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abbreviations

CS	E. de Coussemaker, Scriptores de musica medii aevi (1864-1876).
GS	M. Gerbert, Scriptores ecclesiastici de musica sacra (1784).
MGG	Die Musik in Geschichte und Gegenwart (1949-).
CMM	Corpus Mensurabilis Musicae.
CSM	Corpus Scriptorum de Musica.
MSD	Musicological Studies and Documents.
MD	Musica Disciplina. This title succeeds : Journal of Renaissance and Baroque Music (1948-).
GdM	J. Wolf, Geschichte der Mensuralnotation 1250-1416 (1904).
HdN	J. Wolf, Handbuch der Notationskunde (1913-1919).

introduction

musical tempo and biological rhythm

Before proceeding to the investigation itself, it is necessary to make a few points about the relation between tactus, tempo and notation and also about the nature of the data we have at our disposal, and finally, about the background to the problem of how tempo in mensural music can be fixed.

Tactus in mensural music is usually defined as the twofold 'down-up' motion of the hand or a baton made by the directing cantor. This twofold motion can be made up of two short time-units as well as three such time-units. If the tactus has two time-units, the duration of the down-beat is the same as the duration of the up-beat. If three time-units are beaten per tactus, the down-beat has two time-units and the up-beat one. The tactus chiefly serves for conducting the combined singing of several voices in such a way that the singing - or playing - will be simultaneous and uniform. This tactus is characteristic of the music in the period from c.1200 to c.1600, which does not mean that the tactus would not have been in use before or after that time.

The tactus has always been beaten in a fixed tempo. What tempo this was in fact, is dependent on several factors. In the first instance, tempo is dependent on the choice of the composer himself. He should notate the music which is in his mind in such a way, that his tempo can be read by the musicians either from the symbols of notation, or from additional signs and instructions. It is a fact, however, that this ideal information about the tempo that is required by the composer, is of rare occurrence in the written tradition of mensural music. As is the case with so many other arts and skills in the late Middle Ages, oral tradition or custom also played an important part in the practice of music and in the notation of it. Even when contemporaries wrote detailed commentaries on this notation of music, we often find that this information also falls short of the very problem of the musical performance. This situation means that many carefully chosen examples must be analysed and compared with one another. Theoretical data must be contrasted very extensively in order to obtain as much certainty as possible in the interpretation of the texts. Although notation and theory are closely connected and mutually dependent, the notation is primary as a source of information about the tempo.

1) For detailed literature on this subjects see: A.Solberger, Biological Rhythm Research (New-York 1965).

2) Cf.J.Smits van Waesberghe, Die Niederländer in seinen Tänzerischen, Sprachlichen, und Musikalischen Äuserungen: in Proceedings of the Fifth International Congress of Aesthetics (The Hague 1968), pp.534-542. Gedachten over structuren en tempo in de muzische expressie, in Gregoriusblad, jrg.90 (Utrecht 1966), pp.81-148, especially on pp.104-111. Het biologische in de samenzang, in Gregoriusblad, jrg.91 (1967), pp.150-159. A detailed scientific publication of this author on biological rhythm related to language, music and dance-forms is in course of preparation.

3) This does not mean that there can be no question of other tempi sometimes.

4) These tempi for going along and marching also apply to walking- and marching-songs.

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In any case the staff-notation of music that is actually to be performed can only be a transcription in imperfect symbols. This is clear and needs no further comment. Consequently, the fixing of tempo based on the notation only, is always a more or less subjective interpretation of those inadequate symbols, and this is even more applicable to the music in days long past. For centuries the composer of mensural music had even thought it superfluous to give special indications for the tempo that was in his mind while writing his music. The performing musician chose his tempo, intuitively, as seemed fitting to him. Only at the end of the 16th century was it felt necessary to note 'slow' or 'quick' in written or printed songs, as two other tempi beside the 'normal' tempo which was not mentioned either. But what was this 'normal' tempo? No indication was needed for popular songs. Even today amateurs choose their 'tempo giusto' intuitively in light music, and a marching brass band faultlessly plays in his 'tempo di marcia'. In the period of mensural music a singer had the advantage of a practice in tactus and tempo that was handed down uninterruptedly. But to the same extent modern performers have the disadvantage of a 'lost tradition' as regards the old music. We are forced to find ways to penetrate into an unknown labyrinth. Therefore it would be very important if, besides notation and theory, a scientific method could be found that would make it possible to compare other data with those from notation and theory, and so gain an optimum result. Such a method would also have to give a basis for linking the musical movement of our time with the musical movement of the past in general.

For a half century already motorial movements of men and animals have been observed. It is especially the results of the investigation of the typically human motion that deserve our attention. We have gained an insight into the physical laws of muscular activity, into the two- or three-phased human respiration, into the rhythmical motion of the heart which we experience in daily life as 'the pulse'. Of special interest is the phenomenon of the innate tendency to the formation of groups in structures of time and of constructions in greater interrelations. In short, we know that these biological activities and tendencies, each in its own way, are closely connected with that mighty impulse of life we experience in body and soul, which in a general sense is called 'rhythm'. In addition to the above-mentioned phenomena, human activities such as: walking, striding, dancing, speaking, making music, have also been included in this biological rhythm research for some time now. 1) A method of enquiry into human musical motion, recently developed by J. Smits van Waesberghe (Amsterdam), has proved to be highly important in this field - a subject-matter which has been given little attention as yet. 2) From this study it appeared that the physical laws that underlie tempo, rhythm, structures and constructions in phenomena of a more general character, are just as well applicable to the musical expressions of man, such as: the movement in dance, the rendering of speech, the performance of music, including the simple movement of the tactus. The importance of this method for fixing musical tempo in general, and for comparing it with the tempi in mensural music in particular, may be shown by following comprehensive explanation.

First of all, the observation of ordinary, relaxed human 'going along', 'striding' or 'walking', as opposed to purposeful 'marching', deserves our attention. On the face of it, one would suppose that there is a great freedom of choice of tempo for both motions, either conscious or unconscious. However, when the exact duration of time of the steps in 'going along' and 'marching' was calculated in numerous cases, it was discovered that the freedom in the choice of tempo for both motions was much less. The 'right-left' of relaxed human 'going' appears to be a two-fold unity, a structure like A=a+b, in which each step in the changing of ballance of the moving body functions to the observer as a noticeable moment, perceived as a 'percussion in continuing time'. When measured by means of a stop-watch, the average duration between two percussions of many quietly walking persons appears to be one second, indicated by the number 60 according to Mälzel's metronome. 3) Similar observation and analysis with purposefully 'marching' persons shows that with two marching-steps each step has an average tempo of one half second, or MM. 120, with a structure in this form: $a=\frac{1}{2}a+\frac{1}{2}a$. 4) The marching-step is twice as quick as the walking-step.

Another observation concerns spoken language. If we listen attentively to the tops of accents as the principal percussions of normally speaking or narrating persons, without paying

5) Rhythm should be understood here as: movement in successive durations of percussion. Footnote 2 gives literature on this subject.

6) For details of this development, see Chapters I and II.

7) Not only a greater deposit of units of notes, but also of text-syllables in small values of notes may give occasion to a wider tempo of the tactus. Usually this widening of tempo remains restricted to a certain limit of about one third of the value of duration of the basic tempo.

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attention to the contents of what is said, we can soon establish, after some practice in using a stop-watch, that, for instance, 24 of such rather regular principal percussions in the duration of speaking, small pauses of phrasing or breathing-spaces included, can be measured as 24 seconds in total; thus in a tempo of c.MM 60 per percussion. If the series of the principal percussions is long enough, and the narrator speeks quietly, then small fluctuations in the principal percussions are sufficiently levelled out.
If a similar investigation is made of other languages, it will be found that what was said above also applies to them. For example, an Italian creates the impression that he has a quicker tempo in his speech, but when listened to carefully, it appears that he joins more quickly enunciated syllables together between two principal percussions, so that on an average, the duration of the principal percussion corresponds to the tempo of MM.60 of the group first-mentioned. The same tempo can also be noticed in rocking, whether accompanied by a cradle-song or not. These observations show that the human being, unconscious to himself, uses a certain division of time, when quietly walking, actively marching, normally speaking, and rocking children, although he realizes that he is free to arrange that time in whatever way he likes - which he sometimes does. If people react in such a general and relatively constant way in the motions observed above, we can rightly speak of a natural tendency to divide time into seconds and half seconds respectively. This tempo of MM.60 is termed a principal tempo of the biological rhythm. 5)

Very interesting material for the observation of rhythm, tempo, and structure is offered in the category of the proverbs. Terse, to the point, succinct as proverbs usual are, they have a structural form which is between quiet speech on the one hand, and artistic prose or poetry on the other. Characteristic of the proverb is: a maximum effect of the contents combined with a minimum of exertion in the expression, based on sound human behaviour. Experiments made by J.Smits van Waesberghe have shown that their diction sounds satisfactory, when spoken in the biological rhythm of the principal tempo. The main percussions generally coincide with accentuations or intervals of rest, while the duration of percussions in the tempo of MM.60 is filled up with more or fewer syllables, or with a time of rest. The diction

of proverbs that are longer, clearly shows the need of phrasing or build-up of a 'constructive' performance of the given text-structure: in smaller proportion as A-B, in middle proportion as AB-CD, in larger proportion as AB-AB, with possible subdivisions. Here too, a principal tempo of biological rhythm in structure and construction proves to be highly important. Much more could be said about this subject, in expressions of language such as regular poetry, free verse, artistic prose and address, about forms of dance, about general and special conclusions in this field. But after citing the author of these investigations we confine ourselves to the question to what extent biological rhythm can play a part in mensural music.

Mensural music has been primarily written for the performance of song, and as such it belongs to 'melodious' music. Secondarly it can be accompanied colla parte by instruments, or performed on instruments throughout, or even be composed for that purpose primarily. As is already indicated by the term, mensural music is noted in certain 'mensurae', i.e., little groups of time-durations in sucessive series, arising from joining the smallest units of notes. Both the concrete contents of time and the concrete divisions of notes of the mensurae have developed together with concrete compositions. Three centres of music especially contributed to this: Northern France, Northern Italy, and Central England.6) To illustrate the possible relation between biological rhythm and mensural notation, we select two examples from the first period when this music flourished (c.1320-1400).

In this period the brevis-note as a duration of time is the normal sign of two well-distinguished mensurae: the brevis imperfecta has the value of four smallest notes, called minimae (2x2), and the brevis perfecta has six of such minimae (3x2), the minima being the counting-unit of the whole system. In terms of biological rhythm both breves have a tempo, rhythm and structure of their own, either as brevis imperfecta: A(1)= a+b, and as brevis perfecta: A(2)= a+b+c. Yet we actually have only one basic tempo here, indicated by the twofold unity of the brevis imperfecta, viz. MM.60, analogous to the tempo of quiet walking, rocking, and speaking. Based on the minima as counting unit, the wider tempo of the brevis perfecta is derived from this, viz. MM.40, on account of the greater number of units.7) This mathematical

8) B.Ramos, in Musica practica (1492), ed.J.Wolf,in Sammelbände der Internationalen Musikgesellschaft I, Beilage 2 (1901), p.83. F.Gafurio, in Practica musicae (1496), Lib.I, cap.3. G.Lanfranco, in Le Scintille di musica (1533), Pars II, p.67. L.Zacconi, in Prattica di musica (1592), Lib.I, fol.21'.

9) Verulus, in his Divisio senaria imperfecta (Tempus imperfectum maius), CS III, p.130b.

10) H.Buchner, Fundamentbuch von Hans von Constanz (between 1513 and 1532), ed.by C.Päsler, in Vierteljahrschrift für Musikwissenschaft V (1889), p.28. Mention should be made of F.Machatius as well, who selects MM.70 as the average basic tempo for two minimae, in his book: Die Tempi in der Musik um 1600, (Berlin, 1955).

tendency is characteristic of the whole period of mensural notation, in contrast to 19th century music for example. The brevis-mensura is also a basis for the fixing of the tactus-tempo, that is to say, the duration between beginning and end of one motion of tactus. Tactus is only meant here as a division of the physical process of time; the 'down' of the tactus as such is only a moment of 'drawing the attention' in time. In the 'down'-motion of tactus, just as with the principal percussion in speech-rhythm, one has to abstract from notions such as: loud-soft, heavy-light, long-short, or consonant - dissonant position in the counterpoint. Biological rhythm in music is pre-eminently a play of tactus. In the brevis perfecta the motion of tactus follows the ternary structure (a+b+c) of this mensura. The structure a+b+c may interchange with a+b, while the latter may be replaced by the composer for a+b+c diminished by one third of the note-values. This form of diminution is usually indicated by colouring of notes.

But a composer can also attune his motorial drift, consciously or unconsciously, to a second principle of biological movement, namely to the heart-beat. He is free not to adjust his twofold duration to the rhythm of walking, rocking, or speaking, but of the heart-beat or pulse - pulsus cordis-, which second principle of tempo is experienced as relatively 'quick' or 'quicker' with respect to first-mentioned principle. Not only the heart-beat is regular in ordinary circumstances - in terms of biological rhythm: a=a - but moreover the tempo of the pulse of a grown-up person who quietly sits or stands, can be put at c. MM 70-80, as the average duration between two expansions of the pulse. Besides, it must be said that the walking-stride of young people can also tends towards the tempo of MM. 80 as alternative tempo next to MM. 60.

This second principle of biological rhythm as division of time had been present in no small measure from the beginning of mensural notation, and is seen most clearly from c. 1300 onwards. In these tempi a certain giving-way to the left or right is possible, provided that the identity of the main-tempo remains perceptible. Once chosen, the tempo is regurlarly preserved within the frame-work of the whole piece, or of the section, or of a certain part of it, as indicated by the composer. This also holds good when the mensurae in two or three voices singing simultaneously are of un-equal duration, or when mensurae are shifted by syncopation. In the flowering period of the mensural system the tactus always de-rived its tempo from the time-duration of the mensura, which was indicated mostly by certain symbols of mensuration in or over the staff.

Biological rhythm in connection with choice of tempo was not entirely unknown in the period of mensural music either. Four Italian theorists mentioned the duration of the pulse as a starting point for a normal tempo of two minimae : B. Ramos de Pareia, Fr. Gafurio, G. Lanfranco and L. Zacconi. 8) For the same tempo MM. 72, measured by the 24 hours-cycle, Verulus (Vetulus) de Anagnia (c. 1350) has mentioned three minimae as was usual in Italy. 9) L. Zacconi gave as alternative the tick-tack of the clock, unfortunately without mentioning whether he thought of a second-motion - the principle of going along - or of the pulse. H. Buchner, on the other hand, clearly compared the duration of the tactus-time with the stride (two steps) of a quietly walking person. 10)

To conclude our introduction we state that we do not start our investigation from the above-mentioned data. Our task is mainly to establish the concrete tempo in anyone of our examples. Nevertheless this enquiry leads to parallel conclusions in many respects. In our last recapitulation the similarities and differences will be summarized.

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1) Cf. E.de Coussemaker, Scriptores de musica medii aevi (1864 - 1876), henceforth indicated by : CS,I , p. 120b : <Unum tempus appellatur illud quod est minimum in plenitudine vocis >. Much as the old writers, such as, Marchettus, Anselmus ea., did their best to be more precise in fixing the duration of the pluriform brevis with respect to the 'tempus unum',they did not find a way which was more concrete than Franco's solution for indicating the 'tempus musicale'.

2) S. Gullo, Das Tempo in der Musik des XIII. Jahrhunderts (1964),cap. II and III. For singing 'bene vel leviter' , cf. J.de Liège, Speculum musice, CS II, p. 401a.

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chapter I

indications of tempo in the theory and practice of the 13th and early 14th centuries

In 1964 an important study by Salvatore Gullo was published, entitled : "Das Tempo in der Musik des XIII. und XIV. Jahrhunderts" (Verlag Haupt, Bern). This book contains a minute analysis of Latin texts dating from the above-mentioned periods, which give indications about the tempo in the music of that time. The author rightly holds the view that until then these indications were not given the attention they deserve. Since our tempo-research is primarily focussed on the 13th century and later music, but always in connection with the data derived from the theory which accompanied the music, it is first necessary to give a summary of the most important conclusions which Gullo reached in his research.

The theoretical writings of the 13th century, according to Gullo, only give indications of tempo in a very general sense. In his notation-theory, Franco of Cologne (c.1270) calls the 'tempus unum' of the brevis recta "the smallest duration in a tone sung in full".1) This brevis recta can be divided into 2/3 and 1/3 parts, and it is the basis of the longa imperfecta, longa perfecta and longa dupla. Around 1300, other authors gave further indications. Gullo discusses texts of the otherwise unknown Petrus le Viser (c.1280?), which R. de Handlo included in his treatise of 1326; then texts of Anonymus IV (c.1275) and of Jacobus de Liège (c.1325). These three authors, each in his own way, describe three degrees of mensuration expressed by the brevis, which in consequence can indicate different durations of time. In his system, J. de Liège calls the brevis 'slow', 'moderate', or 'quick', and in hoquetus-notation even 'very quick', which does not permit further division. This difference of duration is dependent on two factors : not only the number of semibreves into which the brevis of a composition was divided, but also the number of text-syllables written under small or smallest values of notes in fact is determining. When there are many text-syllables, this has a slowing-down influence on the duration of the brevis; on the other hand, music without any text, executed on instruments, may be quicker than music sung with a text. Gullo also points out that certain genres of music have tempi of their own : the 'cantus coronatus' for example, was in itself held to be a slow, festive song, whereas the 'cantilena ductio', the 'hoquetus' and the 'estampie' were known as cheerful types of music in quick tempo. The tempo was influenced by the rule that the smallest values of notes with a text must still be sung fairly 'bene vel leviter'. 2)

3) S. Gullo, o.c., pp. 1/2. H. Besseler, Studien zur Musik des Mittelalters: II, Die Motette von Franco von Köln bis Philipp von Vitry, in Archiv für Musikwissenschaft, VIII (1926), pp. 213/214; cf. MGG, Bnd. I (1949-1951), Kol. 691. G. Reese, Music in the Middle Ages (1940), pp. 332/333. W. Apel, The notation of polyphonic music 900-1600, third corrected edition (1945), pp. 343 and 324. Concerning indications of tempo in a general sense, cf. I. Herrmann-Bengen, Tempobezeichnungen (1959), pp. 21-23.

4) S. Gullo, o.c., cap. V, Das Tempo in der Ars nova, pp. 48-86.

5) For a detailed analysis of Verulus 'texts borrowed from CS III, pp. 129-177, especially for pp. 137-150, see S. Gullo, o.c., pp. 69-76. Other information in J. Smits van Waesberghe, Musikgeschichte in Bildern, Bnd III (1969), pp. 172-175 Mensurallehre. In MS Rome, Bibl. Vatic. Barberiniano lat. 307 (14th century), fol. 16' and 26', the name of Verulus is written <Vetulus>.

6) S. Gullo, o.c., p. 58 in medio. 'SB maior' in later period is called: Semibrevis perfecta, with ternary division; 'SB minor' is called: Semibrevis imperfecta, with binary division. The proportions in the last row are added by the author. As fas as we know Verulus was the first of the West-European theorists of music, who thought of measuring the musical tempo in his day from the 24 hours-cycle. Not until 1619 did M. Praetorius lay down for the newer Italian music of his time that "wenn man einen rechten mittelmäszigen Takt helt", 160 tempora could be accomplished in a quarter of an hour of clock-time; cf. Syntagma musicum III, p. 88. If 160 tempora equal 900 seconds, the tempo of the semibrevis-tactus equals 1,406 seconds. Put in metronomic figures this is MM. 42 as the average beat-time including eight black semiminimae, and evidently meant for modern Italian notations in the beginning of the 17th century.

7) S. Gullo, o.c., pp. 57-69. Cf. Marchettus de Padua, Pomerium in arte musicae mensuratae, ed. M. Gerbert, Scriptores ecclesiastici de musica sacra (1784), henceforth indicated with: GS, III, pp. 121-188; Brevis compilatio (1325), CS III, pp. 9b-12. M. Gerbert dates Pomerium in 1309; O. Strunk, in Rassegna Musicale XX (1950), p. 312, dates 1318/9; G. Vecchi, in his ed. of Pomerium in CSM no. 6 (1961), dates between 1321 and 1326; N. Pirrotta: 1326-1327; Marchettus de Padua and the Italian Ars Nova, in MD IX (1955), pp. 60-63.

No doubt, this rule was in force for a long time in mensural music.

Gullo refrains from proposing a concrete tempo for 13th century music, although he quotes H.Besseler's well-known suggestion, which is taken over by G.Reese and, with some difference, also by W.Apel. According to Besseler the tempo in Franco's motet 'Je me cuidoie' could be M.132 for the brevis (Apel M.120). For the motet 'Lonc tens me sui', written by Petrus de Cruce, Besseler suggested a tempo of M.54-60 for the brevis (Apel M.80, but in another place M.60-70). 3) In the second part of this Chapter we shall give a more detailed discussion concerning these suggestions.

Much more lucid information on tempo and notation is given by early 14th century theorists, notably by Marchettus de Padua (c.1326), Verulus de Anagnia (c.1330?) and Philippe de Vitry (c.1320). The best part of Gullo's study is devoted to these authors.4)

The tempo-theory of Johannes Verulus is by far the most scientific, because he derived his musical time-unit from the 24 hours' cycle as expressed in the old terminology of that time. Verulus calculated that the full brevis of the 'Tempus divisionis novenarie maioris prolationis', - the brevis of which is subdivided into three 'semibreves maiores' or nine 'semibreves minimae -, equalled 1/3 'uncia' being a 'tempus perfectum medium' or 1/24 minute of our clock-time. From this starting-point it follows that the full brevis shows a tempo of M.24, the semibrevis maior M.72, and the semibrevis minima M.216. In another place Verulus gives the same tempi once again, but in another way, by stating that the whole uncia being 1/8 minute of our clock-time, was equivalent to 27 'athomi vocis', i.e., to the 27 smallest and indivisible values of notes. This also leads to the equation: 8 times 27 = M.216 for the semibrevis minima, or M.24 for the full brevis.5) Here is a complete table published in Gullo's study, derived from Verulus' data.

Table I shows that Verulus' athomos vocis (=minima) represents a constant basis for all tempora. Next, it appears that this table is in fact the multiplication of the minima, and not the division of a constant value, for example, of a brevis.6)

Gullo compared Verulus' system with the special Italian notation described by Marchettus de Padua around 1326. 7) As well as other elements, this system contains a certain nucleus which could be compared with Verulus' table. On first perusal of Marchettus' texts, it seems that this author starts from the longest duration of the brevis in order to estimate all the smaller values from this. On closer investigation Marchettus not only describes a system of eight brevis-divisions, but also a system of tempora which supplement his divisions and links up with the system of P.de Vitry.

table I

	Brevis	SB maior	SB minor	SB minima	Ratio
1 Divisio duodenaria:	M.18	M.54	M.108	M.216	3-2-2-1
2 Divisio novenaria:	M.24	M.72		M.216	3-3-1
3 Divisio octonaria:	M.27	M.54	M.108	M.216	2-2-2-1
4 Divisio senaria imperfecta:	M.36	M.72		M.216	2-3-1
5 Divisio senaria perfecta:	M.36		M.108	M.216	3-2-1
6 Divisio quaternaria:	M.54		M.108	M.216	2-2-1
7 Divisio ternaria:	M.72			M.216	3-1
8 Divisio binaria:	M.108			M.216	2-1

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8) S. Gullo, o.c., pp.58 ff. and p.66. Cf. Marchettus, Pomerium, GS III, p.138a: < Tempus perfectum minimum est ipsum primum tempus et ratio mensurandi omnia quae in musica continentur... secundum Magistrum Franconem>; cf. ed. G. Vecchi, o.c., Lib.I, Pars II, Tract.V, cap.I, p.78.

9) S. Gullo, o.c., pp.67/68.

10) C. Sachs, Rhythm and Tempo (1953), pp.186/187.

11) S. Gullo, o.c., pp.76-85. Cf. Ph.de Vitry, Ars nova (c.1320), CS III, pp.13-22; ed. G.Reaney, A. Gilles and J. Maillard, in MD X (1956), pp.13-31. On Verulus' connections with the French music cf. G.Reaney, The Question of Authorship in the Medieval Treatises on Music, in MD XVIII (1964), p.15.

table II

	Brevis	SB maior	SB minor	SB minima	Ratio
1 Divisio duodenaria Tempus perfectum recte in 12:	1/1 M.23-27	M.70-80	M.140-160	M.280-320	3-2-2-1
2 Divisio novenaria Tempus perfectum recte in 9 (Fr.):	1/1 M.23-27	M.70-80		M.210-240	3-3-1
3 Divisio octonaria Tempus imperfectum in 8:	2/3 M.35-40	M.70-80	M.140-160	M.280-320	2-2-2-1
4 Divisio senaria imperfecta Tempus imperfectum modi Gallici:	2/3 M.35-40	M.70-80		M.210-240	2-3-1
5 Divisio senaria perfecta Tempus perfectum minus in 6 (It.):	1/2 M.46-54		M.140-160	M.280-320	3-2-1
6 Divisio quaternaria Tempus imperfectum minus in 4:	1/3 M.70-80		M.140-160	M.280-320	2-2-1
7 Divisio ternaria Tempus perfectum minus in 3 (Fr.):	1/3 M.70-80			M.210-240	3-1
8 Divisio binaria Tempus imperfectum minimum in 2:	1/6 M.140-160			M.280-320	2-1

In his text-analysis, Gullo proves that Marchettus ultimately starts from Franco's 'tempus primum'; this is especially shown by the text : "The Tempus perfectum minimum (minus) is the tempus proper and the basis of all that can be measured in music.... according to Magister Franco". 8)

Gullo not only carefully analysed Marchettus' texts, but he arranged for the music of that period to be sung by experienced singers. 9) The performance has shown that the musical time-unit in Marchettus' theory corresponds to a tempo M.70-80, i.e., the same value that C.Sachs found in performing similar old-Italian music. 10) Although this method cannot be considered full-proof, it is not altogether without any value either. The constant duration in this system, which Gullo indicates as M.70-80, occurs four times in the semibrevis maior and twice in the brevis, and functions as common unit for all clean-cut divisions. It proves that the brevis is constant in the divisions in a limited way only, namely in divisio 1 and 2, in 3 and 4, and in 6 and 7. This brevis is variable rather than constant, since it has only 2/3, 1/2, 1/3 and 1/6 of its greatest value in certain divisions. A striking feature is also the fact that the semibrevis minima in this system has two basic times, which again and again have to do with divisions into two or into three. Chapter II will offer an opportunity to see to what extent the tempi-proportions of the Tables I and II are to be found in the music itself.

The final part of Gullo's study is devoted to the theory of P.de Vitry, who, about 1320, described a system of notation which he thought to be the most efficient for performance. In the long run this system of notation outdid Marchettus and Verulus' systems.11) It consists of five different 'tempora' each with its own particular kind of division into smaller values. Based on Gullo's analysis, the Table of De Vitry can be drawn up as follows, in the same order and with the same proportions as in the Tables I and II.

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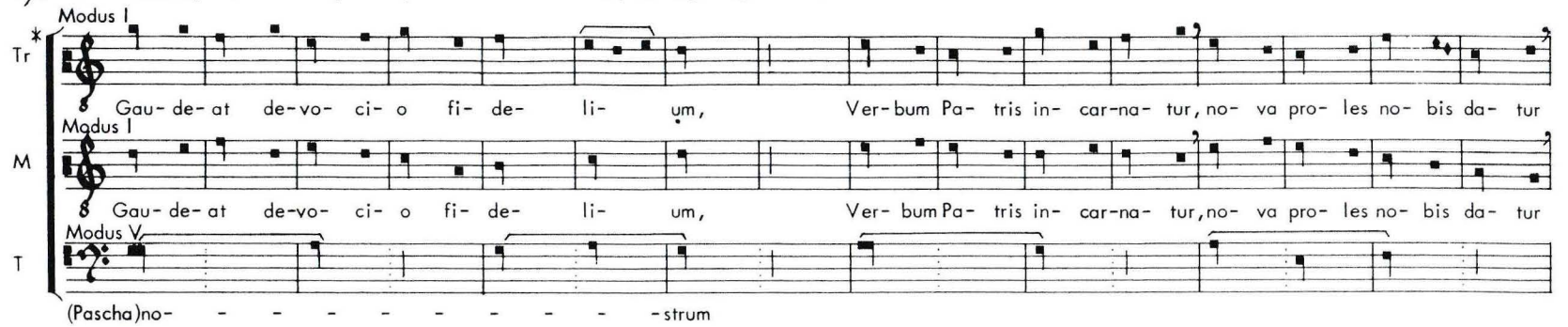
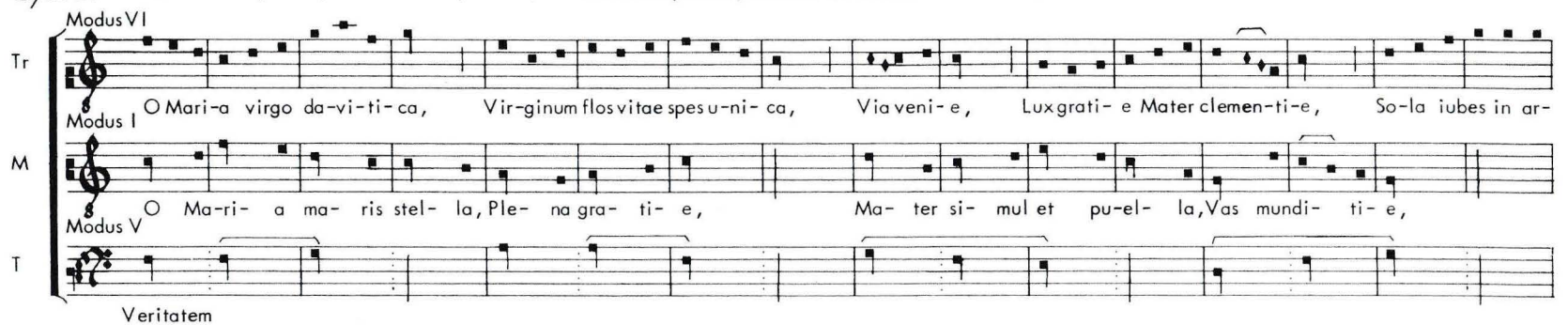
ex. 1 Perotin, modal motet (c.1200) Cod. Wolfenbüttel, Herzog-August Bibl. 628 fol. 107'



ex. 2 Notre Dame-period, modal motet (c.1230) Cod. Montpellier, Faculté de Medecine H 196 fol. 88'



* Tr = Triplum M = Motetus T = Tenor

12) S. Gullo, o.c., pp. 77 and 81.

13) Ex. 1 is taken from the MS Wolfenbüttel, Herzog-August Bibliotek, 628 (1206), fol. 107', and MS Wolfenbüttel, 1099, fol. 131'. Transcription by F. Ludwig, Musik des Mittelalters, in Zeitschrift für Musikwissenschaft V (1922-1923), p. 450. For Modal-notation cf. F. Mathiassen, The style of the early motet (1966), pp. 45-56.

14) Ex. 2 is taken from the MS Montpellier, Faculté de Medecine H 196 (13th. century), fol. 88'. Facsimile in E. de Coussemaker, L'art harmonique aux XII et XIII s. (1865), no. 8. The motet is mentioned by Anonymus Discantus (positio vulgaris) (late 13th century), CS I, p. 96.

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table III

	Brevis	SB recta	SB minor	Minima	Ratio
(2) Tempus perfectum maius:	M.23-27	M.70-80		M.210-240	3-3-1
(4) Tempus imperfectum maius:	M.35-40	M.70-80		M.210-240	2-3-1
(5) Tempus perfectum medium:	M.35-40		M.105-120	M.210-240	3-2-1
(6) Tempus imperfectum minus:	M.53-60		M.105-120	M.210-240	2-2-1
(7) Tempus perfectum minimum:	M.70-80			M.210-240	3-1

In this Table of De Vitry the 'tempus perfectum minimum' is represented by a brevis recta with a subdivision of three (semibreves) minimae. In this connection De Vitry himself says that he borrowed it from Franco. The 'divisio ternaria' of Marchettus and Verulus also is related to the 'tempus primum' of Franco, and the proportions of division are equal to each other in the three Tables. This is the reason why Gullo also suggested the tempo M.70-80 for the semibrevis recta in his table : our Table III. 12). Compositions by De Vitry and De Machaut will show if the tempo suggested can be accepted.

After discussing the argument made by Gullo, we now turn to the music of this period, especially to motets, the most important kind of music in the 13th century. Though we can also include in our research conductus-songs - which have a close relation of notation and text-syllables - or even organa, we disregard these songs in order to focus our attention on the notations of the West European motet. The examples following are always given in their original notation to show to full advantage all the details that are essential for a research into indications of tempo. The original clefs are given at the head of the bar, while the melodies of the several voices are brought together in score in the clefs of g- and f- (in the usual way) Ligatures are resolved in separate notes and indicated by brackets over the notes. Each example is accompanied by such theoretical information as may elucidate the composer's or author's intentions, handed down to us in his own writings or that of his contemporaries. We shall see that in many cases music and theory supplement one another.

Ex.1, the beginning of one of the oldest clausula-motets, ascribed to Perotin, needs some explanation because it was written in modal rhythmic, just as Ex.2. 13) The longa has two tempora, the brevis recta has one tempus, and a longa before another longa counts as three tempora. Three tempora together form a 'perfectio'. The brevis, one tempus, functions as the counting-unit of the musical movement, but nevertheless can be divided into two semibreves. In the modal motet, the simple and the double 'perfectiones' have a certain metrical pattern called 'Modus', derived from classical poetics. In the oldest motets from the 13th century there are six 'Modi', which can be schematized systematically in this way :

table IV

Modus III, IV and V are twofold patterns of course; Modus I, II and VI are usually also described in the theory as double 'perfectiones'. In this way six clearly distinct Modi develop. The divisions of the perfectiones are scored with lines, as is done in the upper voices of Ex.1. When two perfectiones go together as in the Tenor, they are divided with vertical dotted lines. The Triplum and Motetus are written in Modus I, the Tenor in Modus V.

In Ex.2, a French motet, written some time later than Ex.1, Modus VI, I and V are combined. 14) In each perfectio two or three, but seldom four text-syllables occur. Modal music was always beaten some way or other, either by the singers themselves by tacting with the foot, hand or finger, or by some one who did not sang. This practice is depicted on old miniatures

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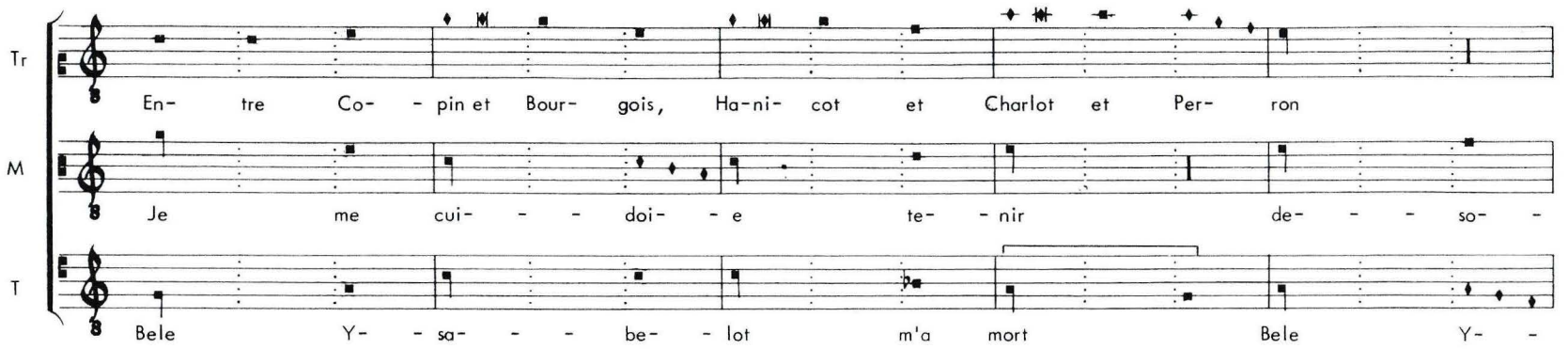
ex. 3 Franconian notation, motet (c. 1260) Cod. Bamberg, Staatliche Bibl. Lit. 115 fol. 31'



15) H. Besseler, o.c., p. 214.

16) Ex. 3 is taken from the MS Bamberg, Staatsbibl., Lit. 115 (13th century), fol. 31'. Facsimile in MGG, Bnd. I (1949-1951), Kol. 688.

17) This can be concluded from Franco's text in CS I, p. 120b: < unum tempus appellatur illud quod est minimum in plenitudine vocis... > ; p. 122a: < semibrevis minima pars temporis est ipsius rectae brevis >. By the end of the 13th century the iambic division of the brevis into 1/3-2/3 appears to be superseded more and more by the trochaic division 2/3-1/3, as Anonymus S. Emmeram observed in 1279: cf. H. Sowa, Ein anonymer glossierter Mensuraltraktat (1930), p. 51.

18) In CS II, p. 401a: < Antiqui cita mensuratione brevium in motetis communiter usi (sunt) >.

19) o.c., p. 214. M. 108 fits better, taking account of a distinct performance.

20) In MS Montpellier, fol. 273. Facsimile in W. Apel, Notation, o.c., no. 65, p. 321. In J. de Liège, CS II, p. 401b, it is mentioned that this motet was assigned to Petrus de Cruce; also by R. de Handlo (1326), CS I, p. 389a, and by J. Hamboys (c. 1370), CS I, p. 424b.

21) In CS II, p. 402a :
< Patet autem ex dictis, quod antiqui pro eadem temporis morula duas semibreves inaequales, contra tres aequales, contra quattuor, contra quinque, et usque ad novem, et tres aequales contra quattuor, quinque, sex, septem, octo, novem posuerunt et pronuntiaverunt >. On p. 429 J. de Liège calls such small values < semibreves quintae, semibreves sextae, semibreves septimae >. By this he indicates that each of those groups of smaller semibreves was sung as quintols, sextols and septols respectively. J. Handschin, in his Musikgeschichte (1948), p. 187, objects to the quintols - in our Ex. 4 -, which J. Ludwig, in G. Adler's Handbuch der Musikgeschichte, Zweite Aufl. I (1930), p. 254, and after him also W. Apel, Notation, o.c., Appendix Transcriptions no. 45, accepted in accordance with the text of J. de Liège; see also A. Auda, Les Motets Wallons (1953), I, p. 56.

22) A. Auda, o.c., p. 61 ff., precludes a priori the possibility of more than one tempo in the motets of late 13th and early 14th centuries.

23) Cf. H. Besseler, o.c., p. 214; MGG, Bnd. I (1949-1951), Kol. 691.

24) In his Notation, o.c., p. 343. An English example written in Petronian notation, with 5 semibreves per brevis in the upper voice, is the triplum-motet 'Caligo terre-Virgo mater' (c. 1300), in MS Oxford, New College 362 no. 7, fol. 88'

25) 'Mo' indicates the MS Montpellier; 'Ba' the MS Bamberg. The text of Lambertus is in CS I, p. 271a: < Unde si querat aliquis utrum possit fieri modus sive cantus naturalis de omnibus imperfectis sicut fit de omnibus perfectis, responso cum approbatione, quod non, cum puras imperfectas nemo pronunciare possit >.

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more than once. In many cases the notation itself makes clear where the beat is to fall. In our score of Exx.1 and 2,the beat falls upon the lines with single perfectio; upon lines and vertical dotted lines with double perfectiones. In Chapter VII we shall deal with some terms used for naming the beat in the period of the old mensural music.

H. Besseler suggested a tempo of M.80 for the longa perfecta with two text-syllables. 15) From this it may be concluded that Ex.2, in which predominantly three text-syllables occur in a perfectio, will have a tempo that is slower than in Ex.1, viz., c.M.60. Later on it appears that these tempi exactly fit the results of our research in many other cases.

In Ex.3, a motet written in Franconian notation, the brevis recta has a subdivision of three equal semibreves, or of two semibreves, the first of which has the value of 1/3 brevis, and the second of 2/3 brevis. 16) The 2/3 brevis is sung in this way, but is not indicated by a special note in the original notation. The order: 1/3 - 2/3 brevis gives a flowing character to the musical movement. Franco himself makes clear in his treatise that the brevis recta has now taken over the role of the tempus as 'mensura vocis' from the longa perfecta in the older modal motet. He has moved the beat, as it were, to the following smaller value of notes, in this case the brevis recta. 17)

In this example we have indicated the 2/3 breves by two vertical lines on either side of the semibreves. The lines divide the longae perfectae, and the vertical dotted lines divide the brevis-times. Jacobus de Liège, whose authority stands out so clearly in his treatise, calls the measuring of time in the Franconian notation a 'quick mensuration of the breves in the motets'. 18) For these breves H. Besseler suggested a tempo of M.132. 19)

Ex.4, a motet by Petrus de Cruce, has a brevis which is not only divided into three equal semibreves, as was the custom in the Franconian notation, but even into four, five, six and seven semibreves, each with one text-syllable. 20) J.de Liège comments on this : "From what was said above it is clear that the 'antiqui' noted and sang for one and the same duration: two unequal semibreves against three, four and five equal semibreves up to as many as nine semibreves, and also three equal semibreves against four, five, six, seven, eight and as many as nine". 21) The increase of semibreves per brevis perfecta induced Petrus de Cruce and his contemporaries to give points of division for the convenience of singers and conductors. Reciting so many text-syllables to so many smallest values in the upper voice causes a certain widening of the tempo of the brevis. 22) Starting from J.de Liège's principle, which we already mentioned, that it must still be possible to sing the shortest note with one text-syllable 'bene vel leviter', the brevis perfecta of motets that were composed in the style of Petrus de Cruce will have been sung more slowly than the brevis perfecta in Franconian motets. 23) W.Apel prefers M.80, which is obviously going too quick.24) The tempo M.54-60 suggested by Besseler is quite possible for the 'morosa mensuratio brevium' in Petronian motets with three to seven or even nine subdivisions of the brevis and with three to seven text-syllables.

When Exx.1 and 2 are sung in the tempo suggested above, it is clear that the 'ternalitas' - as the old writers put it - in the upper voice (Modus I and VI) is more or less be eclipsed by the obvious 'duality' of Modus V in the Tenor under the influence of that tempo; in other words, the musical movement must in fact be called 'binary'. In Exx.3 and 4,on the other hand,the movement is 'ternary' in all the voices, as is also suggested by the notation in the facsimile score.

A division of the longa into two breves was quite rare in the 13th century, but it can be found in Mo,fol.214', in Ba 35,fol.19, and in Ba 86,fol.54, to mention some examples. Magister Lambertus (ps.Aristoteles c.1260) even thought that no one could sing music that would have been written in binary divisions of note-values only. 25) But by the end of the 13th century there were motets in which not only the longa and the brevis were divided 'binarily', but the brevis was also 'ternarily', especially in English notations. In this connection it may be interesting to know what the English theorist Walter Odington wrote c.1310: "The longa with earlier organum-composers had only two tempora, just as in poetry; but later it was sung as 'perfectio', so that it has three tempora on the analogy of the Holy Trinity, which is the highest perfection. And then the longa of this way of singing is called 'perfecta', and the longa which has two tempora is called 'imperfecta'... Others use in Modus III

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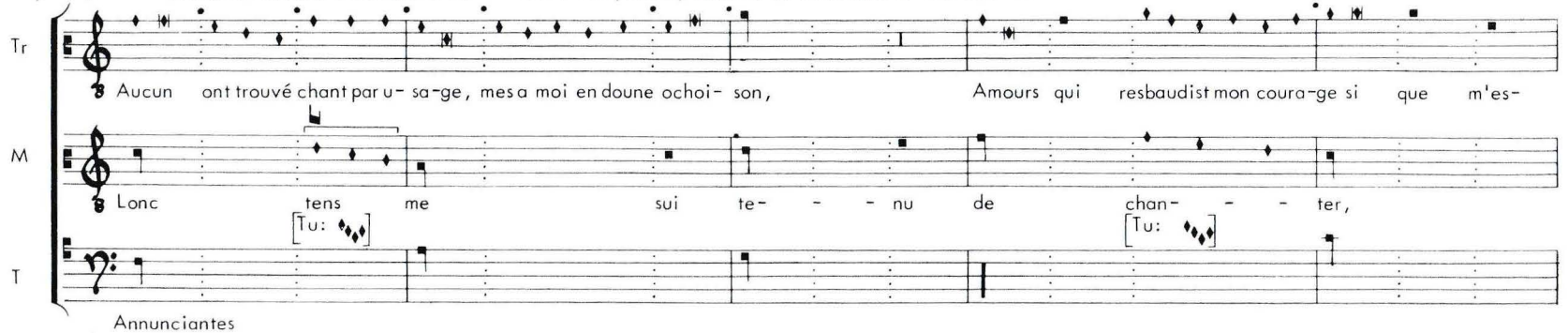
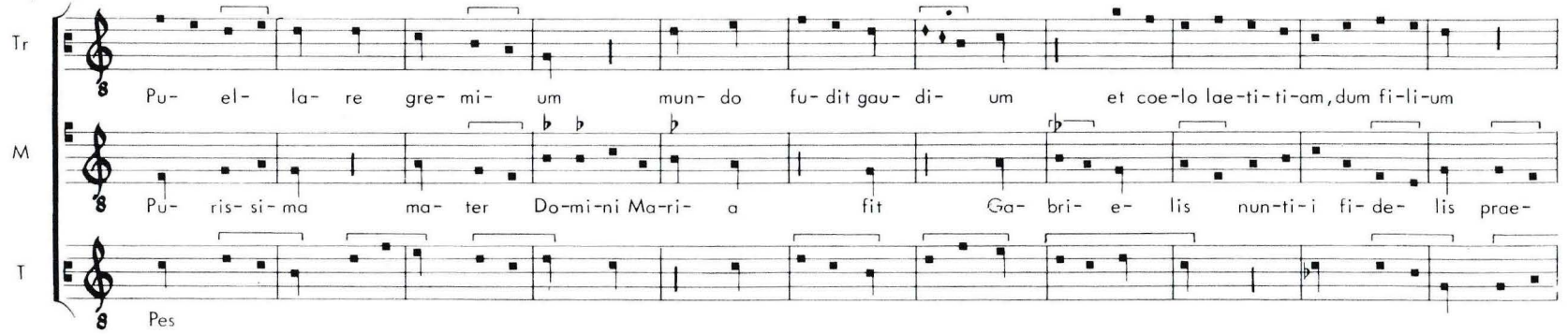
ex. 4 Petrus de Cruce, motet (c. 1280) Cod. Montpellier, Faculté de Medecine H 196 fol. 273



ex. 5 Anonymus, motet (c. 1290) Worcester, Chapter Libr. Add. 68 fol. 39



26) In CS I, p. 235 b: <Longa autem apud priores organistas duo tantum habuit tempora, sic in metris : sed postea ad perfectionem dicitur, ut sit trium temporum ad similitudinem beatissimae trinitatis quae est summa perfectio, diciturque longa huiusmodi perfecta. Illa vero quae tantum duo habet tempora, dicitur imperfecta.. > On p. 245a: < Alii autem, in his modis [III and IV] utuntur longis et brevibus et semibrevibus et pausis secundum quod ego accipio, sed tantum dividunt longam in duas breves et duo tempora habentem, et brevem in duas semibreves, et raro in tres. Et pro longa duo spatia occupat pausa, pro brevi unum >. Cf. J. Handschin, The question of binary rhythm, in Musica Disciplina in MD III (1949), pp. 72-78.

27) Facsimile in L. Dittmer, Auszug aus 'The Worcester music fragments' (1955), p. 25. In this collection several other examples of binary divisions can be found.

28) The motet 'Amor potest - Ad amorem' is written in this manner in MS Montpellier, fol. 378', with binary divisions and Tenor-ostinato : cf. J. Handschin, o.c., p. 194.

29) Facsimile in H. Wooldridge, Early English Harmony (1897) I, pl. 10; facsimile in colours, see Grove, Dictionary of Music VII (1948), frontispiece.

30) Literature: M. Bukofzer, Sumer is icumen in, A revision, in: University of California Publications in Music (1944) II, 2, p. 79. J. Handschin, o.c. p. 195. B. Schofield, The Provenance and Date of 'Sumer is icumen in', in The Music Review IX (1948), p. 81. N. Pirrotta, On the problem of "Sumer is icumen in", in MD II (1948), p. 205. J. Handschin, The Summer Canon and its background, in MD III (1949), pp. 55-94; in MD V (1951), pp. 65-113. F. Ll. Harrison, Music in Medieval Britain 2) (1963), pp. 141-144.

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and IV longae, breves, semibreves and signs of pause <not> in the manner that I do myself, and they divide the longa only into two breves with two tempora, and the brevis into two semibreves and seldom into three, and per longa the pause has two spaces, and one space for the brevis". 26) The following motet is a clear example of binary divisions.

Ex. 5 which may have been written before 1300, shows that the Motetus and the Tenor in the English motets were included in the quick movement of the upper voice at an earlier date than elsewhere. 27) Modal rhythm is out of the question here, even for the Tenor. It would seem that also in France the metrical patterns of the old Modi were gradually given up. In the early 14th century the term 'Modus' refers to the relation of the number of breves to the longa, which the composer in fact used in his notation. Characteristic of the old English motet is the ostinato-technique in the Tenor. The same thing can be said of the paraliturgical Latin texts, of the 'binary' division of the note-values, and of the role the thirds and even the sixts begin to play as consonants in this music. On the other hand, English composers kept to longa-brevis notation longer than the French composers did, so that the four imperfect breves of Ex. 5, each with one text-syllable, can be equated, as regards their duration, with four semibreves in the French notation of that same period. If this notation is found in continental sources, the longa-brevis notation, together with other features, may be an indication of English origin. 28) The longa imperfecta (2 syllables) is c. M. 100.

Ex. 6 is an English 'rota' or 'canon' for four voices combined with two ostinato 'pedes' in Contra and Tenor, also with text, known under the title of 'Sumer is icumen in'. 29) The Tenor is derived from the opening melody of the antiphone 'Regina coeli', and the rhythming sequence-text is related to the liturgical Easter-tide just as the Tenor-melody is. The Latin text 'Perspice christicola' is written in red ink, but over it, in black ink, is the Old-English profane text 'Sumer is icumen in' The fourth system of six lines shows two musical readings in the manuscript : one written in the usual way, and another one which was erased but can still be read very well, as a possible variant. Under the music there is a detailed information about the way in which the canon should be sung and ended.

This canon, notated about the middle of the 13th century, can be considered to be extremely musical as for as melody and harmony are concerned. The tempo of the longa-brevis movement can be compared with Ex. 1. 30)

Many more examples of 13 h century notations could be discussed, but we confine ourselves to these six, because they have already such important elements as are essential for a research into indications of tempo. From these data it already appears that we can distinguish two phases of notation in the 13th century: phase I, in which the musical movement of the upper voices was predominantly noted in longa-brevis; and phase II, in which the upper voice was mainly written in brevis-semibrevis. A comparison of these notations with comments by theorists from that same period, quoted above, is drawn up in the following scheme :

table V

PHASE I, predominantly longa-brevis movement : citissima mensuratio brevium :

ternarily divided French and English notation :

ex. 1 c. 1200 : ┓ ▪ (2 syllables) M. 80, ▪ M. 240.
ex. 2 c. 1230 : ┓ ▪ (3 syllables) M. 60, ▪ M. 180.

ternarily divided English notation :

ex. 6 c. 1250 : ┓ pf. (2 syllables) M. 80, ▪ M. 240.

binarily divided English notation :

ex. 5 c. 1290 : ┓ impf. (2 syllables) M. 100, ▪ M. 200.

PHASE II, predominantly brevis-semibrevis movement : cita mensuratio brevium:

ternarily divided French notation : Franco :

ex. 3 c. 1260 (c. 1270?): (2 syllables) ▪ pf. M. 90-110.

media mensuratio brevium :

ternarily divided French notation : after Franco :

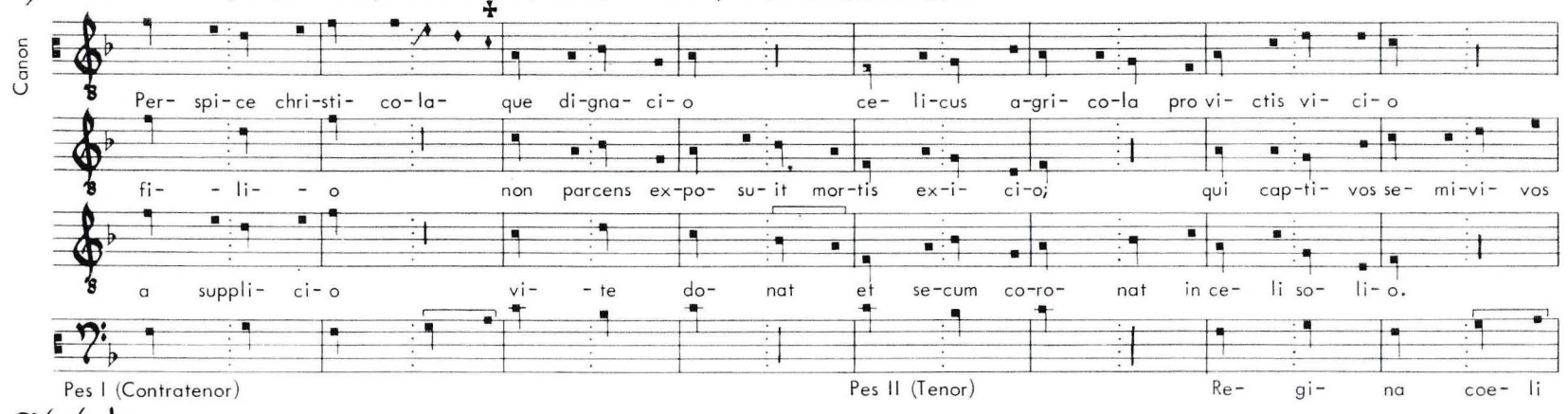
(c. 1275) : (2 syllables) ▪ pf. M. 80- 90.

morosa mensuratio brevium :

ternarily divided French notation : P. de Cruce :

ex. 4 c. 1280 : (5 syllables or more) ▪ pf. M. 54- 60.

ex. 6 a Anonymus, Rota:Perspice christicola (c.1250) London, Brit. Mus. Harl. 978 fol. 11'



ex. 6 b

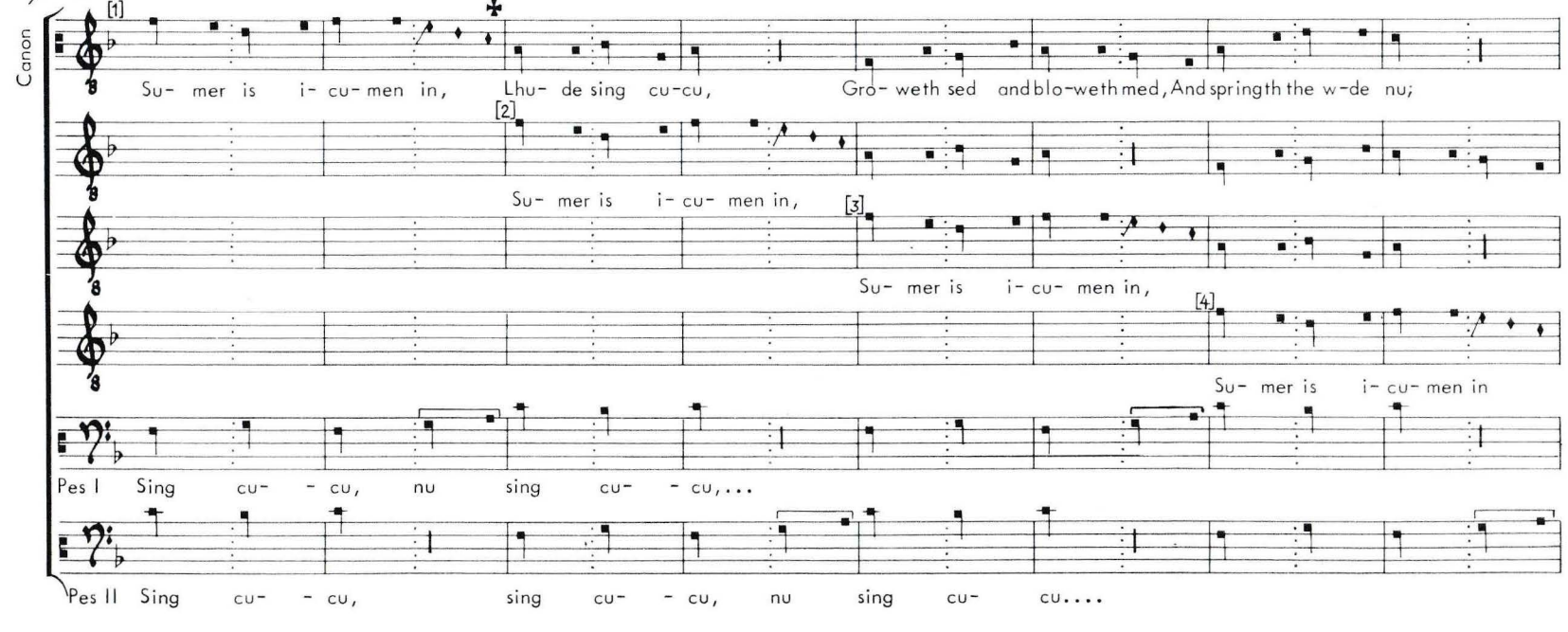


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table VI

	longa + brevis	longa perf.	longa impf.	brevis perf.	brevis impf.
Ex. 1	M. 80				M. 240
2	60				180
3				90-110	
4				54- 60	
5			100		200
6		80			240

When comparing the two phases, we see that the longa perfecta and imperfecta in Phase I give a certain average in tempo, with a deflection to either side, which, indeed, is a variation of tempo, but never halving or doubling. The same thing can be observed in Phase II in the brevis perfecta. Roughly speaking both phases indicate the same average tempo. 31) The deflection to either side depends on several factors, such as, the division of the longa and of the brevis respectively, into more or fewer smaller values of notes, and the recitation of more or fewer syllables. The adaptation of tempo by singers and instrumentalists to their audience or to the room in which they were making music may also play a part, as was observed by theorists of the early 14th century themselves. 32)

The metronomic figures given above, first of all, serve as starting points for their comparison and they have a relative value, though in an optimum sense, and this also applies to all the examples that will be treated.

31) Of this 'tempus harmonicum'- as the average tempo of motets and other liturgical songs - H. de Moravia (between 1272 and 1304), says that in older times this was indicated by means of a brevis with three tempora, but in his time by a brevis with one tempus, as the mensura by which all notes are measured : cf. S. Cserba, Der Musiktraktat des Hieronymus de Moravia : Tractatus de Musica (1935), p. 180 : < Hoc igitur tempus harmonicum est mensura omnium notarum, qua scilicet unaquaeque mensuratur nota>. p. 181 : < Item nota brevis sumpta in cantu ecclesiastico habet et habere debet unum tempus modernorum, resolvendo vero tria tempora antiquorum>. It was not the musical duration that changed, but the note-figure which the composer indicated as unit of measurement.

32) S. Cserba, in his edition of H. de Moravia, o.c., p. 173/174; J. de Liège (c. 1330) in CS II, p. 312a; J. de Muris (?), in CS III, p. 103b (after 1350); Anonymus dictus S. Tunstede (c. 1350) in CS IV, p. 206a.

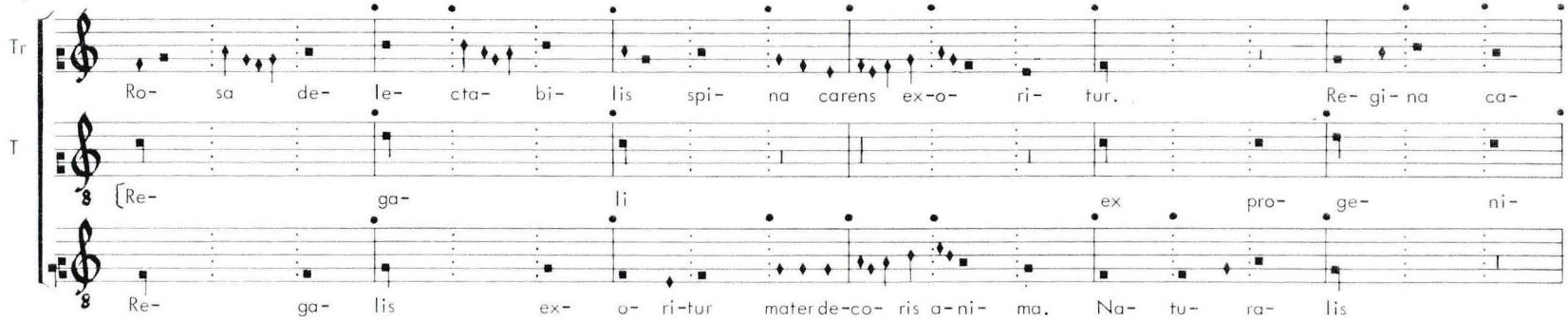
b. 14th century notation in britain

From the many English compositions written from c. 1300 to c. 1350, known to-day, we have selected three examples which are characteristic of the notation of that period, clearly showing similarities and differences with the French notation already being discussed.

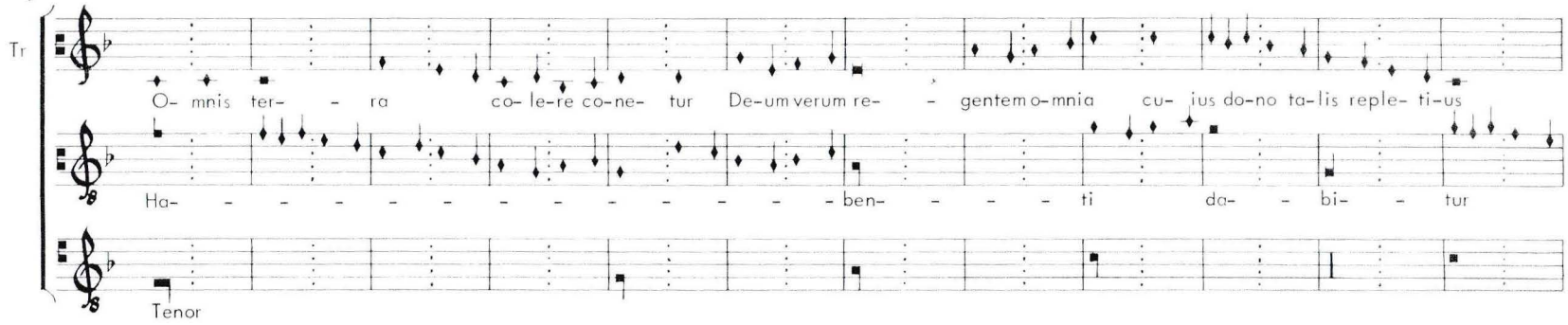
Ex. 19 'Januam', a motet on a sequence-text and written in honour of St. Thomas of Canterbury, has a notation which is reminiscent of the longa-brevis notation of the French clausula-motets in notation-stage I, and a forerunner of our Exx. 5 and 6. 1) The difference lies in the division of the brevis into equal semibreves, for which French composers prefer to notate a division into three equal semibreves, or into two semibreves with an iambic and trochaic pattern respectively. Special in this case is the fact that pieces were written for five voices. The 'quartus cantus' is a sort of Contra-tenor and just like the Tenor in longa-brevis movement. The fifth voice has the marginal note: "The Tenor in itself [can be taken as] the Tenor 'Jacet granum' ". This means that the piece can be sung either as a motet for four voices - thus without the fifth voice - or it can be executed as a motet for three voices, but then with the fifth voice as Tenor - thus without the third and fourth voices. A similar notation can be found in French cantilenes of about 1400, indicated by means of the prescription "Tenor solus".

English music developed along very independent lines after the Notre Dame period. In the manuscripts and fragments that have come down to us, quite a number of motets and rondelli occur which sometimes look like a conductus when the musical movement is practically the same in all voices, as in Ex. 19. On the Continent this notation is hardly ever found in the 13th and 14th centuries, and in France not at all. Characteristic of early English music is also the fact that motets and conductus have so many para-liturgical texts, and that they were written for use in church. In view of the division of the values (3-1) and of the text, the longa-tactus in Ex. 19 is c. M. 60.

ex. 20 Anonymus, motet (c. 1310) Oxford, New Coll. 362 fol. 90'



ex. 21 Anonymus, motet (c. 1350) Oxford, Bibl. Libr. E. Mus. 7 p. 530



2) Facsimile in E. Apfel, o.c., II, p. 50.

3) Cf. Roberto de Handlo, Regulae (1326), in CS I, p. 387 : < Securius tamen et verius in motetis et in aliis cantibus, ubi semibreves sunt, addatur punctus... ut ponit Petrus de Cruce >.

4) This use of the Tenor in England later developed into the technique of Cantus firmus.

5) Facsimile in F. Ll. Harrison, Music in Medieval Britain, ed. 2 (1963), Pl. X no. 14.

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Ex.20 'Rosa delecta' is a motet on a Mary-sequence. Its notation reminds us of postfranconian composition in France, in notation-stage II, but yet with such a specific character of its own that mutual influence is not likely 2). This specific character is visible in the division of the brevis into two semibreves alterae in the form of semibrevis caudata with a downward stick, combined with two semibreves minimae conjunctae, i.e., closely written; next, also in a very abundant - but certainly not superfluous - use of points of division 3), and in the typically English use of a middle-Tenor which has nothing to do with isorhythm. 4) The points in the textual voices have been placed so numerously that they could almost be considered as having a tactus-function, thus resembling Senaria and Quaternaria points in the Italian notation. Nothing in this connection is to be found, however, in contemporary theoretical literature. The brevis-tactus in this example is c.M.60.

Ex.21 'Omnis terra' is given here as an English example of an isorhythmical motet with Tenor-diminution which seems to be influenced by France. 5) Yet the smooth melody with the crossing voices is again thoroughly English. The duplex longa and the brevis are all them imperfect, but the prolatio is perfect (2-3-1), as in our examples of notation-stage III. The minima is a counting-unit as well as a unit of movement, and the number of syllables, viz., 2 or 3 per semibrevis perfecta, leads to a semibrevis-tactus of c.M.60.

Exx. 19, 20 and 21 have been carefully selected from many other English examples. Not only are they a worthy representation to English music from the 13th century and from the beginning of the 14th century, but they also clearly show the relative continuity of the three successive mensuration-stages.

table X

Ex. 7	brevis perf. ■	brevis impf. ■	semibrevis perf. ♦
8	40		
9		50-60	
11		36 (𝅝)	
12	40 (O)		
13			70 (⊙)
14		36 (𝅝)	
15			70 (⊙)
16	36 (O)	36 (𝅝)	72
17		60 (C)	
18			70 (⊙)
20		60	
21			60 (𝅝)

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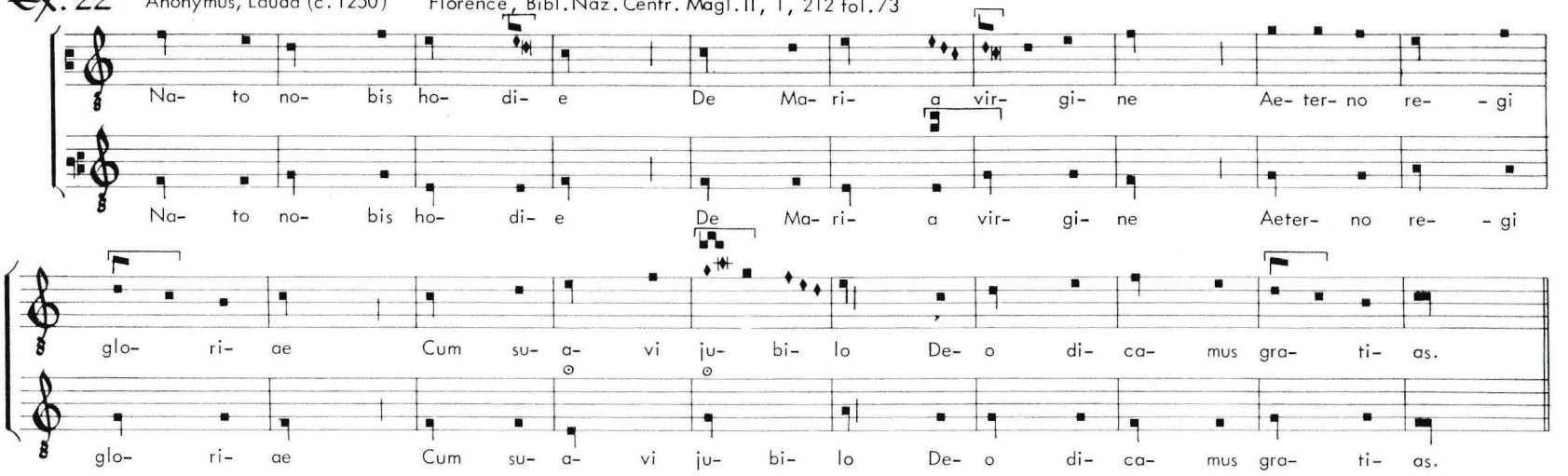
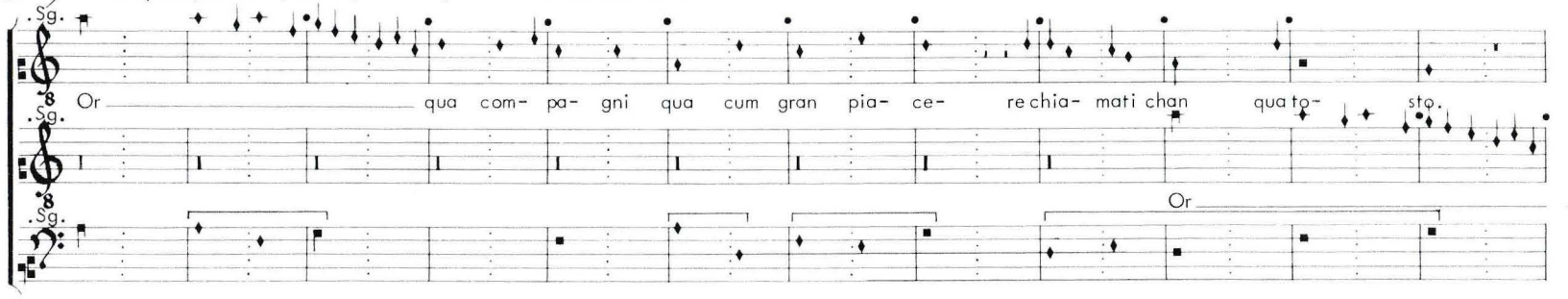
ex. 22 Anonymus, Lauda (c. 1250) Florence, Bibl. Naz. Centr. Magl. II, 1, 212 fol. 73



ex. 23 Anonymus, caccia (c. 1325) Roma, Bibl. Vat. Rossi 215 fol. 19'



1) Pomerium (1321/26), in GS III, pp. 123-187; ed. G. Vecchi, in CSM no. 6 (1961). Brevis compilatio (c. 1325), in CS III, pp. 9b-12.

2) C. Sachs, in Rhythm and Tempo (1953), p. 186.

3) J. Wolf, in GdM (1904), Teil I, Kap. 2, pp. 28-36.

4) W. Apel, in Notation, o.c., pp. 370 and 376.

5) H. Besseler, 'Ars nova', in MGG, Bnd. I (1949-1951), Kol. 720.

6) In his edition of Pomerium, o.c., p. 181; in this matter Nino Pirrotta also shows uncertainty: Marchettus de Padua and the Italian Ars nova, in MD IX (1955), p. 59, note 3.

7) In: Das Tempo in der Musik des XIII. und XIV Jahrhunderts (1964), pp. 57-69. Cf. our Table II in Chapter I.

8) Cf. Pomerium, in GS III, p. 138a; ed. G. Vecchi, o.c., Pars II, cap. I, pp. 77-78.

9) P. de Vitry, in CS III, p. 21b; Verulus, in CS III, p. 133a: 1/3 uncia, or 1/24 minute.

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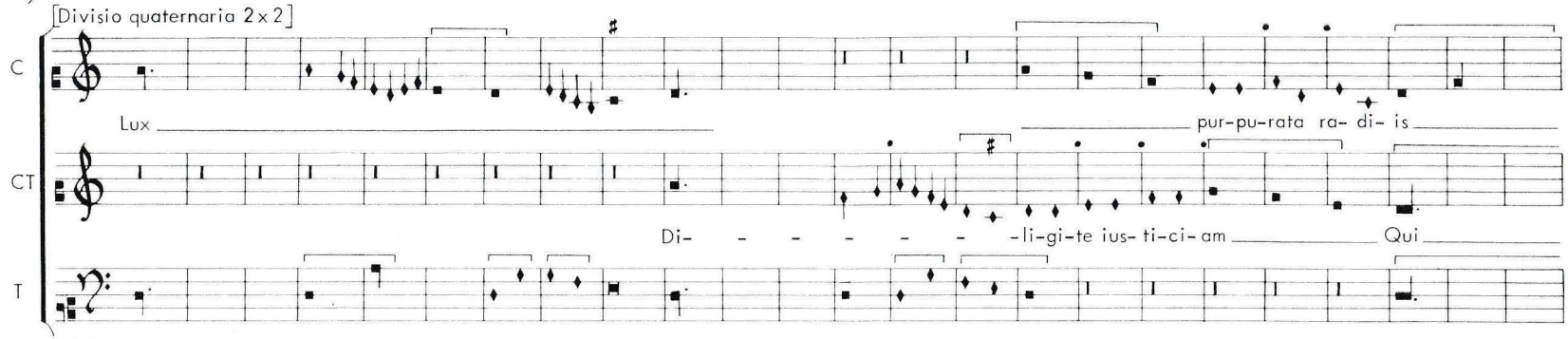
c. trecento notation in italy

Just as P. de Vitry designed in France a very useful notation-system at the beginning of the 14th century for fixing the rhythmic movement of the melodies with greater precision, at the same time Marchettus de Padua described a system of the mensural music in Italy with the same intention as De Vitry. On first perusal of Marchettus' works 'Pomerium in arte musicae mensurate' and 'Brevis compilatio in arte musicae mensuratae' 1), the question arises whether the brevis in this system, given it has two to twelve sorts of values of division, is of constant duration, or, if there are values of division of the brevis, one or more, that are constant in duration. Does Marchettus start from one fixed great value of time, or is the system based on one fixed smallest counting-unit? The answer is important for the determination of tempo in this music, especially when composers combine several mensurations in one and the same composition, as was usual in the Trecento. C. Sachs also raised this question but could not give a satisfying answer. 2) J. Wolf 3), W. Apel 4) and H. Besseler 5), are of the opinion that the brevis in Marchettus' system has a constant duration from which all other values can be determined. G. Vecchi draws up a table, it is true, of all divisions based on texts by Marchettus, but he does not touch upon the question of the basic-value for the tempo. 6)

S. Gullo was the only one that posited the problem and, to our mind, also solved it in a convincing way, though he did not compare the solution with the music itself. 7) He found that solution by combining the system of the Divisiones in 'Pomerium' with the system of the Tempora in the 'Brevis compilatio'. This proved that the duration of the brevis only remains constant within a given Divisio. On the other hand, in the system as a whole, the duration of the brevis is variable, but in a proportional ratio that can be defined clearly. At first sight the system seems to rest on divisions of greater values of time, but in reality it starts from Franco's 'Tempus minimum', the smallest tempus with a fully sung tone 8), as De Vitry and Verulus also did. And so it is not accidental that these three influential authors should have chosen the same Tempus perfectum medium for the brevis, a sort of middle tempo which unites the three theoretical notation-systems. 9)

ex. 24 Jacopo da Bologna, motet (c. 1350) Padua, Bibl. Univ. MS 1475 A fol. 1, no. 15



CT. bassus.
Tenor de Lux purpurata et de Diligite iusticiam.

10) Cf. Marchettus speaking about: < Tempus plus quam perfectum recte, Tempus maius perfecto minori, Tempus maius perfecto minimo, Tempus imperfectum minus [quam recte], Tempus maius imperfecto recte > : cf. Brevis compilatio, in CS III, pp. 10a-11b. Cf. Verulus, in CS III, p. 133a.

11) In CS II, p. 402a.

12) In Pomerium, o.c., GS III, p. 138a: < ... est ipsum primum tempus et ratio mensurandi omnia quae in musica continentur > ; p. 171: < tempus imperfectum, quod est minimum... in semiplenitudine vocis > (1/6 brevis).

13) Facsimile in J. Wolf, HdN I (1913), pp. 267-268 .

14) Facsimile in W. Apel, Notation, o.c., p. 383; H. Besseler, MGG, Bnd. I (1949-1951), Kol. 719-720. H. Husmann, Die Mittelalterliche Mehrstimmigkeit, in Beispielsammlung 'Das Musikwerk' (1955) no. 15, p. 44, always interprets two successive semibreves as iambic patterns instead of trochaic ones, although the iambic pattern in each case is indicated with minima-semibrevis by the composer himself.

15) Facsimile in W. Th. Marrocco, The Works of Jacopo da Bologna (1954), Pl. 5. In the Trecento period motets are scarce.

16) In the treatise 'Arte del biscanto misurato', ascribed to Jacopo, points of division are missing in the examples. The author only speaks about divisions in connection with Tempus and Prolatio: cf. W. TH. Marrocco, o.c., p. 146-155. The following passage is of importance : "Nota che il tempo e la brieve una cosa significano". It means that the brevis-figure is the characteristic sign of the Tempus, but not that the brevis indicates the tempo of the tactus.

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The difference between the two systems lies in the fact that Marchettus drew up more 'prolationum species' than De Vitry. To a certain extent he rather conforms to the Petronian divisions of 2, 3, 4, up to 9 semibreves inclusive, and he also finds names for them 10), whereas De Vitry only takes divisions of 2, 3, 4, 6 and 9 minimae, as is also observed by J.de Liège. 11) There was, no doubt, a connection between Marchettus' system and the existing Italian notation, when he wrote his treatise.

Another difference, connected with the first one, is to be found in the fact that in theory Marchettus always gives a longer duration to the semibrevis minima in the prolatio maior than in the prolatio minor. With prolatio maior the Marchettus minima is equal to that in the system of De Vitry, but with prolatio minor his minima is smaller. This leads to the conclusion that with Marchettus the semibrevis maior (perfecta) is constant in prolatio maior; in prolatio minor the semibrevis minor (imperfecta) is constant. In the first, second, and fourth Divisions the duration of the semibrevis maior (M.70-80) is equal to the duration of the brevis in the sixth and seventh Divisions. Four minimae in the Quaternaria are equivalent to three minimae in the Ternaria. That is why Marchettus writes, and rightly so: "The Tempus minimum - 1/3 brevis - is the first tempus and the counting-unit of everything that occurs in music". 12) It is self-evident that according to this notation-theory in some cases a composer can easily switch from one Divisio to another without the necessity of changing the tactus-tempo. Let us now return from musical theory to musical practice.

Ex.22 is an Italian trope in the form of a conductus, written in the current notation of the Ars antiqua. 13) As is usual we write the semibrevis altera with two lines on either side. In the second voice there are two points of perfection surrounded with a small circle, which underline that a longa perfecta must be sung. This longa perfecta has the tactus in the tempo c.M.40 on account of the notation at 'virgine' and at 'iubilo'.

Ex.23 'Or qua compagni' is a rare example of the Italian caccia, which represents a phase of notation between the Petronian notation and the real Ars nova notation in Italy. 14) Several data such as the longa with plica, the use of the same sign of semibrevis for semibrevis maior and minor and minima together - - although the minima with stick also occurs to indicate a iambic division -, and the alterated semibrevis with downward stick, the staff with six lines, all point to an early 14th century origin close to the notation in the Roman de Fauvel, and even earlier than the period when Marchettus' system was introduced into practice. The symbol 'sg' is short for 'Senaria gallica' and indicates together with the brevis-division, that this caccia was written in the Divisio senaria imperfecta. A striking feature is the division of the semibrevis alterata followed by a semibrevis minima, so five minimae plus one minima. There is no change of mensuration. With a tempo c.M.76 of the semibrevis maior as tactus the text-syllables can still be sung very well.

Ex.24 the motet 'Lux purpurata' is noted in Divisio quaternaria as Tempus imperfectum minus in 4, the brevis of which has two semibreves minores or four semibreves minimae. 15) In the Italian notation we usually see points of division between the notes, indicating the contents of the brevis, for a brevis may comprise four to twelve minimae. To give a clearer indication we write these points over the staff. In this motet, points are given by Jacopo, but he does not do so consistently. The same thing could be said of the Division-letters between two points (cf. Ex.26), which Jacopo also leaves out in most cases, which later colleagues did not. 16) But it is also very well possible that in transcribing the original, one followed one's own preference, or that one transcribed less accurately what originally was written. The notation itself usually gives a clear indication as to the Divisio in question. The longa sometimes has a punctus additionis when it must be sung as a perfecta. The point after the fourth mensura-line in the Cantus is an additional indication that the motet is noted as Quaternaria. The semibrevis with vertical downward stick in the Contra has a value of three minimae or 3/4 semibrevis. The brevis imperfecta has the tactus in the tempo c.M.60-70.

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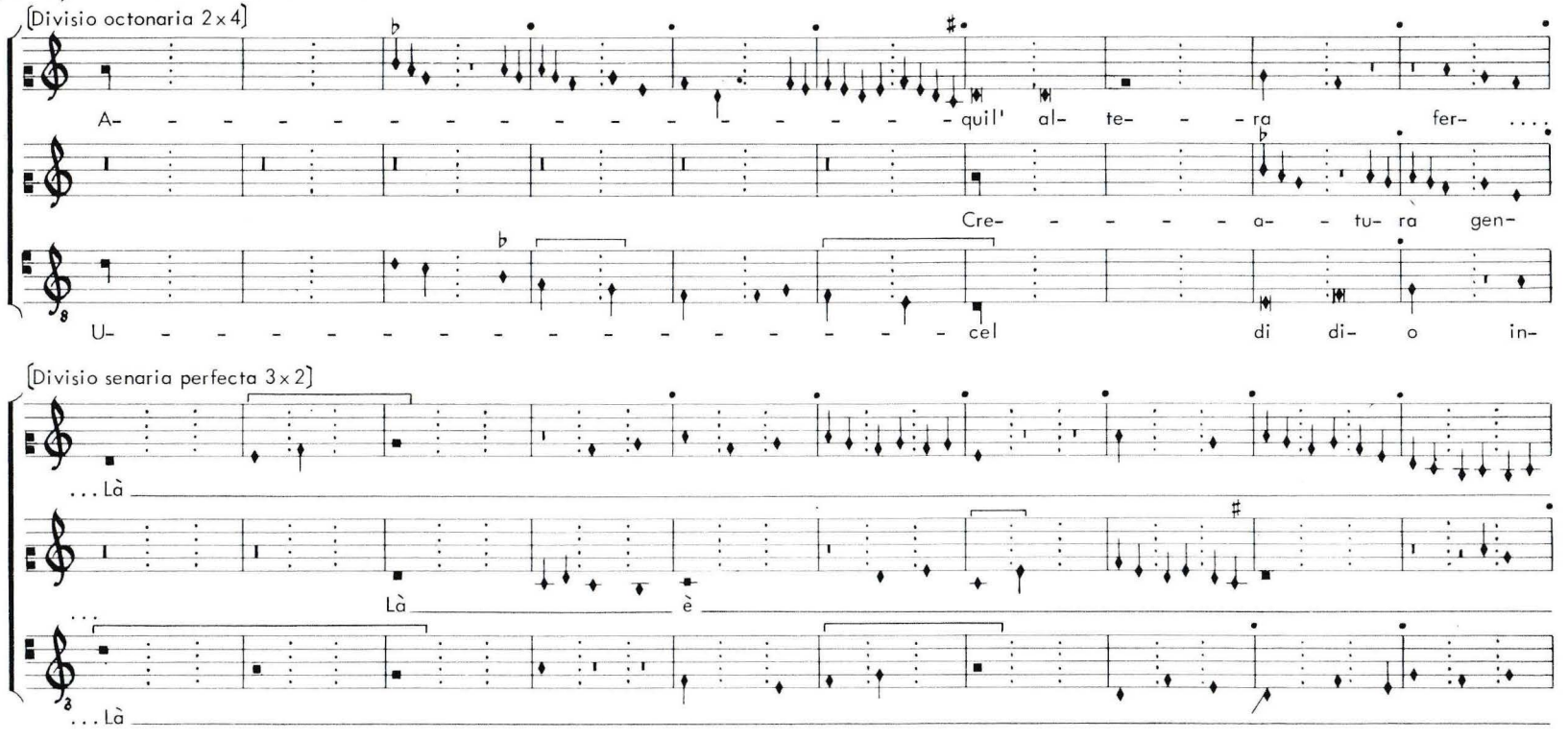
ex. 25 Jacopo da Bologna, Madrigale (c. 1350) Paris, Bibl. Nat. ital. 568 fol. 2'



17) Facsimile in W. Apel, Notation, o.c., p. 375. A similar reading occurs in Codex Squarcialupi: Florence, Bibl. Laur. Pal. 87 fol. 8'; see J. Wolf, Musikalische Schrifttafeln (1923), p. 79.

18) Cf. W. Apel, Notation, o.c., p. 376.

19) Facsimile in W. Apel, Notation, o.c., p. 387.

20) Rome, Bibl. Vat. Rossi 215, fol. 81'; facsimile in G. Vecchi, Atlante paleografico musicale (1951), X. Concerning the mentioned MSS, cf. K. v. Fischer, Studien zur italienischen Musik des Trecento und frühen Quattrocento (1956), pp. 88, 93 and 95.

21) Cod. Squarcialupi, fol. 3'; facsimile in J. Wolf, GdM II (1904), p. 63. The version in Cod. Squarcialupi has no augmentation.

22) Other examples in W. Apel, Notation, o.c., pp. 380-381, and 388.

23) For examples in Cod. Chantilly 1047, cf. U. Günther, Die Anwendung der Diminution in der HS Chantilly, in Archiv für Musikwissenschaft XVII (1960), pp. 1-12.

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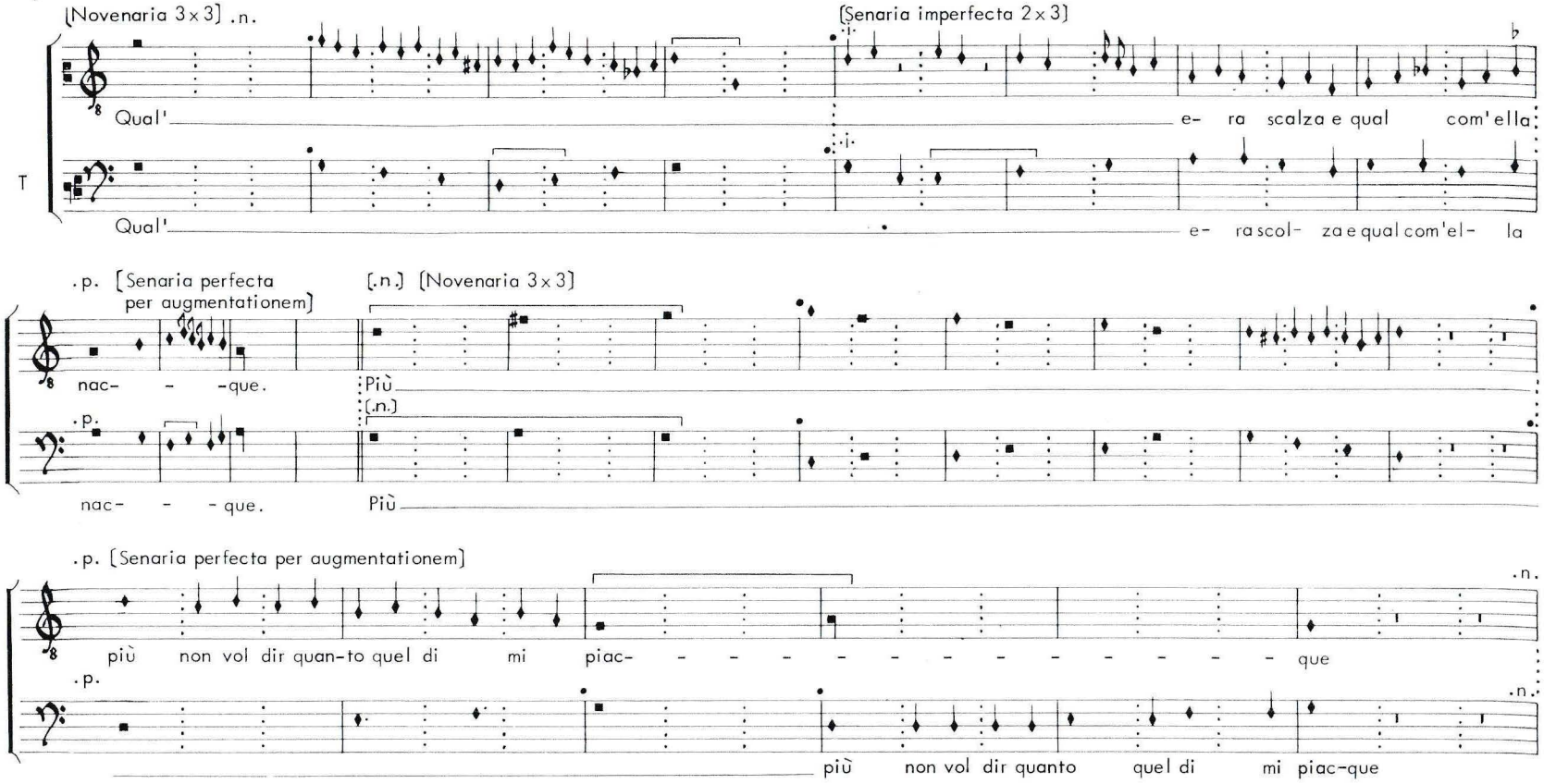
Ex.25 'Aquil' altera - Creatura - Uccel' is a madrigal with three different texts. 17) It begins in the Octonaria with Tempus imperfectum recte in 8. The brevis has two semibreves maiores, or four semibreves minores, or eight semibreves minimae. The semibrevis with downward stick has here two semibreves minores. The semibreves maiores are indicated with two lines on either side. The section 'La el parere' has another mensuration: Senaria perfecta, as Tempus perfectum minus in 6. The brevis perfecta now has three semibreves minores, or six semibreves minimae. The semibrevis with the downward stick equal two semibreves minores, while the semibrevis with the downward oblique stick on the left equals three minimae. Points of division are placed inconsistently. The ligatures resemble those of the French notation.

There can be no question of a possible tempo-proportion between the Octonaria and Senaria perfecta, if we first start from the supposition that all divisions have the same value of brevis or of semibrevis (maior), and hold the opinion, moreover, that between two clearly separated sections there should always be an equality of tactus-time. 18) But a proportion between Octonaria and Senaria perfecta may exist if one starts from Marchettus' system, in the explanation of S. Gullo. From Table II in Chapter I it can be concluded that the Octonaria must be beaten in a semibrevis maior imperfecta with tactus c.M.70-80, and the Senaria perfecta in a brevis perfecta with tactus c.M.46-54. Two tactus c.M.48 in the Senaria perfecta have the same duration as three tactus c.M.72 in the Octonaria. This is the same proportion of tactus-tempi which W. Apel surmised on merely musical grounds, but which he could not prove theoretically on account of a wrong starting-point. There was, indeed, a rule already, dating from Franco's time, saying that a composition must be sung to the end in a constant tempo (uno tenore). But when a composer gives a change of mensuration, either by a division-letter, by canon or whatever, then a change of tactus-tempo may be possible in certain circumstances, as in Ex.25, within the scheme of proportional notation. For this very reason so many new signs arose by the end of the 14th century and in the early 15th century.

Ex.26 'Qual era' is the second section of the madrigal 'Naschoso el viso'. 19) Another version is in the Codex Rossi, which was notated according to the stricter Italian system of notation 20); and also a third version, the latest of these three was notated in the Codex Squarcialupi. 21) In last-mentioned version, the two voices show rather great differences; in addition, the voices are noted with different rhythms in many places. Finally, the Senaria perfecta and imperfecta is transposed in a Novenaria and/or Duodenaria division.
The Squarcialupi-version has more regular points of division than our Ex.26; nevertheless we prefer the Panciatichi--version, because otherwise it is a good example of alternation in mensurations with continuous melody and text, beside alternation in separate sections. Divisio-letters are given with regularity, but points of division are sometimes lacking.

In the Novenaria divisio of our Ex.26 the brevis has three semibreves maiores naturales, or nine semibreves minimae. In the Senaria imperfecta the brevis has two semibreves maiores naturales, or six semibreves minimae. The Novenaria passes into the Senaria imperfecta without any separation; the semibreves as well as the minimae are equivalent, so that the semibrevis imperfecta has the same tempo in both mensurations, c.M.70, in accordance with Table II of Marchettus. At the text 'nac-que' the Senaria imperfecta passes into Senaria perfecta, but in this short section the note-values are doubled. This means that they must be sung 'diminished' into half of their values, with a brevis perfecta--tactus in c.M.70. 22) Both mensurations have become identical now as regards their organisation, though on a different level of notation. At 'piu non' in the text the same augmentation occurs in the Senaria perfecta; once again the note-values must be read as diminished, and the brevis perfecta has the same tempo as the semibrevis perfecta notated with 'integer valor'. In this way two singers can render the quick passage with the text 'piu non' etc. still resonably well, in the beat-time of c.M.70. Thus Giovanni was able to take down very small rhythmical figures without the need of new signs with still smaller values than the minima. The use of augmentation in the above-mentioned short sections must have been borrowed from contemporary French notation. 23)

ex. 26 Giovanni da Cascia (Joh. de Florentia), madrigale (c. 1340) Florence, Bibl. Naz. Centr. Cod. Panciatichi 26 fol. 49'



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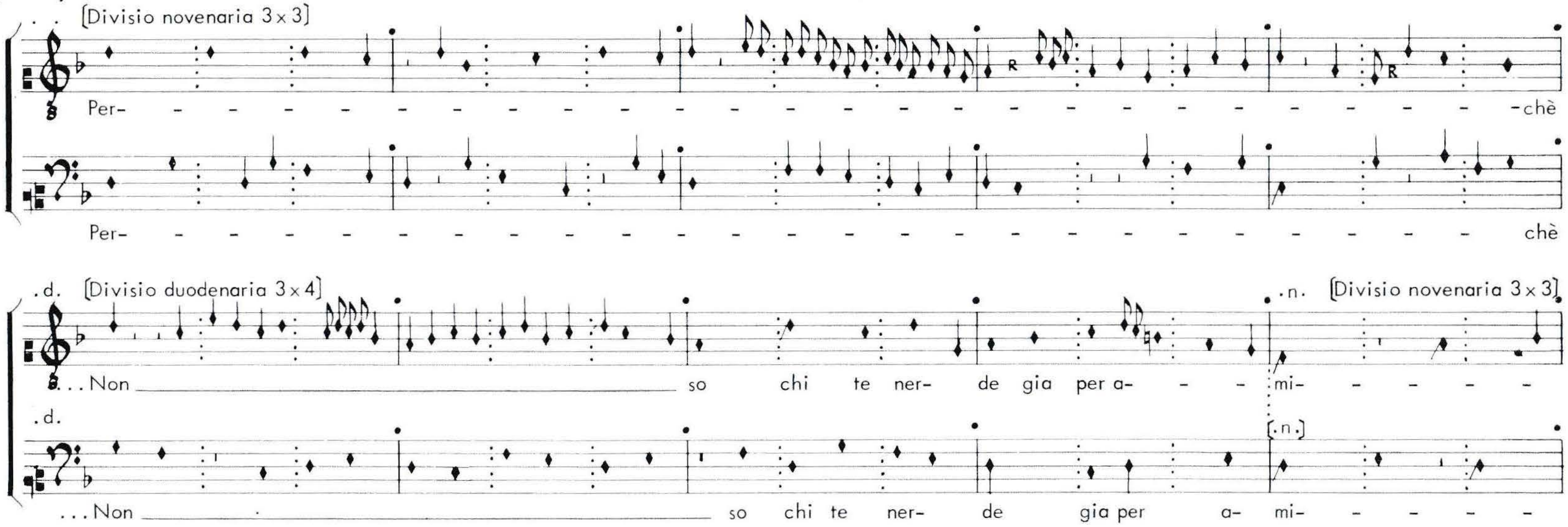
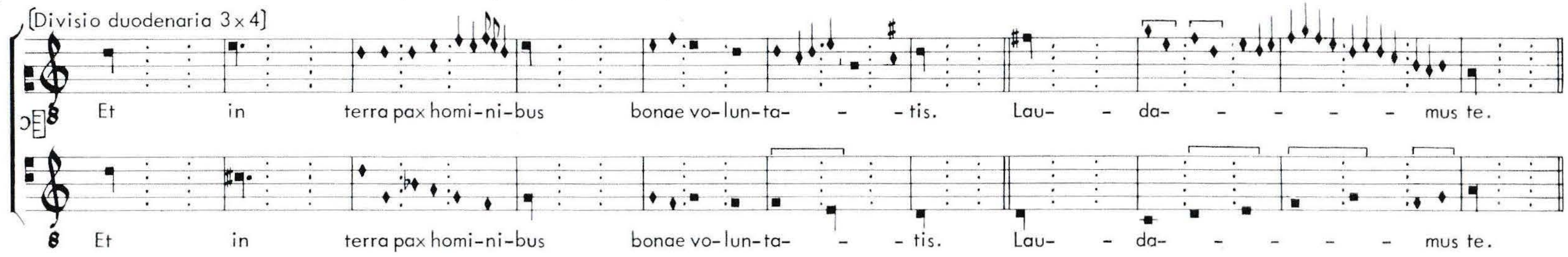
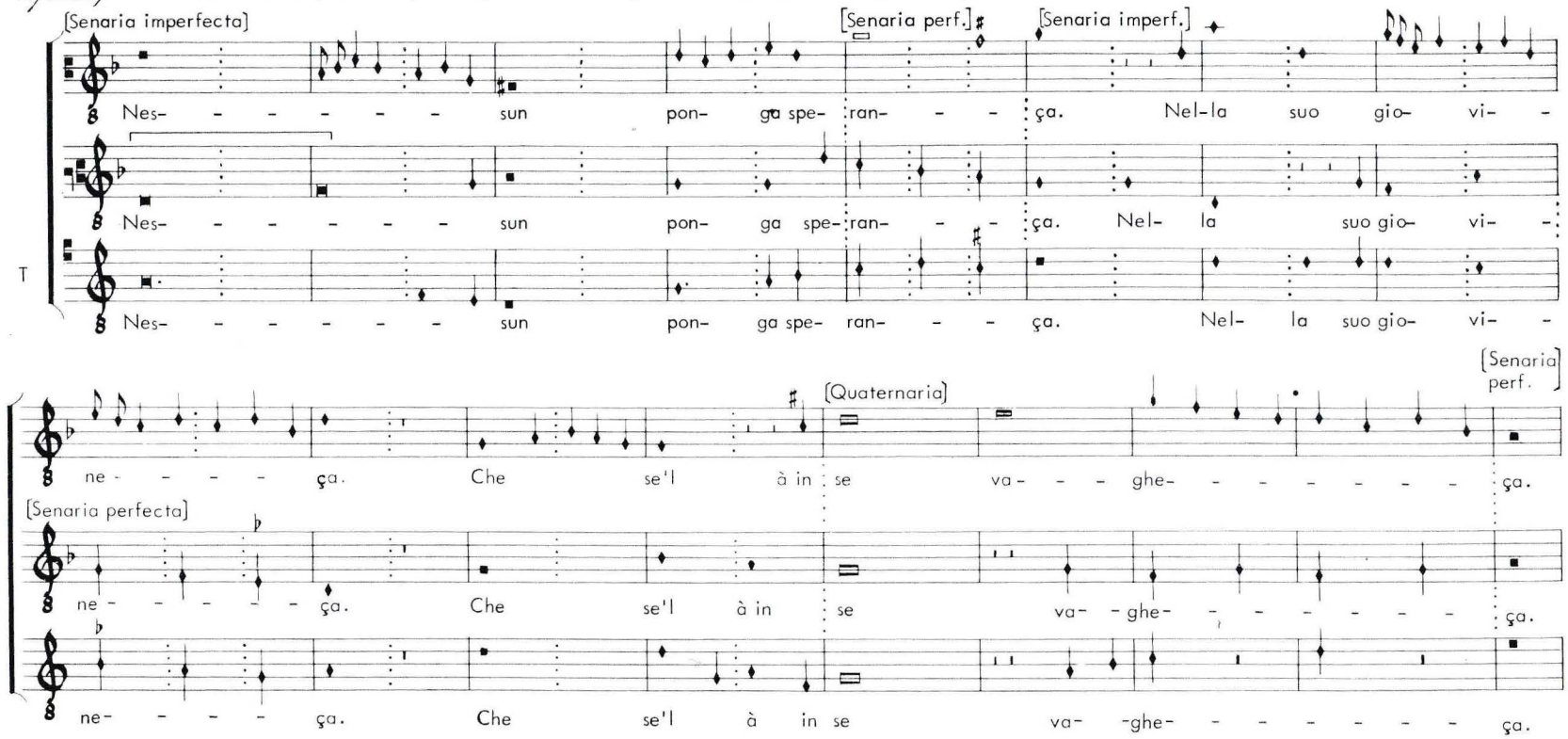
Ex. 27 Bartolino de Padua, ballata (c. 1375) Paris, Bibl. Nat. nouv. acq. franç. Cod. Reina, 6771 fol. 17



Ex. 28 Gherardellus de Florentia, Gloria (c. 1360) Paris, Bibl. Nat. ital. 568 fol. 132



ex. 29 Francesco Landini, ballata (c. 1370) Florence, Bibl. Laur. Pal. 87 Cod. Squarcialupi fol. 162'



24) Facsimile in W. Apel, Notation, o.c., p. 377. A similar version in J. Wolf, GdM II (1904), p. 71, taken from Cod. Squarcialupi, fol. 115.

25) Facsimile partly in N. Pirrotta, o.c., no. 8 I (1954), no. XXI, p. 53. According to K. v. Fischer, o.c., p. 119, note 514, a second version is in Rome, Vat. Urb. Lat. 1419, fol. 88'.

26) The square sign for Modus is mentioned by P. de Vitry, Ars nova (c. 1320), CS III, pp. 20 b and 21. Concerning the sign C, sometimes indicated as ↄ only in this period, cf. Anonymus III (c. 1350), CS III, cap. IX, p. 374.

27) Facsimile in W. Apel, Notation, o.c., p. 393.

28) About the 'dragma', cf. Anonymus III (c. 1350), CS III, cap. V, p. 373; Anonymus dictus T. de Campo (c. 1350), CS III, p. 186.

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Ex.27 'Perche canciato' begins without Division-letters, but has regular points of division in the Novenaria, which alternates with the Duodenaria both separately and joined. 24) The composer highly valued strict use of the Italian notation. Syncopes are still noted within the space of the brevis. But elsewhere compositions with more and more intricate rhythmical refinements are already written, which the French notation shows to a fuller advantage than the Italian one does.

In the Novenaria of the first section the brevis has three semibreves naturales, or nine semibreves minimae. The second section opens with a Duodenaria and then passes right away into a Novenaria. Between both Divisions the brevis itself is equivalent, but the Duodenaria is divided into 3x4 semibreves minimae, and the Novenaria into 3x3. The semibreves with oblique stick to the left indicates three minimae, the one having the stick downward includes four minimae. Both semibreves have the tactus. If one follows the Marchettus-Table II, the duration of those two tactus is the same, viz., c.M.60, on account of the many semiminimae. If one follows the Verulus-Table I, then the Duodenaria--tactus would be a little slower, viz., c.M.54 as opposed to the Novenaria-tactus. But owing to the strict Italian notation, the equivalence of the Marchettus-Table seems to be the most probable one to us in this case, so that both sections have the same tactus--tempo c.M.60.

Ex.28 'Et in terra pax' has a signature of rare occurence ↄ𝌆, indicating that one must sing in Modus perfectus and Tempus imperfectum. 25) Both sign and notation show an increasing French influence on the Italian notation in these years. 26) The longa perfecta has three breves imperfectae, or six semibreves minores (imperfectas), or twelve minimae. Semibrevis maior does not occur in this mensuration. At 'Qui tollis' the Duodenaria alternates with the Senaria perfecta, and at 'Cum Sancto Spiritu' with the Novenaria. The perfection-point after the second longa indicates that without any hesitation both longae should be read as perfect. We cannot decide if the composer chooses his tempi according to the strict theory of Marchettus, which makes the same tempi possible in all sections of our example, except in the Senaria perfecta. According to the Verulus-Table, which is based on equivalence of the minimae, the tempo of the three mentioned mensurations should be different proportionally. In the first case the Duodenaria can begin in a semibrevis maior tactus c.M.70, the same tempo which N.Pirotta suggests in his transcription. In the second case the semibrevis maior is c.M.54, followed by the brevis perfecta c.M.36, and ending with the semibrevis maior c.M.70. The tempo of other sections is determined pro rato. The latter solution is more significant.

Ex.29 'Nessun ponga speranca', a three-part ballad with the same text in all the three voices, is a composition that is not only written most melodiously but also scored in a remarkable way. 27) Division-letters are absent and division-points are very rarely used, but the notation itself is sufficient proof of how the mensurations should be read. The piece begins with the Senaria imperfecta (2x3), without any break, alternating with Senaria perfecta (3x2), and followed by a Quaternaria (2x2). The Senaria perfecta is indicated in the Cantus by a white brevis with semibrevis, equal to six white minimae and clearly equivalent in this case to the six black minims of the black brevis in the Senaria imperfecta. In this way the composer introduces the French use of coloured notes into the Italian notation. De Vitry wrote red notes in the Tenor and Contra of his motets to make perfect values imperfect; if a two-third value remained it was called 'diminutio per tertiam partem', and if one-third value remained it was called 'diminutio ad tertiam partem'. By the end of the 14th century smaller values were also written in colour. Landini uses hollow-white notes instead of full red ones with the same function. Sometimes coloured notes are written in short passages as short rhythmical variants, sometimes they are variations of mensuration of a longer duration. In this case the Quaternaria section is a good example of 'mixed notation'.

In the Contra and Tenor of Ex.29 we have in three places so-called 'dragmas' consisting of a semibrevis with an upward stick and a downward one. 28) Generally speaking the value of the dragma varies from 3/4 minima to 4 minimae. Here the dragma of the Senaria perfecta is two minimae, also in the Contra of the Quaternaria, but in the Tenor two dragmas of four minimae occur, which is indicated in the manuscript by an extra-spacious notation.

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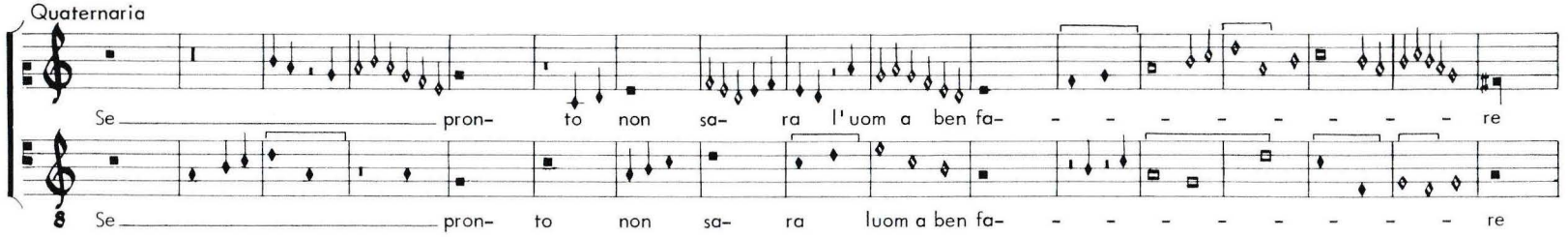
Ex. 30 F. Landini, ballata (c. 1370) Florence, Bibl. Laur. Pal. 87 Cod. Squarcialupi fol. 170



29) Facsimile in W. Apel, Notation, o.c., p. 391.

30) Cf. K. v. Fischer, o.c., pp. 68-73, 82-98; cf. also pp. 111-123 (Die Notation).

31) Other examples in transcription, in L. Schrade, Polyphonic Music of the Fourteenth Century, Vol. IV, The Works of Francesco Landini (1958); W. Marrocco, Polyphonic Music of the Fourteenth Century, Vol. VI, Italian secular music (1964); A. Harman, Man and his Music, ed. 2 (1964), pp. 159, 162, 168 (with tempo-indications).

32) N. Pirrotta, in his ed. The Music of Fourteenth Century Italy, in CMM no. 8 I (1954), p. II infra.

33) Cf. Pomerium, in GS III, p. 138a; ed. G. Vecchi, o.c., p. 78.

34) Prosdocimus, in his 'Tractatus practice cantus mensurabilis ad modum Italicorum' (1412), CS III, pp. 228-248. More about this treatise, see: C. Sartori, La notazione italiana del Trecento in una redazione inedita (1938), pp. 35-71. A special review is edited by F. Alberto Gallo, La Teoria della Notazione in Italia dalla fine del XIII all'inizio del XV secolo (1966).

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At the first brevis-mensura in the second system, the Senaria perfecta of Contra and Tenor 'comes into conflict' with the mensuration of the Cantus from a rhythmical point of view, but this does not change anything in the tempo of the brevis-tactus in the Cantus, beaten in the tempo M.36. The Quaternaria-brevis with four white and four black minimae has a tempo that is one and a half times quicker than the preceding one, viz., M.54. Then the Senaria perfecta resumes its own tempo M.36.

Ex.30 'Se pronto' is noted in division Quaternaria with diminutions in the minima, semibrevis and brevis by means of hollow notes, always in the proportion of three white ones against two black ones. 29) Thus a pleasant rhythmical variant arises again and again. In six white minimae, forming one group, the division is not 2x3, but 3x2. At 'sara' in the first system a triolet of three white minimae equal the two black ones. This also appears from the notes being written closely to one another in the manuscript.

In addition to the examples discussed here, from Piero, Giovanni, Bartolino and Gherardello forming more or less one group, and the one from Landini that has a place of its own, numerous other examples could be added which would offer equally interesting material of comparison for a study in tempo of this kind. This Italian repertoire consists of no fewer than 625 pieces, 177 of which are madrigals, the most specific form of Italian music, 25 caccias and canon-madrigals, and 423 ballads, composed by some sixty composers. 30)

Nevertheless, we confine ourselves to the examples given, because they sufficiently prove what considerations should lead to a choice of tempo in this music. 31) N. Pirrotta observed that in the Trecento-notation the semibreves (maiores) of the Duodenaria, Novenaria, Octonaria and Senaria imperfecta were formerly considered to be inter-equivalent. 32) This does, indeed, correspond to the data of the Marchettus-Table II, in the tempo c.70-80. He adds that these divisions had a broader tempo than the Senaria perfecta (3x2) and the Quaternaria (2x2), the semibreves of which - minores this time - would have 2/3 duration of the above-mentioned semibreves maiores. This opinion does not fit in, however, with Marchettus's theory. For according to Table II the semibrevis minor in the Senaria perfecta and in the Quaternaria is not 2/3 part of the semibrevis maior in first-mentioned divisions, but 1/2 of it. Pirrotta's view better fits in with Table I by Verulus de Anagnia and the notation-practice of Landini in the latter part of the 14th century, when the mensura of the semibrevis minor in the Senaria perfecta was 2/3 of the value of the semibrevis maior in the Senaria imperfecta and the Novenaria, and 1/2 of the semibrevis maior in the Octonaria and the Duodenaria. The Latin texts of Marchettus and Verulus, which S. Gullo so keenly commented upon, do not permit any doubt of that fact. The brevis imperfecta of the Quaternaria in our example 30 is c.M.54-60, in agree with Verulus' table. All the same, any Italian Trecento-composition with change of mensuration should always be judged by its own character of notation with respect to the tempo. Past critics did not always clearly see, that Marchettus emphatically equated the brevis-mensura of Tempus perfectum minus in 3 with the brevis-mensura of Tempus imperfectum minus in 4. Thus in both series the breves had the same tempo c.M.70-80, based on Franco's Tempus perfectum minimum. 33) The minima was not counting-unit in this Italian system, but the semibrevis was, either perfecta or imperfecta.

The Italian notation was not able to hold its own against the French one, despite the fact that it could be more easily read by the singers. This is clearly to be seen with the group of composers in our examples, especially in the mixed notation by Landini, who in fact takes over the French proportional system by using coloured notes. In 1412 Prosdocimus de Beldemandis made a strong plea for the Italian system, but it was of no avail. 34) On the other hand at that time French music was more and more influenced by the 'dolce melodia' of the Italians. In this way both systems influenced each other to their mutual advantage.

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table XI

Ex.	longa (pf.)	brevis (pf.)	brevis (ipf.)	semibrevis maior (pf.)	semibrevis maior (ipf.)	
22	40					
23				76		Senaria imperf.
24			60-70			Quaternaria
25		48			72	Octonaria Senaria perf.
26				70		Senaria imperf.
27				60	60	Novenaria Duodenaria
28		36		70	54	Duodenaria Senaria perf. Novenaria
29		36	54	72		Senaria imperf. Quaternaria Senaria perf.
30			54-60			Quaternaria
35				72	54	Senaria imperf. Octonaria

1) W.Odington (c.1310), CS I, p.236: <Quot sunt notatores, tot sunt novarum inventores figurarum>.

2) J.de Muris, in Libellus cantus mensurabilis (c.1340-1350), CS III, p.47: <Insuper est notandum quod omnis nota perfecta potest imperfici per abstractionem tertiae partis sui valoris, et imperfecta perfici per additionem mediae partis sui valoris.>

3) Anonymus V, CS III, pp.379-380.

4) P.de Caserta, CS III, pp.118-124. Anonymus Paris, Bibl.S.Geneviève MS 1257 fol.37.

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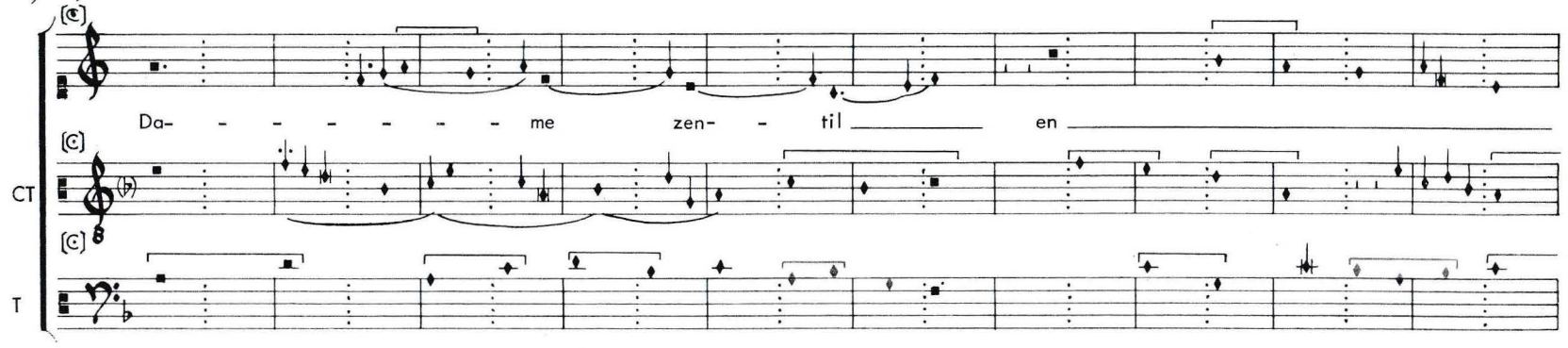
chapter III

ars subtilior notation in france and italy

After the death of P.de Vitry (1361) and G.de Machaut (1377), composers in France and Italy began to write increasingly complicated rhythms in the upper voices of their songs. In the literature of that period they are called "moderni subtilesque musici". As early as 1310, Walter Odington made the remark that there were as many inventors of new figures as there were scribes of notes in England at that time. 1) This was even more true of the 'notatores' around 1400 in France and Italy. We can indicate three elements of notation which stand out most prominently here: a) The preference for mensuration in Tempus imperfectum cum prolatione maiore (C) beside Tempus perfectum cum prolatione minore (O); b) the employment of syncopation in the upper voice on a much larger scale than before, sometimes even in the two upper voices simultaneously; and c) the increasing use of proportions by means of coloured notes or figures like 3/2, 4/3 etc. This can be seen in the following examples.

In the songs of G.de Machaut and his contemporaries, the notation in maior prolation demands considerable care on the part of the singers. Perfect note-values sometimes have to be sung imperfect, and imperfect values sometimes have to be lengthened 2), or even doubled. This practice is one of the reasons why we have made the notation in our examples easier to read by the use of measure--lines and dotted lines respectively in the staff, and of dashes on either side of a doubled note-value, devices which composers in that time did not make use of. It becomes all the more difficult to read this notation a prima vista, when mensurations and proportions of the values constantly change. The songs, no doubt, were intended for soloists who were thoroughly familiar with their task. But even they would problably not have been able to sing works by foreign musicians in unusual notations, without any preparation. It goes almost without saying that this complicated notation is very rarely found in church-music, even though professional choirs in churches came into being around 1400. Group-singing laid restrictions upon notational techniques, even when the group consisted of experts. Descriptions of this newer practice are to be found in Anonymus V (c.1380) 3), in Anonymus Paris (c.1400), and especially in Philippus de Caserta (Filippo da Caserta), in his 'Tractatus de diversis figuris per quas diversimode discantatur per aliquas regulas, non sequentes modum tenoris sed alterius temporis' (c.1380). 4)

ex 31 Anthonellus de Caserta, rondeau (c.1380) Modena, Bibl. Est. lat. (Olim 568) a.M.5.24 fol.38'



5) Anonymus X, CS III, pp.413-415. Ant.de Leno, CS III, pp.307-328. For further information regarding this period see: E.Dannemann, Die Spätgothische Musiktradition in Frankreich und Burgund vor dem Auftreten Dufays (1936); U.Günther, Das Ende der Ars nova, in Musikforschung XVI (1963), pp.105-120; for Italian notation (1377-1425), cf. J.Wolf, GdM,pp.289-327.

6) Facsimile in W.Apel, Notation, p.415.

7) Facsimile in W.Apel, Notation, p.413, originally written on six lines. 'Dragma' is a double-stemmed note-form, mentioned for the first time by An.III (c.1340) in CS III, p.373.

8) Facsimile in W.Apel, Notation, p.423; cf.also W.Apel, Die Notation der Polyphonen Musik (1962), pp.473-475. Apel's facsimile is compared with the facsimile in MGG, Bnd I (1949-195!), Tafel XXVIII, taken from Cod.Chantilly 1047 fol.44.

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About 1450 two other authors refer back to this period: Anonymus X, in his short treatise 'De minimis notulis', and Antonius de Leno, in his 'Regulae de contrapuncto' 5); possibly their material was obtained from sources written closer to 1400.

Ex. 31 'Dame zentil en qui est ma sperance' is noted in the mensuration of Tempus imperfectum maius (2-3-1), the most customary mensuration in this period. 6) At this stage of notation the function of the dots becomes more varied. In the second mensura of the Discantus the dot after the minim prevents the second minim from being altered, as the usual rule prescribes. The dot after the semibreves in the fifth mensura renders the semibreve perfect. The syncope in the Discantus shifts the beat, as it were, in the groups of notes which we have indicated by ties beneath the notes belonging together. The same thing goes for the syncope in the Contra; there, its beginning is indicated by a dot on either side of the minim-staff. The second dot prevents the alteration of the second minim, and the third minim is altered in the usual way, with a vertical dash on either side of the note, as is shown. Here again the syncopic shift of the beat is indicated by ties under the groups of notes, and this ends in the semibreve. The regular mensuration of the Tenor binds the whole together. In this Tenor three red semibreves replace two normal black semibreves, a manner of notation which musicians in later periods call 'hemiola'; the change involved is essentially that of making notes imperfect which are normally perfect. At some points in the Discantus, not given here, there are pairs of black semiminimae. Apparently the function of the minima in this kind of notation was more independent than in the Ars nova period.

With reference to the rhythmical style of this Ars subtilior we suggest a brevis imperfecta-tactus in a tempo of c.M. 30-36.

Ex. 32 'Je ne puis avoir', of which there are two fragments here, is especially interesting because of the playful way in which the composer employs the symbols O and C alternately, after the manner of notation in the Machaut-ballad, Ex. 17. 7) At the same time he makes use of the new symbol ↄ indicating proportio sesquitertia (4/3), in combination with the semibrevis maior caudata, and with black and fully-red dragmas.

Under the symbol O, the perfect breve normally has three semibreves, or six minims. Under the symbol C, the brevis imperfecta has two semibreves, or four minimae. Sometimes the semibreve under O is altered. The composer alternates O and C not only successively one after the other in the same voice, but also between Discant and Contra simultaneously. The symbol ↄ has a special function here: the brevis equals either two semibreves maiores caudatae, or four black dragmas (2x2), or six fully-red dragmas (2x3), so always in groups of two, and in conflict with the divisions in threes under O. The semibreves and minimae under O and C are equivalent. Nevertheless, this example is considerably easier to sing than Ex. 31.

Another notable point is in the second fragment at 'Car'; in the text the O and C mensurations do not alternate on the beat of the tactus as is usually the case, but during the beat-time. This rarely occurs in the whole of the 15th and early 16th centuries. Otherwise, the symbols are nearly always written where the tactus--beat begins.

The tempo of the brevis perfecta is c.M. 36. Because of this rather quick tempo, we have not subdivided the mensurae by dotted lines.

Ex. 33 'En attendant esperance' looks complicated at first sight because of the unusual symbols in the notatic.. of the MS. 8) The clue to the riddle is as follows: the fully-red notes from brevis to minima have the usual meaning of making the perfection of the semibrevis imperfect; in this notation the fully-red minima is equal to the normal black minima.

Four hollow-red minimae are equivalent to a normal black semibrevis perfecta, thus introducing quadruplets instead of the ternary groups of minimae in the prolatio perfecta. Triplets of hollow-black dragmas (double-stemmed), followed by one open--red dragma with a hook underneath to the right, are mutually equivalent; they are equal to two notes of the quadruplets indicated by the hollow-red notes. So six hollow-red dragmas (2x3) are equivalent to the ternary group of minims of the normal black semibrevis perfecta.