefore, the reason for also indicating a sixth above E and A could be seen as implying a more harmonic approach where E is part of the triad built on C; A to the F triad; and B♯ to the triad built on G. Whether the motivation for also indicating sixths on A and E was based on the hexachordal theory (solmised as *mi*) or, on the evolving conception of inverted chords, is arguable.

<sup>19</sup> Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sigs. C4<sup>v</sup>-C5<sup>r</sup>.

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the same harmony. Referring to Morley (p. 143), Simpson only explains that triads are of two kinds: one consisting of a third, fifth, and octave; and another consisting of a third, sixth, and octave.<sup>20</sup>

Campion's formulation of the real bass-line is very clear indeed. His new ideas must have been very popular and accepted by a wider circle of people, since his small tract was reprinted several times during the seventeenth century and even edited by Henry Purcell himself.<sup>21</sup> However, Campion does not link it with inversions of triads as being of the same harmony. Even as late as 1677, Francis North, who apparently recognises the difference between inversions of chords, does not seem relate them to one fundamental chord:

Therefore the Musick is not changed but filled by adding Octaves above the upper parts: but Octaves below the upper parts that should come below the Base, would change the Musick, by changing the foundation and basis of it, to which all the Chords would have other relations than they had to the former.<sup>22</sup>

No English musical tract published during the seventeenth century seems to have been inspired by the German discussions, notably Otto Siegfried Harnisch, on the inversions of triads.

<sup>20</sup> Simpson, op. cit., p. 59. Besides Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), p. 127, 143, also Gioseffo Zarlino, *Le institutioni harmoniche* (Venice 1558), 3.59, tr. Guy A. Marco (New Haven 1968), p. 20, refers to the use of a sixth above the bass note instead of a fifth; this aspect is briefly mentioned by Robert W. Wienpahl, "Zarlino, the Senario, and Tonality", *JAMS* 12 (1959), pp. 37-8. See also PT. 3.viii.

<sup>21</sup> "A Brief Introduction the Art of Descant", *An Introduction to the Skill of Musick*, ed. John Playford (London 1694).

<sup>22</sup> Francis North, *A Philosophical Essay of Musick Directed to a Friend* (London 1677), p. 29.

## Cadences and Cadential Degrees

### CADENCES

In the Renaissance the cadential formulas were defined as particular melodic patterns which could also have a particular rhythmic set (syncopation). However, when the bass is considered the harmonic fundament, determining which intervals to employ, it is also the bass, the *clausula basizans*, which defines the cadence. Hence theorists, who consider the bass as the first part to be composed and the fundament from which the other parts should be built, define the cadence as the fourth/fifth leap in the bass.

One of the first sources in England to mention this new definition is Robert Fludd.<sup>1</sup> He seems to be an exception as he does not examine the melodic progression of the bass in a cadence in terms of counterpoint as did previous theorists, but he mentions that in order to proceed to the final cadence the bass usually proceeds by a fifth descending from the penultimate note to the final. Fludd's approach is very closely linked to his idea that the bass is the fundamental part, governing the way in which the remaining upper parts must progress. It may be suggested that Fludd, through his travels on the continent, became aware of *basso continuo* and relies more on this practice than on theory. This could also explain why he does not mention any other aspect of the traditional cadences, such as *clausula cantizans* or *clausula tenorizans*. He certainly must have known these aspects, since a very large part of "De templo musicae" is literally copied from other sources in which counterpoint is discussed.<sup>2</sup>

In discourses, dealing with continuo playing, the use of the fourth/fifth leap in the bass (*clausula basizans*) receives special attention.<sup>3</sup> Banchieri (1611), for example, considers which intervals to employ when the bass leaps a fourth up or a fifth down and argues that, when the bass uses one of these two combinations, then the interval above

<sup>1</sup> Robert Fludd, *Utriusque cosmi... historia* (Oppenheim 1617-18), "De templo musicae", p. 213; see PT. 3.iii for quot.

<sup>2</sup> See my forthcoming article on Robert Fludd.

<sup>3</sup> F. T. Arnold, *The Art of Accompaniment from a Thorough-Bass* (London 1931), vol. 1, p. 69, 76, 86, 102, et passim.

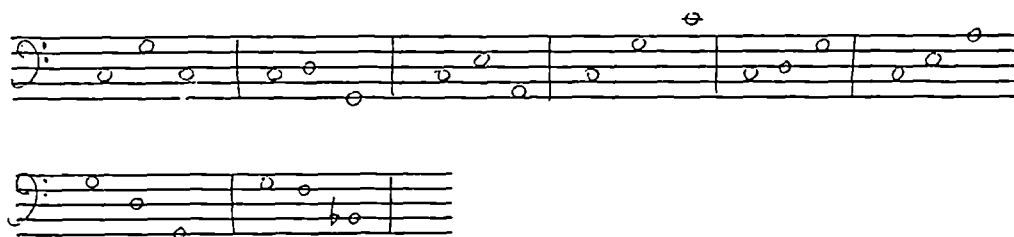
### Part 3: Developments and New Systems

the first note of the leap must be a major third.<sup>4</sup> It is also noticeable that continuo practitioners fail to make any clear distinction between an ascending fourth and a descending fifth in a cadence. The notes employed above the bass are the same in both instances, that is in modern terms, they give the same chord progression.

John Coprario (1610-14) explains that the intervals which one has to employ are the same whether the bass ascends a fourth or descends a fifth.<sup>5</sup> Coprario also expounds upon the subject "if Basso meanes to make a close", and he remarks:

The Bass meanes to make a close when he rises a 5, 2, or 3, and then falls a 5, or rises a 4. Likewise if the Bass fall a 4, or 2, and then fall a 5, he meanes to use a close.<sup>6</sup>

Ex. 3.v.1



This must be considered the first English statement explaining the melodic pattern of the cadence when using the bass as a fundament. Thus Fludd's notion of the final cadence, as a fourth/fifth leap in the bass, has been extended to consist of three notes and has also been clarified in much more precise terms.

Thomas Campion, who published his treatise around the same time as Coprario wrote his, discusses the subject with exactly the same words:

<sup>4</sup> Adriano Banchieri, *L'organo suonarino* (Venice 1605/1611), "Dialogo musicale", p. 10; cf. Gioseffo Zarlino, *Le istitutioni harmoniche* (Venice 1558), 3.53, tr. Guy A. Marco (New Haven 1968), p. 147.

<sup>5</sup> John Coprario, *Rules How to Compose*, 1610-14, US-HU MS EL. 6863, fol. 7<sup>v</sup>:

if the Bass fall a 5, you maie use the sam chords, the which you use when the Bass rises a 4.

<sup>6</sup> *Ibid.*, fol. 4<sup>r</sup>.

*Section v: Cadences and Cadential Degrees*

...that the Base intends a close as often as it riseth a fift, third or second, and then immediately either falls a fift, or riseth a fourth. In like manner if the Base falls a fourth or second: and after falls a fift, the Base insinuates a close...<sup>7</sup>

Since Coprario was the older of the two—as well as being a professional musician and composer, whereas Campion was an able amateur—it seems most likely that Campion must have copied from Coprario in some way.<sup>8</sup> Later in the seventeenth century, Thomas Mace in a very matter-of-fact way explains that the cadence can at least be determined by the leap of a fourth or fifth in the bass. Mace emphasises that using a fourth or a fifth is the same thing.<sup>9</sup>

The melodic aspects of the *clausula cantizans* with its syncopated descending and ascending semitone was now explained as intervals in relation to the bass part. When discussing melodic progressions in the parts above a given bass, Campion indirectly implies that the penultimate triad of a cadence must always contain a major third.<sup>10</sup> In Christopher Simpson's practical treatise of 1659 this very important detail is mentioned again:

...take notice, that when the *Bass* ascends a Fourth, or descends a Fifth, it commonly requires the sharp or greater Third to that Note from which it so riseth or falleth.<sup>11</sup>

Simpson's assertion shows also a great awareness of at least one harmonic progression which in modern terms can be defined as the dominant and tonic relationship. Since

<sup>7</sup> Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. D2'.

<sup>8</sup> Bukofzer believed that the opposite was the case; Coprario, op. cit., facs. ed. Manfred Bukofzer (Los Angeles 1952), "Introduction", p. 19.

<sup>9</sup> Thomas Mace, *Musick's Monument; or, A Remembrancer of the Best Practical Musick* (London 1676), pp. 226-7:

The next *Thing* shall be to inform you concerning the *Cadence*; which is always us'd at the *Conclusion* of a *Song*, or *Strain*, and oftentimes in the *Midst*; and *known certainly* by the *Falling* of the *Bass* a *Fifth*, or *Rising* a *Fourth*; both which *Signifie the same Thing*: They both passing into the *same Key*, or *Letter* of the *Scale*.

<sup>10</sup> Campion, op. cit., sig. C6', C7'.

<sup>11</sup> Simpson, *The Division-Viol, or the Art of Playing ex tempore upon a Ground* (London 1659/1665), p. 18.

### *Part 3: Developments and New Systems*

Simpson in many other instances has paraphrased Campion, this particular observation is presumably also inspired by Campion's observation concerning the bass. On the following page, Simpson remarks that in four-part counterpoint one can employ a dissonance ("a Binding-Cadence") "in that Part always which bears the sharp or greater Third to the Bass in the next Note before any Close." Although Simpson indicates at least one particular chord progression, he nevertheless declares that one uses the consonances "you think are most Convenient" in making a counterpoint. Also Thomas Mace explains which intervals to employ above the bass part and mentions that the third on the penultimate note always must be "sharp".<sup>12</sup>

Though the English authors do not deal with the relationship between the inversions of triads and the fundamental triad, they do, nevertheless, show a greater awareness of chord progression, especially in the cadence.

#### CADENTIAL DEGREES

A hierarchy of cadential degrees is also discussed in music theoretical tracts from 1600 onwards. Thus Campion, for instance, mentions that the main cadences can occur on three degrees:

1. On the final, which is used most often
2. On the fifth above, which is the second to be employed
3. And on the third above the final, which is used more rarely

This is, apparently, in agreement with previous statements concerning cadences defined by the melodic formulas *clausula cantizans* and *tenorizans*.<sup>13</sup> But where previous theorists related the cadences to the *finalis* of the mode, Campion relates them to the triad (see also EX. 3.v.2):

<sup>12</sup> Mace, op. cit., p. 227:

...The 3d. ...must always be *Sharp*, at a *Close*.

<sup>13</sup> See PT. 2.iv.



### Section v: Cadences and Cadential Degrees

The lowest note of [the] fift, beares the name of the Key... then divide that fift into his two thirds, and so you shall finde out all the closes that belong to that Key.

The maine and fundamentall close is in the key it selfe, the second is in the upper Note of the fift, the third is in the upper Note of the lowest third...

The first close is that which maintaines the aire of the key, and may be used often, the second is next to be preferd, and the last, last.<sup>14</sup>

This is in accordance with Zarlino's hierarchy of cadential degrees. However, Campion avoids Zarlino's obsession with over-systematisation and mentions one exception: in an example written in the key of G, Campion argues that one cannot use the third which is B ♯, as the fifth above is a diminished interval and would create a diminished harmony.<sup>15</sup> It is necessary to use either the second or the fourth above the key instead. In the Mixolydian mode this is exactly what the Renaissance theorists, except Zarlino and some of his followers, recommended. He is aware that only when the key is a triad with the minor third lowest (minor chord) are these the possible cadence points. If it is a major chord then the third degree cannot be used. Again, it is the second or fourth degree which must be employed:

True it is that the key next above hath a great affinity with the right key, and may therefore as I said before be used, as also the fourth key above the finall key.<sup>16</sup>

Campion could have been inspired by Seth Calvisius (1600) who shows the possible cadence degrees together with the *ambitus* as chords with no clearly defined hierarchy.<sup>17</sup>

<sup>14</sup> Campion, op. cit., sig. D5<sup>r</sup>.

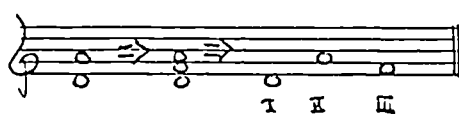
<sup>15</sup> Zarlino, op. cit., 4.20, tr. Vered Cohen (New Haven 1983), p. 61, he indicates B ♯ as a regular cadence degree, but later he mentions that very often the degree is avoided; PT. 2.iv.

<sup>16</sup> Campion, op. cit., sig. D6<sup>r</sup>.

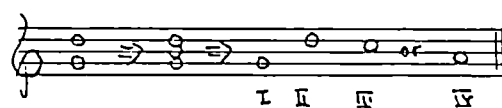
<sup>17</sup> Seth Calvisius, *Exercitationes musicae duae* (Leipzig 1600), p. 15 ff.

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EX. 3.v.2



EX. 3.v.3



EX. 3.v.4



EX. 3.v.5



### Section v: Cadences and Cadential Degrees

It must, however, be emphasised that Calvisius (as Zarlino) in these examples of cadence degrees does not mention the irregularities of modes 3, 4, 7, and 8, corresponding to the finals E and G.

Butler (1636) provides a similar explanation of the possible cadential degrees. It is obvious that Butler, contrary to Campion for example, heavily relies on previous theory. First he classifies cadences "in respect of the Air" (i.e. the mode or key) as either "proper" or "improper". The proper are also named the primary and these are formed on the key (or the octave above or below) of the composition; the improper or secondary cadences appear on the fifth above the key, and on the third above or the fourth above:

The Secundari Cadences ar three: formed in the three Consonant Intervalls of the Tone. The first in the medieti of the Diapason: which is the highest Note of the Diapente: the second in the medieti of Diapente, which is the Third: and the Third in the middle betweene the Fift and the Third, which is the Diatessaron. So that all the proper Cadences (one Primari, and three Secundari,) ar contained in the Tone's Diapente.<sup>18</sup>

Although Butler's explanation is complicated he is in agreement with Campion. Curiously, also he provides an example in G, but in *cantus mollis* and explains that also in this key is the fourth above a "proper Cadence", even preceding the cadence on the third degree in importance. On the other hand, he does go further than Campion, explaining that in the keys C, F, and G, the third is not used as a cadential degree, and in the keys D and A the fifth is excluded because the G# does not belong to the D-tonality and D# does not belong to the A-tonality. In these cases the fourth above the key is employed.<sup>19</sup> The improper cadences which Butler mentions occur on the second, sixth or seventh degree. These are also known as *clausulae peregrinae*.

Later theorists, such as William Brouncker (1653; tr. of Descartes 1650), still rely on what Zarlino has to say regarding cadences.<sup>20</sup> Also Birchensha (1664) merely

<sup>18</sup> Charles Butler, *The Principles of Musick, in Singing and Setting* (London 1636), p. 83.

<sup>19</sup> Ibid., p. 83, and note (k), p. 87.

<sup>20</sup> William Brouncker, *Renatus Des-cartes Excellent Compendium of Musick: With Necessary and*

### Part 3: Developments and New Systems

paraphrases the Zarlinian tradition.<sup>21</sup> Only with Christopher Simpson (1659) are the cadential degrees again explained in the same vein as Campion and Butler:

In making a Bass three things must be observed; First, that it be natural to the Key designed, making its middle Closes (if it have any) in such other Keys as have dependence upon the said Key; such are the Fifth and Third, if it be a Flat Key; but if it be a sharp, imploying the greater Third (which is not so proper and easie for a middle Close) you may in stead thereof make use of the Fourth or Second above the final Key...<sup>22</sup>

Simpson does not give any reasons for why the third degree in a "sharp key" cannot be employed.<sup>23</sup> The author does not otherwise discuss the cadence in greater detail.

In 1677, Francis North, a friend of Henry Purcell and a member of the Royal Society of London, briefly considers the conception of modulation:

In the progress of a long Tune other Notes may gain so great impression in the mind by dwelling upon the relatives to them, that the first Key may be forgotten, and in the same way new Notes may gain possession, so that the Key may change many times.<sup>24</sup>

*Judicious Animadversions Thereupon* (London 1653), p. 50:

That, in the end or close of each Tune, the eares be so fully satisfied, as they expect no more, but perceive the Tune to be perfect: which is most conveniently effected by some Orders of Tones alwayes ending in a most perfect Consonance, which Orders Musicians call Cadences, all the Species of which Cadences have been copiously enumerated by Zarlinus.

Brouncker's translation also includes a commentary and criticism of Descartes but he does not, unfortunately, discuss the cadences in more detail.

<sup>21</sup> John Birchenha, *Templum Musicum: Or the Musical Synopsis of... Alstedius...* (London 1664), p. 68, 81.

<sup>22</sup> Simpson, *The Division-Viol, or the Art of Playing ex tempore upon a Ground* (London 1659/1665), p. 17.

<sup>23</sup> This detail was at least considered of importance to Christiaan Huygens (c.1661) who read Simpson's treatise and made some notes (Huygens, "Musique et mathématique musicale", *Oeuvres complètes publiées par la société hollandaise des sciences* (The Hague 1940), vol. 20, p. 130):

En *b* mol l'on fait des cadences sur la note mediant. Mais cela n'est pas aisè en *♯*; mais alors il veut la cadence mediant à la seconde ou quarte plus haut que la finale...

[In *b* mol one makes the cadences on the mediant. However, this is not possible in *♯*, but made on the second or the fourth above the final...]

<sup>24</sup> Francis North, *A Philosophical Essay of Musick Directed to a Friend* (London 1677), p. 22. North's

### Section v: Cadences and Cadential Degrees

Unfortunately, North does not discuss modulation in greater detail, but he goes on to explain that in short pieces the cadences may occur on the fifth or the third degree "which does not destroy the memory of the first Key Note" before concluding on the key of the composition.<sup>25</sup> When Henry Purcell edited Campion's treatise for John Playford in 1694 the hierarchy of cadence degrees has indeed changed (see ILL. 3.v.1):

To a *flat Key*, the Principal is the *Key* it self, the next in dignity the *Fifth* above, and after that the *Third* and *Seventh* above...

To a *sharp Key*, the *Key* it self first, the *Fifth* above, and in stead of the *Third* and *Seventh*, (which are not so proper in a *sharp Key*) the *Sixth* and *Second* above...

These Examples [see below] are placed in the two open *Keys* to make it plainer, but transpose them into any other, they have the same effect; in applying of which Closes, you may use them promiscuously as you please, only with this Caution, That you have regard to good Ayre.<sup>26</sup>

The minor key makes use of the same cadential degrees as earlier, but the seventh degree has now been added. Also Purcell avoids the problematic third step in the major keys; he recommends the sixth degree and the second degree instead. The fourth degree is completely avoided. That Purcell has included the seventh and second degrees does not immediately imply that these were considered regular cadential points. Instead, they have become a natural part of the modulatory scheme. From Purcell's discussion it is evident that the major/minor keys are accepted and approved by composers. Nevertheless, it must be emphasised that Campion's heavily revised tract addresses the beginners of composition. More advanced students would probably also gain insight into previous practices and theories.

treatise is briefly dealt with by Gertrude B. Miller, *Tonal Materials in Seventeenth-Century English Treatises* (Ph.D diss., University of Rochester 1960). According to Miller (p. 25), North only deals with tonality from a philosophical point of view, this assumption is not correct, since he clearly also discusses theory of music.

<sup>25</sup> Ibid.

<sup>26</sup> Henry Purcell, "A Brief Introduction to the Art of Descant", *An Introduction to the Skill of Musick*, ed. John Playford (London 1694), facs. ed. F. B. Zimmerman (New York 1972), p. 155-6; on major/minor keys, see PT. 3.viii-ix.

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ILL. 3.v.1



Purcell, "A Brief Introduction", *An Introduction* ed. John Playford (London 1694), pp. 155-6

## Transposition

There are two different ways of approaching the concept of transposition; both were employed during the Renaissance, but later they merged into one concept:

[1] *Cantus durus* and *mollis*, which are related to a specific transposition of modes. This is also closely linked with the authentic/plagal distinction of modes, *tessitura*, and clef combinations. It can be considered a theoretical concept, as it was a notational device which did not *per se* indicate an exact pitch location or a transposition in modern terms.<sup>1</sup>

[2] A transposition where the placement of tones and semitones is kept by adding the appropriate accidentals—a practical device.<sup>2</sup>

To be able to use [2] wholly, two areas must first be acknowledged: equal temperament or at least a tuning in which a transposition will not change the composition audibly. This requires that whole tones should preferably be divided into two (nearly) equal semitones. Thus D $\flat$ , for example, must theoretically be considered the same as C $\sharp$ . Secondly, before this practical transposition can be used, also the notational practice, that is the traditional Gamut with the solmisation system and hexachords, has to be altered. As Morley (1597) warns, the use of too many accidentals could rather confuse the singer than enlighten him because of the difficulties in solmisation.<sup>3</sup>

<sup>1</sup> See Pt. 1.iii, p. 39, above.

<sup>2</sup> There are not many studies on transposition in particular, the most extensive being Arthur Mendel, "Pitch in Western Music since 1500: A Re-Examination", *Am* 50 (1978), pp. 1-93.

<sup>3</sup> Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), p. 156:

... and what can they possiblie do with such a number of flat  $b\ b$ , which I coulde not as well bring to passe by pricking the song a note higher?

Also Gioseffo Zarlino, *Le institutioni harmoniche* (Venice 1558), 3.77, tr. Guy A. Marco (New Haven 1968), pp. 278-9, implies that modes could be transposed to steps using many accidentals and emphasises that the use of chromatic steps as part of a transposition does not change the mode. Nicola Vicentino, *L'antica musica ridotta alla moderna prattica* (Rome 1555), pp. 46<sup>r</sup>-47<sup>v</sup>, mentions three ways of notation: *cantus durus* ( $\sharp$ ); *cantus mollis* ( $\flat$ ); and "transcrittione finta" (*per b molle*) in which he employs up to three flats as key signature; thus, in this instance, modes are transposed a minor third or a whole tone downwards. Similar to Zarlino, Vicentino does it for practical reasons.

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Furthermore, the use of transpositions is closely linked with the conception of the Gamut in which pitches were considered relative and not as a set of fixed pitches. Hence a conflict between practice and theory will arise. For an instrumentalist (organist or lutenist, e.g.) the recognition of fixed pitches is essential in order that transpositions using many accidentals can be employed. However, for the singers who were schooled in a solmisation system where the reading of relative pitches was used, many accidentals will make the composition difficult to perform.

The recognition of transposing a composition to all twelve steps of the scale was not foreign to musical theorists of the late Renaissance and early Baroque. Thus the transposition of lute music was in use long before the discussion evolved in theory. This is evident from the very popular book by Adrian Le Roy, translated into English by a "Gentleman" in 1574 as *A Briefe and Plaine Instruction to Set all Musicke of Eight Divers Tunes in Tableture for the Lute*. The treatise shows how to arrange vocal polyphonic music for the lute, and Le Roy explains that for practical reasons, that is, what sounds best on the lute and what is easier to play on the lute, one can choose to transpose the composition.<sup>4</sup>

In his "De templo musicae", Robert Fludd has a fascinating diagram which in effect is a circle of transposition—a diagram to be used by lute players to learn how to transpose on their instrument (ILL. 3.vi.1). Fludd's diagram includes all steps of the scale, diatonic as well as chromatic.<sup>5</sup> Though this illustration at first sight seems "a most unusual thing for its time, since it considers all keys, equally valid...",<sup>6</sup> Fludd's idea or recognition of transposing a composition to all twelve steps of the scale was not foreign at all.<sup>7</sup>

<sup>4</sup> F. Kn. "Gentleman", *A Briefe and Plaine Instruction to Set All Musicke of Eight Divers Tunes* (London 1574), sig. II<sup>v</sup>.

<sup>5</sup> Robert Fludd, *Utriusque cosmi... historia* (Oppenheim 1617-18), "De templo musicae", p. 232. Fludd has presumably been inspired by Joan Carles Amat, *Guitarra española* (Lérida 1626/1639, dedication dated 1596), p. 16. It is possible that Fludd met Amat, a physician, guitarist and writer on astrology, medicine, and arithmetic on his journey in Spain which occurred between 1598 and 1604. On Amat's treatise, see Monica Hall, "The *Guitarra Española* of Joan Carles Amat", *EM* 6 (1978), pp. 362-73.

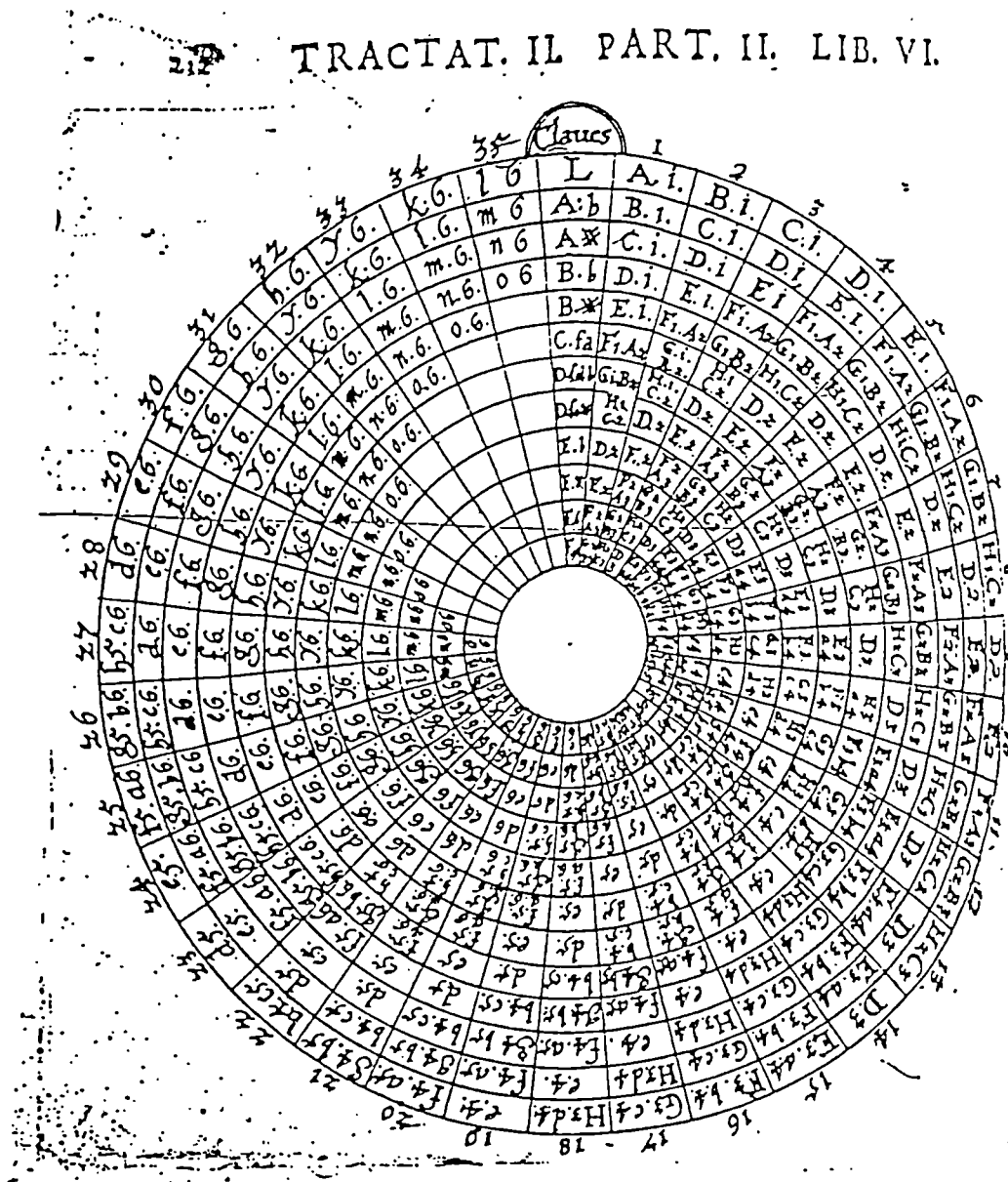
<sup>6</sup> Jocelyn Godwin, "Robert Fludd on the Lute and Pandora", *Lute Society Journal* 15 (1973), p. 19.

<sup>7</sup> On the other hand, Agostino Agazzari, *Del sonare sopra'l basso* (Siena 1607; Oliver Strunk, *Source Readings in Music History* (London 1950/New York 1965), vol. 3, p. 69), claims that transposition must



Section vi: Transposition

ILL. 3.vi.1



Fludd, *Utriusque cosmi... historia* (Oppenheim 1617-8), p. 232

be limited to a fourth or fifth upwards or downwards, and that a transposition must be natural to the mode of the composition, for using too many accidentals would make it difficult for the performer to play and would also offend the audience. Agazzari's statement indicates that he at least—and presumably many with him—in practice employed some sort of unequal temperament.

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One of the reasons why the circle of transposition is possible is because the lute uses equal temperament. The recognition of equal temperament also means that any composition can be transposed upwards or downwards by any interval, for transposition in equal temperament does not change the intervallic structures within a composition.<sup>8</sup> Furthermore, using the lute tablature when transposing, one avoids the disputable notation of accidentals. To employ transposition within the traditional Gamut would lead to many problems in notation since D $\flat$  theoretically was not considered the same as C $\sharp$ , for example.

At the same time it became common for theorists to deal with the transposition of modes a second or a third, and not only as *cantus durus* or *mollis* ([1]). Diruta, in his *Il Transilvano* (1603/1622), gives examples of how to transpose compositions a third, employing sharp accidentals, which in theory belong to *musica ficta*. However, Diruta's reason is practical, for sometimes the range is too high for the singers (or the pitch of the organ is too high) and the composition has to be transposed down to a convenient pitch:

Since you have grasped the way in which the tones are formed and also the transpositions to the fourth above and the fifth below, you must now understand another kind of transposition in order to answer the choir at a comfortable pitch both in figured music and in plainsong. Since the majority of organs are pitched high, beyond the range of the choir, the organist must accustom himself to playing a step or a third lower.<sup>9</sup>

Diruta clearly distinguishes between the two groups of transposition: one known as *cantus mollis* and *durus* and "another kind of transposition in order to answer the choir

<sup>8</sup> This was already realised by Giovanni Maria Artusi, *L'Artusi ovvero imperfettioni della moderna musica* (Venice 1600), fols. 27<sup>v</sup>-29<sup>r</sup>; quot. Karol Berger, *Theories of Chromatic and Enharmonic Music in Late Sixteenth-Century Italy* (Ann Arbor 1980), p. 93. Artusi also observes that composers certainly must have conceived their music in terms of equal temperament (Artusi, op. cit., fols. 20<sup>v</sup>-25<sup>v</sup>); for an extensive discussion of the subject, see Edward E. Lowinsky, "Adrian Willaert's Chromatic Duo Re-Examined", *Tijdschrift voor Muziekwetenschap* 17 (1956), pp. 1-36; cf. Berger, op. cit., p. 89; and Mark Lindley, "[review of:] Karol Berger, *Theories...*", *Early Music History* 2 (1982), pp. 379-80, 391-4.

<sup>9</sup> Girolamo Diruta, *Seconda parte del Transilvano Dialogo* (Venice 1609/1622), lib. 3, p. 4, tr. Murray C. Bradshaw and Edward J. Soehnlen (Henryville 1984), vol. 1, p. 102.

### Section vi: Transposition

at a comfortable pitch". Another Italian theorist and composer, Adriano Banchieri, made similar suggestions in *L'organo suonarino* (1605). He also shows how all the eight modes can be transposed so their final becomes D, thus employing sharp accidentals. This, again, is done for practical reasons, and he argues that it is for the convenience of the choir.<sup>10</sup>

These 'unusual' transpositions were considered irregular by some theorists and changed the mode from one to another. Hence Lippius (1612), when reflecting on the subject, clearly makes a distinction between vocal and instrumental transposition presumably because of the fixed pitches on instruments opposed to relative pitch in singing:

...a mode can be and usually is transposed a fourth above or equivalently a fifth below [i.e. *cantus mollis*]. This occurs mainly in instrumental music (since there is no need for it in vocal music), through the medium of chromaticism... Otherwise the piece can be transposed at the interval of a second, third, or other. In this way one mode is essentially transformed into another...<sup>11</sup>

Lippius' view that transposing a mode (i.e. a practical device [2]) is the same as transforming it into another arises because he distinguishes each mode by the triad built on the final of the mode. The fundamental triad is not the same when the mode has been transposed. Also the notion of fixed pitches seems to be of influence here, for the exact pitch of the final is the determining factor.

Thus theorists begin to argue that transposing a mode or key does not change anything except the range; that is, the intervallic relationships are the same whether the mode has been transposed or not. Charles Butler (1636), when observing that there are three different scales (i.e. the hard, natural, and soft hexachords), mentions that these are in fact the same. It is only the order of the notes and their names that are different:

<sup>10</sup> Adriano Banchieri, *L'organo suonarino* (Venice 1605/1611), pp. 43-4.

<sup>11</sup> Johannes Lippius, *Synopsis musicae novae* (Strassburg 1612), tr. Benito V. Rivera, *Colorado College Music Press* (Colorado Springs 1977), vol. 8, p. 56.

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Althowgh yet, the Mollar, which hath 2 Flats marked in it, (the one in *B*, the other in *E*) is no more flat indeede, than the Dural, which hath none: for the Dural which is sharp in both those Cliefs, hath yet 2 Flats in one Heptachord, (*C* and *F*:) and the Mollar hath no more; becaus those 2 Flats (*C* and *F*,) by the flatting of *B* and *E*, becomm whole notes, (*sol* and *ut*.) And though one wolde flat the third *Mi*-clief also, (which soom, professing to make an extraordinary flat song, have doon) and so set *Mi* in *Dla-sol-re*, *Re* in *C-sol-fa-ut*, and *Ut* in *Bfa-Bmi*; yea if hee wolde goe further, and flat *D* too; yet all wolde bee one: the song wolde proove noe more flat with all these flats, that with none of them.<sup>12</sup>

Butler concludes that it is up to the singer to decide whether to transpose or not, depending on the compass of that particular singer's voice.

John Birchensha (1664), relying on Alsted and Lippius, mentions the "uncommon" or "irregular" transposition as a particular instrumental device:

*The Mood in instrumental Musick, by the Mediation of Chromatisme, is transposed either to the fourth above; or, which is the same, to the fifth beneath. Hence, from a regular or sharp Mood, an irregular Mood is made, which is called mollis. It is transposed also to the second, third, or other Interval: So that one Mood is changed into the nature of another; as the Lydian into the Ionic...*<sup>13</sup>

Similar to Lippius, Birchensha clearly thinks of modes or keys in terms of fixed pitches instead of intervals, since he mentions the transposition of "the Lydian into the Ionic...". The placement of tones and semitones is the same in the two scales; it is only the exact pitches (the finals) that are different. Similar to Butler, Birchensha simply deals with one transposition which he names *mollis*. This is not only a transposition of a fourth up or a fifth down, but can also be made with any other interval. In accordance with Lippius, also Birchensha explains that transposition of pieces transforms them into another mode. Following this discourse, the author provides illustrations showing the

<sup>12</sup> Charles Butler, *The Principles of Musick, in Singing and Setting* (London 1636), p. 22; Butler transposes the three hexachords down a fourth, relying on English hexachordal practice.

<sup>13</sup> John Birchensha, *Templum Musicum: Or the Musical Synopsis of... Alstedius...* (London 1664), p. 82.

## Section vi: Transposition

modes, their range, syllables and transposition.<sup>14</sup> Here the traditional transposition a fourth down of the authentic modes has been confused with the plagal modes, though transposition has nothing to do with the distinction between plagal and authentic modes. In the original treatise by Alsted (1630) the names are correct; it is Birchensha who has misunderstood the terms, calling the authentic modes in a "flat song" for hypo-. Also in his manuscript treatise, *Compendious Discourse...* written around the same time, Birchensha's discussion on the modes is confusing. Here the author clearly considers the lowest note of the *ambitus* of each mode the same as the final; thus, for example, mode 2 has A as final and not D.<sup>15</sup> First, it is evident that Birchensha thinks in terms of fixed pitches where the note name is essential for the classification of a piece. Second, his discussion implies that the distinction between authentic and plagal modes has by now faded away.

One must doubt whether Birchensha knew very much at all about the traditional theory of the modes and more or less just copied the section from earlier sources without really understanding the terms. On the other hand, Birchensha was a well-known teacher in musical composition, so why should he deal with modes if they were of no value? The errors he makes suggest that he might have been an inadequate translator as Samuel Pepys also seems to imply.<sup>16</sup> Another reason could be that new concepts which could explain the new approaches to music were not yet completely developed, and

<sup>14</sup> Ibid., pp. 83-6.

<sup>15</sup> John Birchensha, *A Compendious Discourse of the Principles of the Practicall & Mathematicall Parties of Musick for the Use of the Honorable Robert Boyle. Esqu.*, c.1664, GB-The Royal Society of London, MS Boyle Papers BP.41.1, chap. 3, fol. 4'. Birchensha even refers to Glarean whom he certainly cannot have read.

<sup>16</sup> Samuel Pepys, who for a brief period was a student of Birchensha and was also a member of the Royal Society, seems to have doubted the value of some of Birchensha's methods (*The Diary of Samuel Pepys*, ed. Robert Latham and William Matthews (London 1970), vol. 3, p. 35, "24th February 1662"):

...And thence over the water to Southwarke to Mr. Berchenshaws house and there sat with him all the afternoon, he showing me his great Card of the body of Musique, which he cries up for a rare thing; and I do believe it cost much pains, but is not so usefull as he would have it.

"4th March 1667" (vol. 8, p. 96):

...This day in the barge I took Berchensha's translation of Alsted his *Templum*; but the most ridiculous book, as he hath translated it, that ever I saw in my life; I declaring that I understood not three lines together, from one end of the book to the other.

Pepys possessed a copy of the original of Alsted's book, bought on 28th October 1660.

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therefore music theorists still had to rely on the old concepts rooted in modal theory to explain some of the new approaches in compositional techniques.

Birchensha also has a somewhat unconventional way of using transposition. In the *Compendious Discourse...*, Birchensha mentions briefly that a transposition is "known by the addition of the ♭ cliffe".<sup>17</sup> On the following page of the manuscript, Birchensha presents the diatonic scale from *G* to *g* and transposes it seven times, each time adding one flat to the key signature.

ILL. 3.vi.2



Birchensha, *A Compendious Discourse* (MS c.1664), fol. 4<sup>r</sup>

The reason why Birchensha does not utilise the sharp signature to transpose could be due to the traditional concept of *cantus mollis* as a transpositional system. Since it was normal in England to transpose the hexachords a fourth, thus employing E♭ in the soft hexachord, the *cantus mollis* could appear with one or two flat key signatures.

It is evident that during the seventeenth century *cantus mollis* and *cantus durus*

<sup>17</sup> Birchensha, op. cit., chap. 4, fol. 4<sup>r</sup>.

### *Section vi: Transposition*

slowly loose their original function as transpositional systems. Instead the practical device ([2]) takes over the role; that is, the transposition "refers only to the sounding notes called for in notation by positions of the fingers... other than those regularly associated with those notes on the instrument concerned".<sup>18</sup> In this connection also the notion of fixed pitches plays an important part.

<sup>18</sup> Arthur Mendel, *op. cit.*, p. 66.

## New 8-Mode Systems

The many new evolving concepts, including the circularity of the octave, a theoretical clarification of inversions of intervals, and the definition of the real bass-line, meant that modal classification systems became difficult to apply. Consequently, attempts were made in order to adjust especially the 8-mode system to accord closer with musical practice. In effect, theorists tried to incorporate the irregularities of the modal systems and musical practice into one single system.

As discussed in Pt. 2.iv ("Clef Combinations"), some modes are more often found transposed than not, because their *tessitura* would be either too high or too low to be sung in the proper place. This is particularly the case with mode 2, which is seldom used in its original range with the final on D, since it would be too low for the bass part. This mode was normally transposed a fourth upwards (*finalis*: G), employing one flat key signature. Mode 6 often occurs transposed a fifth upwards so that the final becomes C instead of F. Mode 7, with final on G can be found transposed a fifth upwards to D, thereby employing an F# as key signature.<sup>1</sup> With the use of fixed pitches now being common practice, the method of distinguishing keys or modes according to the final became much more important. Consequently, the transposition particularly of modes 2 and 7 was treated independently and became, in effect, new modes or rather keys.<sup>2</sup>

Following some laudatory comments on Zarlino in *L'organo suonarino* (1605), Banchieri explains that the 12-mode system used by Zarlino, Tigrini, and Artusi is not the same as the traditional 8-mode system and mentions that this system, as dealt with by Guido, Gaffurio, and Aaron, is only used in church "to praise God".<sup>3</sup> Following these

<sup>1</sup> See discussion below.

<sup>2</sup> Walter T. Atcherson, "Key and Mode in Seventeenth-Century Theory Books", *JMT* 17 (1973), p. 210.

<sup>3</sup> Adriano Banchieri, *L'organo suonarino* (Venice 1605/1611), p. 39:

...dirassi ancora che gl'otto sono quelli che nelle Chiese servino per lodare Iddio,...



### Section vii: New 8-Mode Systems

statements, Banchieri explains the origin of the eight modes and shows a table with the eight modes without any thorough explanation (ILL. 3.vii.1).<sup>4</sup>

In this system mode 1 retains its original final and range, but Banchieri's second mode has G as the *finalis* with a Hypodorian structure in *cantus mollis*. Hence the traditional mode 2 was transposed a fourth upwards. Banchieri's new mode 3 is similar to the traditional Aeolian mode (mode 9) which seems to indicate the complex problems the Phrygian and Hypophrygian modes created for Banchieri and his contemporaries. The traditional Aeolian mode appears now in *cantus mollis* with the final on D as mode 7. In 1614, Banchieri extends his discussion on this 'new' 8-mode system, describing the cadences and providing musical examples (duets with the lowest part having bass figures).<sup>5</sup> With regard to his mode 7, Banchieri explains that it corresponds to mode 1 in terms of the cadence degrees and the note on which fugues can commence. The only difference is that mode 1 is notated in *cantus durus* and mode 7 in *cantus mollis*.<sup>6</sup>

The purpose of the new 8-mode system, which Banchieri proposes, seems also to have been to reduce the range required for the choirs. The traditional distinction between authentic and plagal modes is consequently eliminated, except for Banchieri's modes 3 and 4. Instead, each of the eight modes have a different final (except modes 1 and 7, 2 and 8, but the two latter are notated in *cantus mollis* and the two former in *cantus durus*), thus implying the growing importance of fixed pitches. Finals, together with *cantus durus* and *mollis*, are now the determinant factors. Again modes 3 and 4 are the exceptions.

[Again, I have instructed that the eight [modes] are those which are used in churches in order to praise God.]

<sup>4</sup> Ibid., p. 41. For further discussions see: Imogen Horsley, "Symposium on Seventeenth-Century Music Theory: Italy", *JMT* 16 (1972), pp. 50-61; Harold S. Powers, "Mode", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 12, pp. 414-5; Joel Lester, *Between Modes and Keys: German Theory 1592-1802* (New York 1989), pp. xv-xvii, 77-9; Renate Groth, "Italienische Musiktheorie im 17. Jahrhundert", *Geschichte der Musiktheorie*, ed. Frieder Zaminer (Darmstadt 1989), vol. 7, pp. 358-61.

<sup>5</sup> Adriano Banchieri, *Cartella musicale nel canto figurato, fermo, et contrapunto* (Venice 1614), pp. 68-83.

<sup>6</sup> Ibid., p. 82.

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ILL. 3.vii.1

Principiante. Mezana. Indifferente. Finale.

Primo tuono

Secondo tuono.

Terzo tuono.

Quarto tuono.

Quinto tuono.

Sesto tuono.

Settimo tuono.

Ottavo tuono.

F 2

Banchieri, *L'organo suonarino* (Venice 1605/1611), p. 41

*Principiante* is the note on which the *cantus* begins; *mezana* is the note on which to make a cadence in the middle of a verse; *indifferente* is the note on which one can make a cadence if one wishes; and *finalis* is the final note on which the choir ends.<sup>7</sup>

<sup>7</sup> Banchieri, op. cit., p. 40.

## Section vii: New 8-Mode Systems

In a manuscript compiled shortly after 1628 by the Flemish admirer of John Bull, Gulielmus à Messaus, many keyboard compositions can be found with a title implying a classification system.<sup>8</sup> The titles of the pieces suggest that two different classification systems have been employed. Thus some of the pieces have titles referring to modes, such as *Octavi Toni*, *Sexti Toni*, *Secundi Toni* etc., while others have more ambiguous titles such as *Een kindeken is uns geboren in D la sol re*, *Courante prima in Alamire* or *Præludium van Doct. Jan Bull: in C sol fa ut*. The following pieces have a tonal classification:

TABLE 3.vii.1

### Add. 23.623 Tonal Designations

fols.	2 <sup>r</sup> -9 <sup>v</sup>	<i>Fantasia sopra re re re sol ut mi fa sol. Octavi toni.</i>
	9 <sup>v</sup> -13 <sup>v</sup>	<i>Toccata di Roma Sexti toni: di hieronime ferabosco:</i>
	19 <sup>v</sup> -21 <sup>v</sup>	<i>Præludium octavi toni van Jan Bull Doct.</i>
	21 <sup>v</sup> -22 <sup>r</sup>	<i>Præludium van Doct. Jan Bull: in C sol fa ut:</i>
	63 <sup>r</sup> -64 <sup>v</sup>	<i>Een kindeken is uns geboren in D la sol re: van Jan Bull: Doct.</i>
	88 <sup>r</sup> -89 <sup>v</sup>	<i>Courante prima in Alamire: van Jan Bull: Doct.</i>
	89 <sup>r</sup> -90 <sup>r</sup>	<i>Courante secunda in Alamire van Jan Bull: Doct.</i>
	90 <sup>r</sup> -91 <sup>r</sup>	<i>Courante tertia in Alamire:...</i>
	91 <sup>r</sup> -92 <sup>r</sup>	<i>Courante Quarta in Alamire:...</i>
	92 <sup>r</sup> -93 <sup>r</sup>	<i>Courante Quinta in Alamire:...</i>
	96 <sup>r</sup> -99 <sup>v</sup>	<i>Pavana secundi toni:...</i>
	100 <sup>r</sup>	<i>Præludium voor de fantasia octavi toni...</i>
	113 <sup>r</sup> -122 <sup>r</sup>	<i>Fantasia, sexti toni a 4...</i>
	122 <sup>v</sup> -126 <sup>v</sup>	<i>Fantasia sexti toni A Leona...</i>
	126 <sup>v</sup> -128 <sup>r</sup>	<i>Ricerciar, Sexti toni. A 4.</i>
	128 <sup>v</sup> -129 <sup>r</sup>	<i>Præludium voor de fantasia Quinti toni...</i>
	129 <sup>v</sup> -133 <sup>r</sup>	<i>Fantasia Quinti toni:...</i>
	144 <sup>r</sup> -145 <sup>v</sup>	<i>Ricerciar: primi toni A. 4.</i>
	145 <sup>v</sup> -149 <sup>v</sup>	<i>Ricerciar Altra primi toni A. 4.</i>
	149 <sup>v</sup> -152 <sup>r</sup>	<i>Ricerciar Quinti toni A. 4.</i>

<sup>8</sup> GB-Lbl MS Add. 23.623; regarding the date, see John Bull, *Keyboard Music I-II*, ed. Steele et al, *Musica Britannica* (London 1967), vol. 19, p. 159.

### Part 3: Developments and New Systems

Comparing the titles with the transpositional systems (*cantus durus* and *mollis*) and the final of the compositions, it is clear that in the pieces designated as being in a key, that is, *Alamire* or *Dlasolre*, for instance, a new classification system is used: the composition in *Dlasolre* (i.e. with D as the final) is notated with one sharp key signature, suggesting that the Mixolydian mode has been transposed a fourth downwards. The designation *Alamire* might refer to the Aeolian mode. The pieces in *Alamire* have been transposed, since their actual final is D and with one flat key signature.

Furthermore, when studying the pieces with the more traditional designations (*octavi toni*, for example), a similar picture emerges. One piece, categorised as mode 2, is transposed to *cantus mollis*; the pieces classified as being in mode 5 are notated as mode 11 (of Glarean's 12-mode system). Mode 6 is notated in *cantus mollis* with final on F; both mode 1 and mode 8 have retained their original *cantus durus* and finals. The Table below (TABLE 3.vii.2) shows the result of a collation of these pieces with Banchieri's proposed 8-mode system:

TABLE 3.vii.2

Pieces from Add. 23.623 Classified according to  
Banchieri's System

mode	transposition	final
1	♯	D
2	♭	G
3		
4		
5	♯	C
6	♭	F
7		
8	♯	G

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No pieces with finals on E or A in *cantus durus*, that is modes 3 and 4, are found. Since pieces in A are found in the collection, but using *cantus mollis*, the reason for not classifying them as mode 4 could be that they are transposed and therefore do not fit into any of the modes in Banchieri's system. This could also be the reason why they are designated *Alamire* rather than a specific mode. In addition, the collection does not, contain any compositions in mode 7.

Another MS from around 1621 containing works by John Bull has on the last folio a small table with the eight modes, the key of each mode, and part of the scale of each mode indicated by solmisation syllables:<sup>9</sup>

TABLE 3.vii.3

#### "Bull's System"

[mode]	[final]	in Tonis
1	d sol re	re mi fa
2	G sol re ut	re mi fa
3	A la mi re	re mi fa
4	E la mi	mi fa sol
5	C fa ut	ut re mi fa
6	F fa ut	ut re mi fa
7	D sol re	ut re mi fa sol la fa sol
8	G sol re ut	ut re mi fa sol la fa sol

<sup>9</sup> The MS (*A-Wn* Musikabteilung MS 17.771, last fol.) has been described by several scholars, though most have not acknowledged the importance of the table: Erwin E. Lowinsky, "Mattheus Greiter's *Fortuna*: An Experiment in Chromaticism and Musical Iconography", *MQ* 43 (1957), pp. 74-6; John Henry van der Meer "The Keyboard Works in the Vienna Bull Manuscript", *Tijdschrift voor Muziekwetenschap* 18 (1959), pp. 72-105; Gerald Hendrie, *An Edition and Critical Study of the Keyboard Music of Orlando Gibbons (1583-1625)* (unpubl. Ph.D diss., Selwyn College, Cambridge University 1961-62), vol. 1, pp. 139-41. Thanks are due to Professor Hendrie for giving me permission to consult his thesis. See also Joel Lester, op. cit., p. 80. The first *Fantasia* in the MS is dated "Anno 1621"; John Bull, *Keyboard Music I-II*, ed. Steele et al, op. cit., p. 160.

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The solmisation syllables in the column, "in Tonis", show the transpositional system; thus the following table arises:<sup>10</sup>

TABLE 3.vii.4

Transcription of Table 3.vii.3 According to  
Mode, Final, and Transpositional System

mode	transposition	final
1	b	d
2	b	G
3	b	A
4	b	E
5	b	C
6	b	F
7	#	D
8	b	G

It appears that mode 7 of this 8-mode system is indeed different from Banchieri's. It also makes more sense than Banchieri's Aeolian mode transposed to *cantus mollis* with final on D. Although the final is still D, a sharp accidental has been added as key signature. It is obvious that, for each pair of modes (1-2, 5-6, 7-8), the transpositional system alternates between *durus* and *mollis*. As usual modes 3 and 4 are the only exception. For modes 7 and 8 the transpositional systems have been moved one step in the sharp direction, thus alternating between b and #. Professor Gerald Hendrie, who has made a tho-

<sup>10</sup> Professor Gerald Hendrie, op. cit., p. 140, indicates in his transcription of the table that mode 7 has not got any key signature at all; the solmisation syllables show, however, that there must be one sharp key signature in this mode. Hendrie combines the final with the transpositional system and hence uses major and minor keys.

*Section vii: New 8-Mode Systems*

TABLE 3.vii.5

Classification Systems

8-MODE SYSTEM

mode	transpositional system	final
1	h	D
2	h	D
[2	b	G]
3	h	E (A)
4	h	E (A)
5	b	F
6	b	F
7	h	G
8	h	G

12-MODE SYSTEM

mode	transpositional system	final
1	h	D
2	h	D
3	h	E
4	h	E
5	h	F
6	h	F
7	h	G
8	h	G
9	h	A
10	h	A
11	h	C
12	h	C

BANCHIERI'S SYSTEM

mode	transpositional system	final
1	h	D
2	b	G
3	h	A
4	h	E
5	h	C
6	b	F
7	b	D
8	h	G

BULL'S SYSTEM

mode	transpositional system	final
1	h	D
2	b	G
3	h	A
4	h	E
5	h	C
6	b	F
7	#	D
8	h	G

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rough examination of English compositions from this period, classifying them according to this table, has only been able to find one piece by Bull which can be ascribed to mode 7: "Een kindeken is uns geboren".<sup>11</sup> The only source for this composition is Add. 23.623 where the complete title is "Een kindeken is uns geboren in D la sol re".

Hendrie claims that pieces from this period seldom can be designated to modes 3 and 4, and finds only very few pieces which he can ascribe to mode 3 and none at all to mode 4.<sup>12</sup> Nevertheless, it is important to remember that some pieces written in *cantus mollis* with final on A can be found, thus suggesting transposed mode 4. Hence modes 3 and 4 become paired so that mode 3 is in *cantus durus* and mode 4 in *cantus mollis* in the same way as modes 1-2 and 5-6 (and 7-8). On the other hand, this does create a problem, since both modes 3 and 4 will then have the same final.

Whether Bull—as well as other English composers—employed the new system of modes/keys is arguable, since both manuscripts are transcriptions made by foreign copyists. Taking into consideration the irregularities of the traditional 8-mode system and the new modes of Glarean's system, it is possible to observe how these have been included in the system proposed by Banchieri and the system associated with John Bull (TABLE 3.vii.5). It is significant that the new 'Bull-system' has been applied to keyboard music in which the distinction between plagal and authentic modes (i.e. using the whole range of the instrument as Trabaci indicated) has been eliminated.<sup>13</sup> The use of only two (or sometimes three) clefs in keyboard music also makes the method of clef combinations impossible to employ.<sup>14</sup> The only signifiers left are the finals and the transpositional systems.

<sup>11</sup> Hendrie, op. cit., p. 150, 190.

<sup>12</sup> Ibid., pp. 47-9, 155-6, and p. 176.

<sup>13</sup> See quot. by Giovanni Maria Trabaci, cited in PT. 2.iii.

<sup>14</sup> In Italy it was very popular to publish keyboard music in four parts, employing the concept of clef combinations. Thus Frescobaldi and Trabaci, who utilise the *ambitus* of both the authentic and plagal mode in the same part, can still distinguish between authentic and plagal modes by using the clef combination, transpositional system, and final, as well as melodic patterns as modal determinants.



## From Major/Minor Modes and the *Senario* to Major/Minor Keys

In the section dealing with inversions of intervals, it was briefly mentioned that Renaissance theorists paired the major imperfect intervals, since these produced the same affect, and the minor imperfect intervals, which contained the opposite affect.<sup>1</sup> Thus Thomas Morley (1597), literally translating from Zarlino (1558), explains:

...if you would have your musicke signifie hardnes, cruelty or other such affects, you must cause the partes proceede... by whole notes, sharpe thirdes, sharpe sixes and such like (when I speake of sharpe or flat thirdes, and sixes, you must understand that they ought to bee so to the base)... but when you woulde expresse a lamentable passion, then must you use motions proceeding by halfe notes. Flat thirdes and flat sixes, which of their nature are sweet, speciallie being taken in the true tune and naturall aire with discretion and iudgement.<sup>2</sup>

It is obvious that Morley (and Zarlino) here considers major thirds and major sixths as yielding similar affects which at first sight seems to contradict the modern notion of invertibility.<sup>3</sup> This method of classifying thirds and sixths is found in numerous theore

<sup>1</sup> Cf. PT. 3.iii, category [A].

<sup>2</sup> Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), p. 177; compare with Zarlino, *Le institutioni harmoniche* (Venice 1558), 4.32, tr. Vered Cohen (New Haven 1983), p. 94. For more on the affects, see Daniel Pickering Walker, *Studies in Musical Science in the Late Renaissance* (London 1978), pp. 63-80.

<sup>3</sup> This has tempted Joel Lester ("Root Position and Inverted Triads in Theory around 1600", *JAMS* 27 (1974), p. 111) to argue that Zarlino does not recognise inversions between intervals, and that it would be inconsistent with several other of his principles:

Zarlino does not recognize the octave inversional relationship in the derivation of all intervals. The fifth and fourth are so related because they arise from the division of the octave. The major and minor thirds arise from the division of the perfect fifth. Sixths are generated by the addition of the major and minor third to the perfect fourth. Thus, the thirds are related to sixths of like quality, which contradicts the inversional relationship in which the thirds are related to sixths of opposite quality.

However, Lester does modify his interpretation in *Between Modes and Keys: German Theory 1592-1802* (New York 1989). Robert W. Wienpahl ("Zarlino, the Senario, and Tonality", *JAMS* 12 (1959), p. 30), on the other hand, using the same quotation, argues that this clearly indicates that Zarlino only recognised two types of modes, those which had a tonic major third and were cheerful, and those which had a minor third and were sad. Then he affirms the identity of each group of

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tical treatises of the time, Descartes (1618/1650), Charles Butler (1636), and even William Holder (1694), for example.<sup>4</sup> In order to understand these statements, it is necessary to return to Zarlino and connect them with his definition of the *senario*.

To extend the number of consonances to include also the imperfect thirds and sixths, Zarlino divides the string into six equal segments.<sup>5</sup> The whole concept he defined as *numero senario*. Thus the major third (5:4); the minor third (6:5); and the major sixth (5:3) were accepted. The minor sixth (8:5), however, was still problematic, but since Zarlino interpreted the minor sixth as consisting of the perfect fourth and the minor third, both belonging to the *senario*, it was also included.<sup>6</sup> The order of the sonorous number was octave, fifth, fourth, the major and minor thirds, thus giving preference to the major third over the minor third. Accordingly, the major chord was more perfect than the minor chord. The symbolic implications of the *senario* were also very important, because the number six was also considered the first perfect number ( $1+2+3=1\times2\times3=6$ ).<sup>7</sup>

Zarlino, when dealing with counterpoint, classifies modes according to the third above the final of the mode. This has influenced many musicologists who then argue that Zarlino was leading the way to major/minor modes and eventually major/minor

modes with the major and minor triad respectively... It is remarkable that Zarlino did not go one step further and call them major and minor modes...

Also H. F. Cohen, *Quantifying Music: The Science of Music at the First Stage of the Scientific Revolution, 1580-1650* (Dordrecht 1984), p. 66, expresses the same view. Cohen does not, unfortunately, seem to have a thorough knowledge of modal theory since he argues that

Now in fact the distinction between *cantus durus* and *cantus mollis* was really the germ out of which the distinction between the major and minor modes was to grow, a distinction that governs modern tonality.

<sup>4</sup> See PT. 3.iii for quotations from these theorists. Also Marin Mersenne (*Harmonie universelle*, Paris 1636-37) makes the same observation pairing the minor and major imperfect intervals since "they are of the same nature"; Albion Gruber, "Mersenne and Evolving Tonal Theory", *JMT* 24 (1970), p. 49.

<sup>5</sup> For a detailed discussion of Zarlino and the *senario*, see especially Cohen, op. cit., passim; see also "Zarlino, Gioseffo", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 20, p. 647.

<sup>6</sup> Zarlino, op. cit., lib. 1, cap. 15-6.

<sup>7</sup> Ibid., lib. 1 cap. 13; for a more detailed discussion, see Claude V. Palisca, *Humanism in Italian Renaissance Musical Thought* (New Haven & London 1985), pp. 247-9.

*Section viii: From Modes and the Senario to Keys*

tonality.<sup>8</sup> However, Zarlino's discussion of major and minor modes must be linked with his discussion of the *senario*: some modes are cheerful *because* the consonances in these are placed according to the sonorous number, that is, in their natural place or the fifth divided harmonically (4:5:6).<sup>9</sup> Thus the concept of *senario* leads to the definition of two distinct scales where major imperfect consonances have a cheerful affect and belong to one scale, and the minor imperfect consonances have the opposite affect and belong to another scale. It is important to remember that the third and sixth degrees of the scales do not necessarily indicate major or minor modes or even keys.<sup>10</sup>

It is because of the *senario* and the pairing of major imperfect consonances, in opposition to minor imperfect consonances, that theorists cannot acknowledge the inversionsal relationship between chords. When dealing with intervals to be used above a bass, Zarlino (lib. 3, cap. 59) and Morley (p. 143, 127) explain that most often a fifth is employed, but sometimes it will be necessary to use a sixth instead. Hence, in order to keep the same affect, the fifth of a C-E-G chord (major third, minor third) can be replaced with the major sixth C-E-A. According to modern terminology (and ear) these two chords are of completely different harmonies and even affect. In the same way the opposite affect will be contained in the following chords: A-C-E and A-C-F.<sup>11</sup>

What Zarlino and Morley are discussing are the two most important degrees in the modal scale. When a mode has a minor third above its *finalis* (for example mode 3: *e'-g'*), then the sixth above *finalis* is also minor (*e'-c''*); if the third is major (for example mode 5: *f'-a'*), the sixth will be major (*f'-d''*). This is true for both the traditional 8-mode system and the new 12-mode system. The only mode which is an exception is mode 1

<sup>8</sup> Wienpahl, op. cit., p. 30; for quotations of other scholars, see Walter T. Atcherson, "Key and Mode in Seventeenth-Century Theory Books", *JMT* 17 (1973), pp. 206-8.

<sup>9</sup> Zarlino, op. cit., 3.10, tr. Guy A. Marco (New Haven 1968), pp. 21-2:

...These modes [i.e. those with a major imperfect consonances above the finals and mediant] are very gay and lively, because in them the consonances are frequently arranged according to the nature of the sonorous number...

<sup>10</sup> Zarlino's arguments do not oppose in any way a modal conception as Wienpahl suggests (op. cit., p. 30).

<sup>11</sup> This is very briefly mentioned in Eva Linfield, "Modal and Tonal Aspects in Two Compositions by Heinrich Schütz", *JRMA* 117 (1992), p. 94; and also Joel Lester, [Comments and Issues; response to Lyn Tolkoff Daniels], *JAMS* 31 (1978), p. 396.

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with *finalis* on D, where the sixth degree of the scale is B ♭:

Ex. 3.viii.1



However, B ♭ occurs very often, and sometimes just as often as B ♮, in mode 1. Zarlino, who advocates the 12-mode system and was very keen to systematise the earlier, rather complex modal system, could also have been attempting to make a classification which did not fit completely as regards the similar affects of thirds and sixths.<sup>12</sup> Zarlino's and Morley's statement regarding the pairing of major thirds with major sixths, for example, becomes confusing, as they do not explicitly mention that the thirds and sixths are seen as scale degrees above the *finalis*. They only indicate that the major and minor thirds and sixths "ought to be so to the base."<sup>13</sup> This becomes even more obvious in Butler's words, where he clearly links these degrees with the final.<sup>14</sup>

Although the members of the Royal Society mainly discussed Kepler's theories on astronomy, mathematics, musical temperament, and harmony, it is possible that they also knew his ideas concerning the traditional system of modes. In his *Harmonices mundi*, published in 1619, Kepler has a chapter dealing with the terms *cantus durus* and *mollis*. According to Kepler, the major imperfect intervals belong to *cantus durus* and the minor imperfect intervals (which are named *molles*) belong to *cantus mollis*. In the example which follows the discussion, Kepler shows the two types of scales, omitting the second and the seventh degrees.

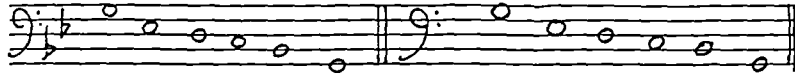
<sup>12</sup> Bernhard Meier, *Alte Tonarten. Dargestellt an der Instrumentalmusik des 16. und 17. Jahrhunderts* (Kassel 1992), pp. 13-4.

<sup>13</sup> Morley, op. cit., p. 177.

<sup>14</sup> See PT. 3.iii.

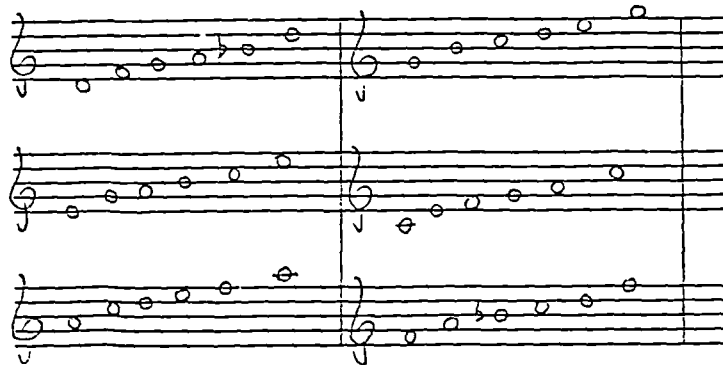
### Section viii: From Modes and the Senario to Keys

Ex. 3.viii.2



Both degrees are important for the minor modes, and the seventh degree is, in particular, essential for the major modes.<sup>15</sup> Mersenne, whose theories on sound, acoustics, and temperament were also known to the Society,<sup>16</sup> must certainly have been aware of Kepler's statement, for in the *Harmonie universelle* (Paris 1636-37) Mersenne demonstrates, using a seven-syllable solmisation system, that there are only two different scales: one with a major third above the final and another scale with a minor third. In order to prove this, Mersenne omits the important second and seventh scale degrees. Gruber (1970), who has made a thorough study of Mersenne's ideas on the theory of modes, has interpreted the complex and at times unclear comments of Mersenne.<sup>17</sup> Gruber arrives at the following table (Ex. 3.viii.3):<sup>18</sup>

Ex. 3.viii.3



<sup>15</sup> Johannes Kepler, *Harmonices mundi, liber III* (Linz 1619), cap. 6, ed. Max Caspar, *Johannes Kepler: Gesammelte Werke* (Munich 1940), vol. 6, p. 137.

<sup>16</sup> Penelope M. Gouk, "Acoustics in the Early Royal Society 1660-1680", *Notes and Records of the Royal Society* 36 (1982), pp. 161-6.

<sup>17</sup> Albion Gruber, *op. cit.*, pp. 36-67.

<sup>18</sup> Ibid., p. 65; however, Gruber does not notice that Mersenne has presumably copied this idea from Johannes Kepler.

### Part 3: Developments and New Systems

Though Mersenne does acknowledge the twelve modes, he later suggests that there are, in fact, only two distinct modes that are different in their cadences or principal notes only.<sup>19</sup> Approximately fifteen years later, Christiaan Huygens, who was an active participant in the Royal Society of London, scribbled a lot of notes on Mersenne's thoughts. Huygens agrees that there are no more than two modes: the first is expressed through the triad, having the major third lowest, and the second mode has the minor third lowest.<sup>20</sup>

Another theorist, who made this classification of major/minor thirds and sixths, is John Birchensha (1664). Though he does not mention modes, he does explain that the major third and sixth belong to a "sharp Song" (i.e. with a major third above the final), and the minor thirds and sixths to a "flat Song" (i.e. with a minor third above the final). Here the author must have reckoned the intervals from the key of the song:

...There are seven Concordances or simple Consonances. Of which the Octave is the first, which is of a dupla proportion between 2. and 1. In his Terms the most simple Conveniency is diverse, as is between the whole and the half. The Fifth doth obtain the second place; then followeth the Fourth; then the Ditone or third in a sharp Song; then the Semiditonus, which is the third in a flat Song; in the last place save one is the Sexta major in a sharp Song; and in the last place, the Sexta minor in a flat Song...<sup>21</sup>

Or in music:

Ex. 3.viii.4



<sup>19</sup> Gruber, op. cit., p. 61.

<sup>20</sup> Christiaan Huygens, "Musique et mathématique musique", *Oeuvres complètes publiées par la société hollandaise des sciences*, (The Hague 1940), vol. 20, p. 70.

<sup>21</sup> John Birchensha, *Templum Musicum: Or the Musical Synopsis of... Alstedius...* (London 1664), p. 52.

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Birchensha's assertion is drawn from previous discussions concerning the *senario*, but he clearly links it with the distinction between songs written either 'sharp' or 'flat'. Also in his *Compendious Discourse...*, Birchensha comments on the subject. After mentioning that some keys have the major third "naturally", he continues and explains that the student must be aware of whether the third, sixth, and seventh above the key are major or minor before composing a 'melody':<sup>22</sup>

Ex. 3.viii.5

C is sharp in the 3d (which is E) also in the 6th (or A) & 7th (se. B)  
F is sharp in the 3d (which is A) also in the 6th (or D) & 7th (se. E)  
B is flatt in the 3d (which is D) also in the 6th (or G) & 7th (se. A)  
E is flatt in the 3d (which is G) also in the 6th (or C) & 7th (se. D)  
A is flatt in the 3d (which is C) also in the 6th (or F) & 7th (se. G)  
D is flatt in the 3d (which is F) but sharp in the 6th (or B) & flatt in the 7th (se. C)  
G is sharp in the 3d (which is B) also in the 6th (or E) but flatt in the 7th (se. F)

The mention of the seventh degree is very interesting indeed as this degree also becomes part of the definition of major/minor keys. Birchensha is the first theorist to draw attention to this degree, whereas Kepler and Mersenne consciously avoid it. Nevertheless, looking at the table which Birchensha provides (Ex. 3.viii.5), it is obvious that they are not major or minor keys. The scale with final on D has a minor third, major sixth, and a minor seventh degree, whereas the scale on G has a major third and sixth, but a minor seventh. These correspond to the traditional modes 1 and 7. Birchensha does not try to combine the *senario* argument (major imperfect in opposition to minor imperfect consonances) with the seventh degree. But as Birchensha in many other instances shows that he does not use or even know much about modes, it is conceivable that the scales, which he mentions in this connection, are only described as diatonic

<sup>22</sup> Birchensha, *Compendious Discourse of the Principles of the Practicall & Mathematicall Partes of Musick for the Use of the Honorable Robert Boyle. Esqu.*, c.1664, GB-The Royal Society of London, MS Boyle Papers BP.41.1, "Preconsiderables", fol. 20<sup>r</sup>.

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scales. This view is stressed by the fact that Birchensha also presents the final/key of B $\flat$  which was never considered as a mode.

In the same chapter Birchensha briefly observes that the keys which are naturally 'flat', can be made sharp by adding sharp accidentals to the third, the sixth, and the seventh degrees; thus A minor becomes A major. And similarly, if one wishes to change sharp keys into flat, one adds flat accidentals to the same degrees.

Thomas Salmon, tries to reform the traditional Gamut and interprets the octave as circular. He argues that when recognising the distinction between major and minor thirds above the final, the old Gamut becomes useless.<sup>23</sup> Some years later (1688) Salmon argues that in the past twenty years the octave has been divided in two ways:<sup>24</sup>

[1] major third, major sixth, major seventh

[2] minor third, minor sixth, minor seventh

Salmon remarks that the prototypes of the two scales are A minor (flat key) and C major (sharp key). The classification of major thirds, major sixths, and major sevenths into one scale and the minor thirds, minor sixths, and minor sevenths into another scale is similar to the discussion of Zarlino, Morley, Butler, and Birchensha. Now, however, the seventh degree has clearly been paired together with thirds and sixths to illustrate the major and minor scales. The second degree is not mentioned, since it is major in both types of scales. The Phrygian modes have thus lost their very particular characteristic feature, though the cadential formula was still retained and explained.<sup>25</sup> At the end of Salmon's book from 1688 there is a letter by Dr. Wallis who often corresponded with the Royal Society. The letter ends by Wallis arguing (using Ptolemy) that of the seven modes used by the ancients, five are lost so that only two remain, one based on A and

<sup>23</sup> Thomas Salmon, *A Vindication of an Essay to the Advancement of Musick* (London 1672), pp. 37-8.

<sup>24</sup> Salmon, *A Proposal to Perform Musick in Perfect and Mathematical Proportions* (London 1688); cf. Sir John Hawkins, *A General History of the Science and Practice of Music* (London 1776/New York 1963), vol. 2, p. 716.

<sup>25</sup> See for example Christopher Simpson, *A Compendium of Practical Musick* (London 1667), p. 52; cf. PT. 3.v.



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the other on C.<sup>26</sup>

Similar to the circularity of the octave and the Gamut, it is again among the members of the Royal Society that the clearest statements concerning the major and minor scales are to be found. Thus William Holder, "late Sub-Dean of their Majesties Chappel-Royal", explains the affects of major and minor keys:

...As, *Almand*, *Corant*, *Jigg*, &c. which variously attack the Fancy of the Hearers; some with Sprightfulness, some with Sadness, and others a middle way. Which is also improved by the Differences of those we call Flat, or Sharp Keys; The Sharp, which take the Greater Intervals within *Diapason*, as 3ds, 6ths, and 7ths *Major*; are more Brisk and Airy; and being assisted with Choice of Measures last spoken of, do Dilate the Spirits, and Rouze them up to Gallantry, and Magnanimity. The Flat, consisting of all the less Intervals, contract and damp the Spirits, and produce Sadness and Melancholy....<sup>27</sup>

Holder, who also uses the *senario* to explain the minor sixth and the pairing of major imperfect consonance in opposition to minor imperfect consonances, is able to use it as an argument for major and minor keys. In that year Playford again published an edition of Campion's short tract. This time it had, however, been heavily revised by Henry Purcell. Following the rules for making a bass to a treble, Purcell discusses in very clear terms the conception of keys:

There are but two *Keys* in Musick, viz. a *Flat*, and a *Sharp*; not in relation to the Place where the first or last Note in a Piece of Musick stands, but the *Thirds* above that Note. To distinguish your *Key* accordingly, you must examine whether the *Third* be *sharp* or *flat*, therefore the first *Keys* for a Learner to Compose in ought to be the two Natural

<sup>26</sup> Hawkins, op. cit., p. 717:

At the close of the remarks is a very curious passage, containing an assertion of Dr. Wallis, that there are manifest places in Ptolemy that the frets... of the ancients were moveable, not in tuning only, but even in playing, which is a strong argument against the opinion that in the ancient modes the tones and semitones followed the succession as they arise in the scale, and that of seven modes or keys, five are lost; so that only two, viz. A and C, are remaining.

<sup>27</sup> William Holder, *A Treatise of the Natural Grounds and Principles of Harmony* (London 1694), p. 198.

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*Keys*, which are *A re* and *C fa ut*, the first the lesser, the last the greater *Third*; from these all the other are formed, by adding either *Flats* or *Sharps*.<sup>28</sup>

It is now obvious that theory and practice are united, which was indeed the original aim of the Royal Society.<sup>29</sup>

In 1705, the issue culminates with Salmon's demonstration at a meeting in the Royal Society. At the meeting, Salmon offers a table showing a new viol fingerboard, on which it was possible to use a new tuning system (with four different sizes of semi-tones) in C major and A minor. About a week later, the members of the Society were invited to a concert to hear a performance of a Corelli sonata employing the new fingerboard. Salmon's somewhat untraditional approach, using the diatonic scales, led him to pair A minor and C major: today defined as relative major and minor keys.<sup>30</sup>

<sup>28</sup> Henry Purcell, "A Brief Introduction to the Art of Descant", *An Introduction to the Skill of Musick*, ed. John Playford (London 1694), facs. ed. F. B. Zimmerman (New York 1972), p. 155.

<sup>29</sup> See PT. 3.i

<sup>30</sup> Leta Miller and Albert Cohen, *Music in the Royal Society of London, 1660-1806* (Detroit 1987), p. 17; Atcherson, op. cit., p. 226.

## Major/Minor Keys and Practical Classification Systems: Third above the Final

Though musicians and composers do not seem to participate actively in the search for theoretical arguments and explanations as regards the development of new musical concepts, they show indirectly new approaches which clearly influence the emergence of simpler classification systems. A redefinition and a new understanding of the terms *cantus mollis* and *cantus durus* lead to new ways of classifying music of which the major/minor keys is one, and the practical system, using the third above the final of a composition, is another. Also, though these two systems may seem similar, they are indeed different: the major/minor keys are closely connected with the conception of the *senario*, and thus also the internal placement of the tones and semitones, whereas the practical systems do not consider any internal characteristics except the final and the third above. Thus, first the present section deals with how terms such as *cantus durus* and *cantus mollis* were slowly redefined and how the evolving major/minor keys were discussed. Second, the section deals with classification systems found in indices to manuscripts from around the first half of the seventeenth century containing music.

### MAJOR/MINOR KEYS

Although new classification systems of modes were proposed and the conception of the *senario* ultimately led to the theoretical recognition of major/minor keys, other and easier methods were also proposed and indeed used. In England recognition of the major and minor scales was mainly inspired by the natural philosophers of the Royal Society; musicians, on the other hand, employed another approach. During the seventeenth century it became common to use the terms flat and sharp in a very different manner. These two terms originated from the transpositional systems *cantus durus* and

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*cantus mollis*, which mean 'hard' ('sharp') and 'soft' ('flat'), respectively. Since the systems had by now become outmoded, the *durus* and *mollis* could be used in a different sense. The terms became associated with the third above the final key of a composition: a "sharp song" contained a major third and a "flat song" a minor third above the final. Thus the violist and composer Christopher Simpson (1659) explains:

Every Composition in Musick, be it long or short, is (or ought to be) designed to some one Key or Tone, in which the Bass doth always conclude. This Key or Tone is called Flat or Sharp, according as the Key-note hath the lesser or greater Third next above it. If it be the Lesser Third, 'tis called a Flat Key; if the Greater Third, 'tis a Sharp Key...<sup>1</sup>

The author provides an example showing the possible sharp and flat keys. Eight years later Simpson published *A Compendium of Practical Musick*, which to a great extent is based on the earlier treatise, and now the author states that

...As the Bass is set in a *flat* or *sharp* Key; so must the other parts be set with *flats* or *sharps* in all Octaves above it.<sup>2</sup>

The *cantus mollis* and *cantus durus* have now altered their definition and are linked with the third above the final, not directly indicating a transposition.

The final note of the bass together with the third above, has become the distinction between the keys: a new classification system, more simple than any of the previous, has been developed. The system is a practical tool which can be used by everybody—professional as well as amateur—to give an initial idea of the music and its character. From the examples Simpson provides, it is evident that the placement of the semitones within a scale has been reduced to two possibilities (major or minor), and

<sup>1</sup> Christopher Simpson, *The Division-Viol, or the Art of Playing ex tempore upon a Ground* (London 1659/1665), p. 16.

<sup>2</sup> Christopher Simpson, *A Compendium of Practical Musick* (London 1667), p. 43. In *The Division-Viol*, p. 16, Simpson explains:

As the Bass is Flat or Sharp, so must the other Parts be set, which are joyned to it.

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that the key signatures and the basic triads correspond to the major/minor scales.<sup>3</sup> Also the important concept that polyphonic compositions contain two modes (a mode and its collateral) has vanished; all parts must now be set in the same "Key". Simpson refers to the former theorists who, when dealing with modal theory, could not give any distinct principles on how to judge the mode or in "keeping the key". According to Simpson, the modern approach is simpler and easier, as it is the bass which is the foundation:

And no marvail they [i.e. the former theorists also referring to Morley] could give no certain Rule, so long as they took their sight from the *Tenor*;... But, according to the Method formerly deliver'd in this Treatise, when we make the *Bass* the foundation of the Harmony, upon which the Key solely depends, as also the other Keys which have affinity therewith, the business is reduced to a certainty of Rule, both plain and easie...<sup>4</sup>

The rule which Simpson refers to has been explained in his chapter "Concerning the Key or Tone", mentioned above.<sup>5</sup>

Though Simpson now recognises and utilises the major and minor scales, he still only employs sixteen in all. In his first treatise, *The Division-Viol* (1659), Simpson presents the following keys:<sup>6</sup>

Flat: G, A, B $\flat$ , C, D, E, E $\flat$ , and F  
Sharp: G, A, B $\flat$ , C, D, E, E $\flat$ , and F

<sup>3</sup> Later Birchensha (in the 1660s), Salmon (1688), and Holden (1694) discuss two scales, the difference between them being the third, sixth, and seventh degrees. Therefore, it seems that in this case theory lacks behind practice; see PT. 3.i, viii.

<sup>4</sup> Simpson, *A Compendium...* (London 1667), p. 117; this is also briefly mentioned by Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. B6<sup>v</sup>, quot. PT. 3.ii; it is possible that Simpson merely copied Campion.

<sup>5</sup> Simpson, op. cit., p. 43.

<sup>6</sup> Simpson, *The Division-Viol* (London 1659/1665), p. 16; in *A Compendium* (London 1667), p. 41, Simpson only gives seven different keys, not mentioning the E $\flat$ -major and E $\flat$ -minor.

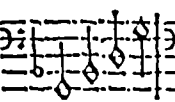
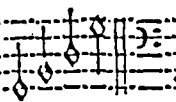

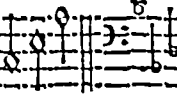
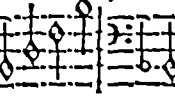

ILL. 3.ix.1

§ 5. Concerning the Key or Tone.

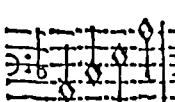
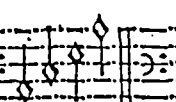




Every Composition in Musick, be it long or short, is (or ought to be) designed to some one Key or Tone, in which the Bass doth always conclude. This Key or Tone is called Flat or Sharp, according as the Key-note hath the lesser or greater Third next above it. If it be the Lesser Third, 'tis called a Flat Key; if the Greater Third, 'tis a Sharp Key, thus exemplified.

De Melothesia Clavi seu Tono.

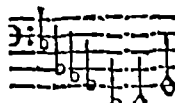
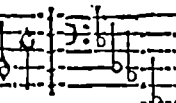
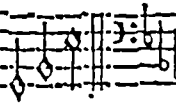
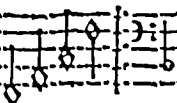
Omnis porro Melothesia ad Clavem aliquam seu Tonum reducitur, in quo nimirum Bassus post varias fluctuationes quasi in Portu anchoram jacet. Tonus durus dicitur, cum Tertia supra Notam Toni cardinales dura est seu Ditonus. Tonus denominatur Mollis, si praedicta Tertia mollis fuerit seu Semiditonus.

<i>Mollis</i>	<i>Durus</i>	<i>Mollis</i>	<i>Durus</i>	<i>Mollis</i>	<i>Durus</i>
					
Flat	Sharp	Flat	Sharp	Flat	Sharp

<i>Mollis</i>	<i>Durus</i>	<i>Mollis</i>	<i>Durus</i>	<i>Mollis</i>	<i>Durus</i>
					
Flat	Sharp	Flat	Sharp	Flat	Sharp

<i>Mollis</i>	<i>Durus</i>	<i>Mollis</i>	<i>Durus</i>
			
Flat	Sharp	Flat	Sharp

How strange or difficult soever some Songs may appear by reason of the Flats or Sharps set at the beginning of them, yet all is but in relation to the Lesser or Greater Third taking place next above the Key or Tone-Note; being the very same, in all respects, with the first Instances of the Lesser and Greater Third above G.

Observandum porro Tonos Duros, tametsi alii aliis peregriniores appareant, omnes esse non affines modo sed ejusdem plane indolis; adeo ut per Transpositionem, non solum quotquot hic sunt reliqui, sed quotquot omnino excogitari possunt, ad primum in G. nullo negotio revocentur. Quod de Tonis Mollibus perinde intelligendum est.

### Section ix: Keys and Practical Classification Systems

From the illustration below (ILL. 3.ix.1) one will notice that Simpson has avoided A $\flat$  and B $\natural$  as keys; the B $\natural$  is presumably avoided because of the many notational problems, for example the seven sharp accidentals. However, one could also argue that the notation of E $\flat$  minor is just as difficult as the B $\natural$  major. Perhaps tradition is playing a significant role here as B $\natural$  was considered irregular according to traditional theory. Avoiding the A $\flat$  degree, on the other hand, seems somewhat peculiar, since Simpson does recognise F minor which has the same number of flat accidentals. Could one reason be that he wishes to keep the number of keys to eight—eight sharp and eight flat keys—again referring back to traditional theory with only eight modes?

There is no doubt that Simpson is proposing the major/minor keys in which there are only two distinct scales and triads, and thus recognising the close link there is between the final, the third above, and the transposition.<sup>7</sup> Because the Gamut is conceived as a circular octave of fixed pitches, the difference between each major key and between each minor key is the pitch name.

Thomas Mace, writing in 1676, seems to hold another view. He indicates that there are seven different keys, but these are not arranged according to the third above the final; instead, it is the final that is the determinant. The keys of the pieces which Mace provides in his book are: C major, D minor, E minor, F major, G major, A minor, and B $\natural$  minor. The thirds above are the ones naturally found within the traditional Gamut, namely, the diatonic steps. Because Mace uses the diatonic scale, he also includes B $\natural$  as a regular degree, though he still seems to consider sharp accidentals as *musica ficta* apart from F $\sharp$ . However, the third does play a prominent role for Mace, for also he categorises compositions into either flat or sharp.<sup>8</sup> Mace does not utilise transposition.

<sup>7</sup> Simpson, *The Division-Viol* (London 1659/1665), p. 16; the scientist Christiaan Huygens, in some notes concerning Artusi, distinguishes between six major triads (C, F, G, D, E, and A, the three latter employing a sharp on the third degree) and seven minor triads (D, E, G, A, C, and F, the two latter employing a flat on the third degree); "Musique et mathématique musique", *Oeuvres complètes publiées par la société hollandaise des sciences* (The Hague 1940), vol. 20, p. 75.

<sup>8</sup> Thomas Mace, *Musick's Monument; or, A Remembrancer of the Best Practical Musick* (London 1676), p. 88, 225.

### Part 3: Developments and New Systems

#### PRACTICAL CLASSIFICATION SYSTEMS: THIRD ABOVE FINALIS

Before the mid-seventeenth century, English composers and copyists began to simplify the designation of pieces according to mode or key. In one manuscript which contains consort music for various combinations of two viols and organ, mainly composed by Coprario, the compositions have been listed with an indication of whether the third above the final key of the piece is major or minor:<sup>9</sup>

TABLE 3.ix.1

Title	Key
Fancie	D <sub>+</sub>
Almane	D <sub>+</sub>
Galliard	D <sub>+</sub>
[...]	
Fancie	D <sub>+</sub> #
Almane	D <sub>+</sub> #
Galliard	D <sub>+</sub> #
[...]	

The keys indicated are D, D<sub>+</sub> #, C, G<sub>+</sub> b, G<sub>+</sub> #, A, A<sub>+</sub> #; the flats and sharps refer to the third above the final, which becomes clear when examining the pieces. The copyist of the manuscript has collated with two other sources, *Bernard's score* and *Derham's Booke*, and the discrepancies between the sources have been notated. He has also supplied an editorial discussion and mentions the different changes made and problems concerning the accidentals.<sup>10</sup> It is a very interesting discussion and the index is revealing as regards to the way in which the key of a composition was understood. A<sub>+</sub> # only indi-

<sup>9</sup> *GB-Lbl* MS Add. 23.779, fols. 35<sup>v</sup>-36<sup>r</sup>; no precise date can be given, except that it must have been finished before the mid-seventeenth century.

<sup>10</sup> Fols. 63<sup>v</sup>-64<sup>r</sup>:

False and doubtfull places betwixt Mr Derham's and my Organ Booke and Solecismes...

Cleffs Altered in Pricking, (Differing from the copy) or since; and b s or # s sett to them, according to the Naturall Aire of the Lesson: or suted to the b or # Change or Point, for the more Formall Pricking hereafter.



### *Section ix: Keys and Practical Classification Systems*

cates the final and the third above, and does not automatically imply A major.

It becomes clear that the hierarchy of intervals has changed. The species of fourths and fifths, that is, the harmonic or arithmetic division of the octave, which is a characteristic and an essential feature of the plagal and authentic modes, has been replaced by the major and minor third above the final key. Consequently, the distinction between plagal and authentic modes has become much more vague. Furthermore, since the fifth above a note was now considered the same as a fourth below, and contrarily the fourth above the same as a fifth below, they do not play a prominent role in the distinction between modes/keys. When the fourth/fifth species cannot be used to determine the mode of a composition, then the final, together with the third above, will be the most obvious, practical and easily discernable characteristics of a piece.

There is no obvious distinction in the index of the MS between the Mixolydian transposed (final A, and two sharp accidentals) and the Lydian or Ionian transposed (final A, and three sharp accidentals). Studying the pieces in A, # with two sharp accidentals as key signature, it becomes evident that G# is used just as often as G, but functions as a pivot around the note A or as the traditional *clausula cantizans*. The note G is employed as a pivot to F#, either as a chord built on D or Bb, or leading to a chord built on E.

The notational procedure could stem from modal practice. Thus, it is the Mixolydian mode which is the notational basis for the major scale rather than the Ionian or Lydian modes. On the other hand, pieces designated D, # have also two sharps as key signature, which implies that the Ionian or Lydian mode in this instance is the original notational basis. Compositions in G with a sharp key signature are also derived by the transposition of the Lydian mode, rather than the Mixolydian mode with the seventh degree raised a semitone.

As indicated above, the problems which the copyist of the MS deals with are mainly concerned with the 'missing' accidentals, adding sharp or flat accidentals as key signatures in some of the pieces:

### Part 3: Developments and New Systems

Key	PAG	L	B	N	
G $\flat$	94	1	1	&	FAN: AL: GAL: Bas: TR: throughout in Elami $\flat\flat$ ad. but not in org: Pt because the 1mer Pts would not bear it.
G $\sharp$	98	1	1	&	FAN: $\sharp$ d. But Halfe way. the AL: and GAL: $\sharp$ d. in Ffaut. throughout in all the Parts.
D $\sharp$	128	1	31	&	FAN: ALM: GAL: $\sharp$ d. in Ffaut. and Csolfa. in all the Parts throughout.
D $\flat$	133	2	1	&	FAN: ALM: GAL: $\sharp$ d iust as the Last.

Rarely that any Cleffe in D (unlesse  $\sharp$  in F. and C) Key. is prickt without a  $\flat$  in B. but there being Little odds in the number of B  $\flat$ s and  $\sharp$ s in the 7 Fancy it may passe as it is...<sup>11</sup>

Unfortunately, the references which the copyist gives do not fit this MS, and they must therefore allude to one of the other MSS with which he has collated the present one. He also notices that at least one composition, ending on D, has been notated in *cantus durus* which, he argues, one can leave unchanged, i.e without adding a flat accidental. The number of B  $\sharp$ s, occurring in the piece, is approximately the same as the number of B  $\flat$ s. His observations yield that his approach is practical, for he does not seem to consider the difference between pieces in D notated as *cantus durus* or *cantus mollis* of great importance. The former arises from modes 1 and 2, whereas the latter stems from modes 9 and 10 transposed.

The use of the transpositional systems, *cantus durus* and *mollis*, has become obsolete, and hence even Banchieri's 8-mode system, or the one found in the Bull MS, does not seem to be applicable. In these, the distinction between *mollis* and *durus* was indeed important.<sup>12</sup>

<sup>11</sup> *GB-Lbl* MS Add. 23.779, fol. 64<sup>r</sup>.

<sup>12</sup> See PT. 3.i. That the transpositional systems were outmoded was also indicated by the natural philosopher and member of the Royal Society of London, John Pell, who questions the purpose of these systems.

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ILL. 3.ix.2

[illegible]

GB-Lbl MS Eg. 3665, index

### Part 3: Developments and New Systems

Another English manuscript, the famous Tregian manuscript, also contains an index written in a mid-seventeenth-century hand (ILL. 3.ix.2).<sup>13</sup> The index, which is not complete, however, specifies the final key of the pieces as for example: "Gam ut w<sub>th</sub> B. flatt"; "Gamut"; "A re"; "C fa ut"; "C fa ut w<sub>th</sub> B. flatt"; "A re w<sub>th</sub> b flatt"; "ff fa ut"; "e la mi". The designations are not consistent with the notion of indicating the third above the final. The "B flatt" seems rather to refer to the *cantus mollis*, for compositions in "C fa ut w<sub>th</sub> B. flatt" do not explain that the third is minor, but that the final is C in *cantus mollis*: the Mixolydian mode transposed. On the other hand, the few pieces in "ff fa ut" are written in *cantus mollis*, though this is not shown in the title. This is presumably due to the tradition in which modes 5 and 6 most often were notated with one flat key signature. Also the pieces in "Gamut w<sub>th</sub> B. flatt" and "A re w<sub>th</sub> b flatt" are written in *cantus mollis* and do not refer to the minor third above the final. Many of the pieces could have been written with a mode in mind; especially the compositions in E with no sharp key signature and in A with a flat key signature seem to belong to the Phrygian modes.<sup>14</sup>

For the compiler of this collection of compositions, the *cantus mollis* and *durus* seem still to hold the original definition as transpositional systems. Also, the fact that the third above the final is not indicated at all suggests that one of the new 8-mode systems is understood in this case. It is, nevertheless, also evident that it is the final as a fixed pitch which is important and not the 'internal' placement of the tones and semitones.

A similar index, but without indication of the third degree above the final key, is found in the bass part of another manuscript. It is told that this MS was collected by John Jenkins, presumably around 1620-30, for the L'Estrange family at Hunstanton, co. Norfolk.<sup>15</sup> Hence one could tentatively argue that the Tregian MS, employing the transpositional systems, *cantus durus* and *mollis*, according to their original definition, was compiled at the same time as the MS collected by Jenkins, but before *Lbl* MS Add.

<sup>13</sup> *GB-Lbl* MS Eg. 3665; facs. with an introd. F. A. D'Accone (New York & London 1988), vols. 7a-b.

<sup>14</sup> See PT. 3.vii.

<sup>15</sup> *GB-Lbl* MS Add. 39.554 (Bass-part), fols. 89<sup>v</sup>-90<sup>r</sup>; Charles Coleman, whose name is mentioned in the MS, died in 1664; the catalogue at *GB-Lbl* "Students Room".

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23.779 where the system of classification is more developed and where the transpositional systems have become obsolete.

The musical theorists (later the natural philosophers) discuss and try to define the practice composers and musicians employ. Thus the practical approach of the new classification system, only using the final as determinant, is developed into a system employing the third above. The composers and musicians do not give any reasons for this in any of their writings; instead, the natural philosophers provide the argumentation, first by the *senario* dealing with the third and sixth degree of a scale, later including the seventh degree as well.



## **CONCLUSION**

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PART 2 of the present thesis dealt with the methods theorists explain could be employed in order to classify compositions according to a mode. It is apparent that there was no easy method and that each 'tool' contained problems. From the examination of the modal classification systems, it becomes obvious that they were different both in terms of their background and their use. One of the first theorists to discuss modal theory in terms of polyphony was Pietro Aaron (1525) who consciously tried to arrange earlier music according to the traditional 8-mode system which originally stemmed from the single-line Gregorian chant.<sup>1</sup>

Aaron classifies compositions according to specific modes, explaining his reasons very carefully. He also reveals his entire motivation for writing a treatise on this subject and explains that no one in his time had written about it before and that many misunderstood the subject:

It is clear that no writers of our age have explained how the many different modes are to be recognised, although to their greater credit they have treated of matters which can be readily understood... I show briefly what I know to be necessary, for I see that many are deceived about the true understanding, and regarding this I hope in some measure to satisfy them.<sup>2</sup>

Though Aaron argues that polyphonic works could be related to the 8-mode system, it does not immediately imply that composers thought in terms described by the theorist. He does not indicate that this is what the composers of his time did; rather, he tries to systematise the classification of polyphonic music. Aaron's attempt created many new problems, because of the difficulty applying a theory or systematisation stemming from

<sup>1</sup> Pietro Aaron, *Trattato della natura et cognizione di tutti gli toni di canto figurato* (Venice 1525); Peter Bergquist, "Mode and Polyphony around 1500", *Music Forum* 1 (1967), pp. 99-161.

<sup>2</sup> Aaron, op. cit., chap. "An explanation of the finals of all the tones", tr. Oliver Strunk, *Source Readings in Music History* (London 1950/New York 1965), vol. 3, pp. 16-7.



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the monodic plainchant to polyphony without including a serious re-evaluation of the concepts employed.<sup>3</sup>

In 1547, Glarean, after 20 years of work, published *Dodecachordon*, which became one of the most influential music theoretical treatises of the time. He proposed four additional modes—the Aeolian and Ionian together with their plagals—and re-evaluated a great amount of polyphonic music in accordance with his 12-mode system. One of Glarean's reasons for proposing a new system of modes was the obstacles in classifying compositions ending on their co-finals. As the notes A and C should be considered co-finals according to Aaron and his 8-mode system, this leads to complex intricacies and contradictions, especially with modes 3, 4, 7 and 8.<sup>4</sup> But also the other modes could create problems: modes 1 and 2 could end on their co-final, A, as indicated by Aaron; and modes 5 and 6 in *cantus mollis* were from Glarean's point of view merely transpositions of modes 11 and 12.

Glarean classifies polyphonic music into modes first of all by looking at the range of the tenor, then by considering the final and the harmonic/arithmetic divisions and some of the melodic features. The *repercussa*, particular to each mode and essential in distinguishing modes according to the traditional 8-mode system, is not considered. Glarean argues that he is only trying to perfect the traditional system by proposing additional modes.<sup>5</sup>

Aaron's and Glarean's understanding of previous modal practices does not necessarily mean that their conclusions were right and that their interpretation of earlier

<sup>3</sup> Harold S. Powers, "Tonal Types and Modal Categories in Renaissance Polyphony", *JAMS* 34 (1981), pp. 428-70; Dolores Pesce, *The Affinities and Medieval Transposition* (Bloomington & Indianapolis [1987]), pp. 114-20; and Harold S. Powers, "Is Mode Real? Pietro Aron, the Octonary System, and Polyphony", *BJhM* 16 (1992), pp. 9-52.

<sup>4</sup> Heinrich Glarean, *Dodecachordon* (Basel 1547), tr. Clement A. Miller (s.l. 1965), *MSD* vol. 6.1, p. 104 ff.; Gioseffo Zarlino, *Le istituzioni harmoniche* (Venice 1558), 4.3, tr. by Vered Cohen (New Haven 1983), p. 14; Seth Calvisius, *Melopoia seu melodiae condensae ratio* (Erfurt 1592), sig. H2<sup>r</sup>; Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), "The Annotations. Upon the third part", sig. \*\*2<sup>r</sup>. Previously these two degrees had not been considered regular; Aaron, (*Trattato della natura* (Venice 1525), quot. Strunk, op. cit., p. 17) argues that in the traditional system *d*, *e*, *f*, and *g* are finals and the other steps, that is, *G*, *A*, *B ♯*, *c*, *a*, *b ♯*, and *c'* must be considered irregular.

<sup>5</sup> Glarean, op. cit., p. 38:

Therefore it is established that this declaration of ours concerning twelve modes is not a new statement, but a proper renewal of antiquity.

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polyphonic music was in accordance with the practice of earlier times. It is clear that they had enormous problems in trying to adapt (i.e. the 8-mode system) or create a system (i.e. the 12-mode system) which could include all aspects of polyphonic music. Glarean even went so far as to ask some contemporary composers to supply him with some examples which he needed for his treatise, because of his difficulty in finding music which fitted the new Aeolian modes.<sup>6</sup> Using music by earlier composers such as Josquin and Obrecht, he attempts to show the value of the 12-mode system and claims that these composers employed it, though they, of course, were unaware of it and only knew the 8-mode system. There can be no doubt that Glarean's system became popular and was widely used during the sixteenth century. Both Aaron and Glarean dealt with earlier polyphonic music, but their theories had also great impact on later composers and theorists.

Though Glarean suggests employing a new set of modes where A and C would become finals, he is, at the same time, very much aware of the traditional use of the 8-mode system. He shows a very deep knowledge of the old system in his treatise; however, for Glarean the purpose and function of the two systems were entirely different. The distinctions between the 8-mode system which had its roots in plainchant practice, and the 12-mode system which was promoted in order to classify free polyphonic music, seem to have been kept throughout the period. Zarlino (1558) distinguishes between the two systems and later theorists such as Banchieri (1605) and Diruta (1622) emphasise more strongly this differentiation.<sup>7</sup> Seth Calvisius (1600), too, briefly mentions that there are two different systems: 1. the 8-mode system ("the ecclesiastical")

<sup>6</sup> Clement A. Miller, "The *Dodecachordon*: Its Origins and Influence on Renaissance Musical Thought", *Md* 15 (1961), pp. 160-1.

<sup>7</sup> Adriano Banchieri, *L'organo suonarino* (Venice 1605/1611), p. 39; Girolamo Diruta (*Seconda parte del Transilvano Dialogo* (Venice 1609/1622), lib. 3, p. 1, tr. Murray C. Bradshaw and Edward J. Soehnlén (Henryville 1984), vol. 2 p. 96) declares—when *Transilvano* says that some argue that there are no more than eight and asks why—that the twelve modes were employed for instrumental music, thus implying that the traditional system was rather used for vocal music:

*Transilvano*. On many occasions, I have heard various persons in this profession say that there are no more than 8 tones, four authentic and four plagal. I should like an explanation of this.

*Diruta*. I answer them with reference to our practice by telling you that on our instrument there are neither more nor less than twelve tones.

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which can have irregular endings that make it impossible to judge the mode—one has to refer to the EUOUAE formulas instead; 2. in *musica figurata* (i.e. free polyphonic music using the 12-mode system) one can detect the mode from the species of fourth and fifth and from the final note, that is, the lowest, final note of the composition.<sup>8</sup>

The distinction between the two modal systems and their purpose is also dealt with by Pedro Cerone (1613). That becomes evident in particular when he discusses modes 3 and 4, because he argues that the traditional 8-mode system is used for plainchant (psalms and canticles). The 12-mode system was, on the other hand, used when composing free polyphonic music (motets, masses, lamentations, and madrigals):

[There are] two kinds of proper and principal cadences found in the third mode: one which is used for composing motets, masses, lamentations, and madrigals; and the other which is only used for psalms and canticles. Similarly, we will say that [the mode] has two finals: one in *E lami* which is used for motets, masses, and all that which is not a psalm; and the other [final] in *A lamire* which is one for canticles and psalms which follow the *Sæculorum*.<sup>9</sup>

Also English music theorists deal with the distinction between the two modal systems. When Thomas Morley (1597) explains the 8-mode system, he implies that he certainly did not adhere to it, but preferred to follow Glarean who "broke the yce for others to follow him into a further speculation & perfect knowledge of these tunes or *modi*...".<sup>10</sup> Morley then continues to prove, literally copying Glarean, that there are twelve modes and gives the fourth and fifth species of each mode. He terminates the

<sup>8</sup> Seth Calvisius, *Exercitationes musicae duae* (Leipzig 1600) pp. 36-7.

<sup>9</sup> Pedro Cerone, *El melopeo y maestro. Tractado de musica theorica y pratica* (Naples 1613), p. 888: [There are:] *dos maneras de Clausulas propias y principales se hallan en el Tercer Tono*: la una que sirve para las Composiciones de los Motetes, Missas, Lamentaciones, y Madrigales; y la otra que sirve solamente para los Psalmos y Canticos. Assimesmo diremos que *tiene dos finales*, una en *E lami* que sirve à los Motetes, Missas, y à todo lo demas que no es Psalmo; y otra en *A lamire*, que sirve solamente à los Canticos y Psalmos que siguen *Sæculorum*.

<sup>10</sup> Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), "The Annotations. Upon the third part", sig. \*\*\*v.

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discussion by referring the reader to study the

...fourth part of *Zarlino* his Harmonicall institutions, where hee may satisfie his desire at full, for with the helpe of this which here is set downe he may understand easily all which is there handled, though some have causelesse complained of obscuritie.<sup>11</sup>

The 8-mode system and the 12-mode system did certainly exist side by side, and the distinction between them seems to have grown during the late Renaissance and especially after the turn of the seventeenth century. The 8-mode system becomes more closely associated with its pre-Glarean roots and part of the earlier theory of the Renaissance.<sup>12</sup>

Dowland's translation of Ornithoparchus could be related to the distinction between the 8-mode and 12-mode systems, the latter heavily promoted by Morley. One must be careful not to interpret Dowland's translation of a tract from 1517 as revealing him as a rather conservative composer or an adherent to 'old-fashioned' music theoretical concepts. On comparison of Dowland's translation with Morley's treatise from 1597, it becomes obvious that their approach in many ways is similar. For instance, both Morley and Dowland deal with the traditional hexachordal theory with the complex system of mutations and solmisation. It should be kept in mind that Morley also made use of medieval sources when expounding on these subjects and also in his discussions of the mensuration theory and ligatures.<sup>13</sup> The essential difference between Morley and Dowland is precisely their discussion of the modal systems. Morley refrains from dealing with the 8-mode system as much as possible, using more space on the art of counterpoint. Dowland, in choosing to translate Ornithoparchus' popular tract from 1517, demonstrates clearly his strong advocacy for the 8-mode system. Thus one can argue that Dowland's translation compensates for the fact that there were no books on music

<sup>11</sup> Ibid., sig. \*\*\*2<sup>r</sup>.

<sup>12</sup> E.g. Gerolamo Cantone, *Armonia gregoriana* (Turin 1678); and D. Marzio Erculeo, *Il canto ecclesiastico* (Milan 1686).

<sup>13</sup> Cf. Morley, op. cit., "The Annotations", sig. 3<sup>v</sup> when dealing with mutation which has been copied from *Quatuor principalia musicae*; cf. Charles Edmond Henri de Coussemaker (ed.), *Scriptorum de musica medii aevi* (Paris 1864-76), vol. 4, pp. 223-5; see also Pt. 1.ii.

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theory published in that period in England which specifically dealt with the traditional classification system, that is, the 8-mode system.

Thomas Morley does not explicitly deal with modes in the same way as his continental colleagues, although many elements can be traced. Instead of ascertaining that the subjects are not mentioned, it is more pertinent to ask why he does not discuss them. When studying Morley's treatise in the light of the music theory of the time, it is found that the subjects are considered, but in close relation to each other: clef combinations, for example, are linked with modal pairing, *ambitus*, mixture of modes, and transpositional systems. As has been shown in the sections of PART 2, Morley agrees with continental theorists. The assumption that English music theorists have neglected discussion of the theory of modes, or are even unacquainted with continental modal theory, is not correct.<sup>14</sup> Furthermore, it is very important to be aware of for whom *A Plaine and Easie Introduction to Practicall Musicke* was written. As the title indicates, it is not necessarily the serious student of music, but rather "any of but meane capacity", whom Morley addresses.<sup>15</sup> In addition, as Morley does not seem to be writing for students to enable them participate in the services of the church, as most of his German colleagues did, he does not have to deal with the modal systems, and in particular with the traditions of the 8-mode system.

The 8-mode system was more complex than the 12-mode system because of its roots in plainchant practice. By adhering to the 12-mode system, Morley could avoid discussing the intricacies of the co-finals, a complex hierarchy of cadences, and even melodic patterns. Compared with the 8-mode system, the 12-mode system (especially as dealt with by Zarlino) is attractive because of the rather rigorous systematisation at times.<sup>16</sup> Complex subjects such as the modal systems and the divergent opinions are, of course, avoided or relegated to the "Annotations" in Morley's book.

This approach seems to be common for English musical treatises which nearly all address the beginner or amateur in musical matters, the only exception being Charles

<sup>14</sup> Harold S. Powers, "Is Mode Real?", *BJhM* 16 (1992), p. 17, note<sup>14</sup>.

<sup>15</sup> Thomas Morley, op. cit., "To the curteous Reader", sig. B1<sup>r</sup>.

<sup>16</sup> Cf. PT. 2.i, note<sup>18</sup>; PT. 2.iv, note<sup>39</sup>; PT. 3.viii, note<sup>12</sup>.

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Butler's *Principles of Musick, in Singing and Setting* (1636). As discussed in Pt. 1.ii, many treatises published during the seventeenth century aimed at a completely different readership, that is, not necessarily the student of music, and therefore also promote the musical subjects in a different way. The rising class of natural philosophers, especially those connected in some way with the Royal Society of London, also discuss musical matters, including some aspects of music theory. With their background and interests they can approach the subject without being burdened by music tradition. The majority of these tracts deal with music as sound, acoustics, and temperament, and do not yield new intriguing results. However, since the physical science of music is indeed related to intervals and proportions for example, the natural philosophers will at times touch on these subjects and reveal new insights which could lead to a re-evaluation of fundamental principles of music theory.

The essence of all the changes taking place in the early 1600s, and later indeed supported by the natural philosophers, seems to be linked with a desire to simplify the solmisation and hexachordal theories, the incipient understanding of fixed pitches versus relative, and a new conception of the octave. Interpreting the octave as a circle consequently means that the complementarity of intervals is now also acknowledged in theory as part of the construction of intervals. Though inversions of intervals had been used and recognised as part of the art of counterpoint, the consequences of a theoretical explanation had wide implications. Thus the clear distinction which music theorists made between cadences occurring on the fifth above and the fourth below a note, vanishes. The erosion of the difference between an ascending fourth and a descending fifth means that the distinction between plagal and authentic modes fades away. The circularity of the octave, together with the growing importance of the bass as the fundament from which the remaining upper parts were built, also change the definition of the cadence. The melodic pattern of the *clausula cantizans*, which Calvisius, Morley and Butler defined as the cadence, has changed function and been incorporated into the new definition and seen in relation to the bass. Since the bass gained more importance than the tenor, it is the *clausula basizans* together with the *clausula cantizans*

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that form the cadential structure. It is now described as the penultimate note of the bass, descending/ascending a fifth/fourth to the final, and must have a major third or tenth above. Instead, a greater awareness of chordal progressions, especially the dominant-tonic function, develops. However, the use of *clausula tenorizans* in the lowest part was not forgotten; it was employed in exceptional cases and became known as the Phrygian cadence.

One of the first in England to induce a new way of composing is Robert Fludd (1617-18), though he does not recognise the real bass-line. Fludd continuously argues that it is the lowest note, that is, the bass as *basis*, that determines the intervals which should be employed in the upper parts. At the same time, he consciously avoids the traditional definition of the cadence. Thus Fludd presents new ideas and approaches which are not until later discussed by other English musical theorists. It must therefore be emphasised that the general view, expressed by Ruff (1961), Amman (1967) and Ashbee (1980), among others, that Fludd is conservative and even out-of-date in his dealing with music theory, is simplistic indeed and even erroneous.<sup>17</sup>

Though German theorists began to formulate theories explaining the inversions of triads stemming from a fundamental one, the notion does not seem to have been considered by English theorists. It has been proposed by scholars that Campion (c. 1613) presumably recognised the inversions of a fundamental triad as being of the same harmony; however, Campion's statement is made because of a contrapuntal rule to avoid parallel octaves. Though Campion does acknowledge the function of the real bass-line and the complementarity of intervals, he is not able to relate the inversions of triads to a fundamental one in root position. Before this is possible, he would have to define the triad as an entity in itself, and not as a combination of three different notes, arranged in different ways. However, Campion does present a new idea, as he himself is aware of,

<sup>17</sup> Lillian M. Ruff, *The Seventeenth-Century English Musical Theorists* (unpubl. Ph.D diss., University of Nottingham 1961-62); Peter J. Amman, "The Musical Theory and Philosophy of Robert Fludd", *Journal of the Warburg and Courtauld Institutes* 30 (1967), pp. 198-227; Andrew Ashbee, "Fludd, Robert", *The New Grove Dictionary of Music*, ed. Stanley Sadie (London 1980), vol. 6, p. 663. See also my forthcoming article on Robert Fludd.

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based on the recognition of the invertibility of intervals and the real bass-line.<sup>18</sup> His counterpoint table has been reduced to the combinations of third, fifth, and octave above a bass, whereas Morley had up to twelve different combinations on each bass note of the diatonic scale.<sup>19</sup> Had Campion mentioned inversions of triads, it would most probably have been dealt with by other English theorists who copied and used the popular tract.

In practice some modes were more often than not found to be transposed; this is one of the reasons why Adriano Banchieri (1605) proposed a new set of 8-modes. This system seems to have been popular in Italy, where it is discussed and developed by later theorists such as Lorenzo Penna (1672) and Giovanni Maria Bononcini (1673). Bononcini mentions that, in theory, there are indeed twelve modes and explains them thoroughly, but adds that in his day only seven are ever used. The modes which, according to Bononcini, were employed are the same as those proposed by Banchieri with the exception of mode 4 (*cantus durus*, final on E). The problematic modes 3 and 4 have been combined into one mode with the final either on A or E. At the same time, Bononcini retains the authentic/plagal pairing of modes in polyphonic works and the use of the fourth and fifth species.<sup>20</sup> Penna also uses Banchieri's system, but contrary to Bononcini, he remarks that the authentic/plagal distinction is obsolete.<sup>21</sup> Furthermore, Penna proposes that the internal cadences should occur only on the final, the fifth and fourth above.

In England it seems that Banchieri's new 8-mode system was never mentioned. There is, however, an 8-mode system which was used in connection with a classifi-

<sup>18</sup> Thomas Campion, *A New Way of Making Fowre Parts in Counter-point* (London s.d.), sig. C2<sup>v</sup>:  
If I should discover no more then this already deciphered of Counter-point,... I had  
effected more in Counterpoint then any man before me hath ever attempted.

<sup>19</sup> Morley, op. cit., p. 131; see PT. 3.ii. Morley, on the other hand, implies a very different perception of chords in his illustration of the counterpoint table, linking an F major chord with a D minor in second position. Had Morley recognised the inversions of chords, he would presumably have gathered the F major chords in one bar and the D minor chords in another.

<sup>20</sup> Giovanni Maria Bononcini, *Musico pratico* (Bologna 1673), p. 82, 123; cf. Renate Groth, "Italienische Musiktheorie im 17. Jahrhundert", *Geschichte der Musiktheorie*, ed. Frieder Zaminer (Darmstadt 1989), vol. 7, p. 362-3; and Joel Lester, *Between Modes and Keys: German Theory 1592-1802* (New York 1989), p. 62.

<sup>21</sup> Bononcini, op. cit., p. 129 ff.



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cation of some of John Bull's keyboard music (1620s). The system is certainly very similar to the Italian one. The only difference is mode 7 which has one sharp key signature and final on D, whereas mode 7 according to Banchieri's system has one flat signature and also final on D. Since this system is only found in two continental sources, presumably originating from Flanders, it is questionable whether the system was English (or even Bull's) at all.

It is because of practice, that is, to incorporate the irregularities, the exceptions, the growing awareness of fixed pitches, and the urge to simplify the somewhat complex 8-mode system, that the new systems arise. It is curious that these systems did not gain the same popularity in England as they did in Italy and France, and to a lesser extent also in Germany.<sup>22</sup> On the other hand, the English 'music practioners' began to develop a much simpler classification system, using only the final note and the transpositional system. When the terms *cantus durus* and *cantus mollis* became obsolete through the redefinition of the concept of transposition, the fixed pitch became more important and a system developed, involving only the final note of the bass and the major or minor third above it. Contrary to the modal systems, this method does not provide many details about the internal character of the music such as the *ambitus*, the hierarchy of cadences, melodic patterns etc., thereby implying that at this time the gap between compositional theory and compositional practice had developed into two distinct areas.

While this was taking place, especially among members of the Royal Society of London, discussions concerning a new definition of the octave and the Gamut as a circular principle ultimately led to a new approach and understanding of inversionsal relationships between intervals. Similarly, the Zarlirian argument, using the *senario* in order to explain the composition of the minor sixth in particular, was also discussed. Thus Zarlino's pairing of modes into two categories, according to whether the third and the sixth above the final was major or minor, was used and explained even as late as Butler (1636). Perhaps inspired by Kepler (1619) and Mersenne (1636-37), Birchensha

<sup>22</sup> Almonte C. Howell, "French Baroque Organ Music and the Eight Church Tones", *JAMS* 11 (1958), pp. 106-18; Lester, op. cit., pp. 80-2. Could this have something to do with the status of English church music at that time?

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(c. 1664), too, included the seventh scale degree. He, unfortunately, does not seem to have realised the importance of his idea; nevertheless, it was taken up only a few years later by one of his students and a consultant to the Royal Society, Thomas Salmon. In 1688, Salmon mentions that, for the previous two decades, theorists had only recognised two scales: one containing a major third, a major sixth and a major seventh above the final, and another containing a minor third, a minor sixth and a minor seventh above the final. These correspond to the major and minor keys. As Salmon uses the diatonic scales, he can also pair the keys as relative major and minor (C/A). It was the diatonic scales, C major and A minor, which from the beginning were the fundamental keys and functioned as such. It was not the Ionian and Aeolian modes or the Dorian and Lydian modes, which ultimately developed into major/minor keys.<sup>23</sup> Later also William Holder (1694) explains in very clear terms this pairing of intervals. Though Salmon's approach is very theoretical and stems from a desire to find an appropriate and workable temperament, the ideas and suggestions seem to have been employed by practioners and composers. Thus Henry Purcell, in the revised edition of Campion's popular treatise (1694), explains thoroughly these two scale types, also using the diatonic scales as the fundament. He explains that all other major and minor scales are transpositions of these two.

It seems highly probable that the major/minor keys developed independently from earlier theories of modes,<sup>24</sup> and that especially Zarlino's attempt to find a tenable argument for including the thirds and sixths as consonances, together with his desire for number symbolism, was an essential impetus. However, before a full recognition was possible, other important concepts such as the octave, the complementarity of intervals, and the bass, had to be redefined. All these concepts, together with the growing importance of fixed pitches and the urge to simplify the complex systems of modes must be considered the 'germs' from which the major/minor keys developed. In England the theoretical arguments and explanations were provided by the members and associates

<sup>23</sup> However, it is clear that the notational practice (notating D minor with no key signature, e.g.) stemmed from the tradition of notating in *cantus durus* and *mollis*.

<sup>24</sup> This strongly suggests that the modal systems were first and foremost classification systems, and that the development of new methods presumably were caused by a growing gap between music theory, as expressed by the two systems of modes, and compositional practice.

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of the Royal Society of London. Their main aim was to unite music theory and practice: to revise theory in accordance with musical (compositional) practice. The purpose was not to create a simple pitch classification system which was the ultimate result of the discussions. In Thomas Salmon's *Vindication* (1672) against the renowned Matthew Locke, the author explains his reasons for defending the circularity of the octave:

...By which discourse I have not only endeavoured to clear my Hypothesis, to vindicate my Reputation for circulating in an impertinent Octave (which, let the Observer say what he will, is the very nature of Musick, both to its division, and the return of the Similar Notes into the same places) but also attempted to unite the Theory and Practice.<sup>25</sup>

<sup>25</sup> Thomas Salmon, *A Vindication of an Essay to the Advancement of Musick* (London 1672), p. 28.



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