# Concerning Tempo in the English Polyphonic Mass, c. 1420–70*

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Of the many problems involved in the study of fifteenth-century performance practice, one of the most difficult to tackle is the one concerning tempo. This problem raises so many fundamental questions all at once that it is difficult to decide where to start a systematic study of the subject. Were fifteenth-century composers conscious of the tempi they used? Did they conceive their works in fixed, absolute, speeds? If so, why did they make no apparent effort to specify these intended speeds unambiguously? Or, does the lack of tempo indications and the absence of a fully worked-out fifteenth-century tempo theory indicate that the choice of tempo was left to the discretion of the performer? Can each fifteenth-century composition then be imagined at various tempi? If so, where would that leave the problem of tempo relationships? When different mensurations are used simultaneously, their tempi normally relate to one another in simple integer proportions such as 1:1 (e. g., ○:𝐂), 2:1 (e. g., 𝔠:𝐂 or ○2:○), 3:2 (e. g., 𝐂3:𝐂), etc. But can it be assumed that the horizontal relationships between mensurations were always identical with the vertical ones? It is nowadays agreed that this was very probably not the case; yet in what other ratios did the tempi of different mensurations then relate?

In his important article on ambiguities of the mensural system, written in 1968, Arthur Mendel concluded: "What is needed, it seems to me, is not more articles advocating this or that interpretation of this or that theorist, or a group of theorists arbitrarily selected, but rather an orderly method of gathering and sorting evidence from both theorists and (particularly) the music itself."[1] An attempt to fulfil the first part of this demand has recently been published by Anna Maria Busse Berger, in an impressive article on the relationship of perfect and imperfect time in which she worked on the evidence from theorists active in Italy between 1400 and 1600.[2] The following essay is complementary to Busse Berger's study in that it approaches the problem of tempo by focusing on a group of fifteenth-century compositions. I propose to work out an existing, but hitherto more or less implicitly stated theory about the relationship between tempo and rhythmic movement in Medieval polyphony, to formulate it into a testable and falsifiable hypothesis, and then to test this hypothesis in a selected repertory of English sacred polyphony from the fifteenth-century, *viz.*, thirty-five Masses from the period c. 1420–70. In order to evaluate the obtained test results and to determine to what extent they allow us to

* I would like to thank David Fallows, Chris Maas, Reinhard Strohm, Hans Lüning, Heleen van Rossum, Jaap van Benthem and Eddie Vetter for reading previous versions of this essay and for making many valuable suggestions and comments.

[1] A. MENDEL, *Some Ambiguities of the Mensural System*, in: *Studies in Music History: Essays for Oliver Strunk*, ed. H. Powers (Princeton 1968), p. 153.

[2] A. M. BUSSE BERGER, *The Relationship of Perfect and Imperfect Time in Italian Theory of the Renaissance*, in: *Early Music History* 5 (1985), p. 1–28.

arrive at certain conclusions concerning tempo in fifteenth-century English music, I have made use of a number of methods developed in statistics.[3] I conclude this essay with a short discussion of the possible implications of the theory for problems of authorship and chronology.

## 1. *The "Tempo-Rhythmic Movement Compensation" Theory*

In his important study of mensural usage in the works of Guillaume Dufay,[4] Charles Hamm observed that most music of the fifteenth century moves either predominantly in breves and semibreves, or in semibreves and minims. In polyphonic manuscripts of the time these two different types of rhythmic movement can usually be distinguished at one glance, but Hamm demonstrated his observations throughout his study by presenting counts of the numbers of longs, breves, semibreves, minims and semiminims used in the upper voice or upper two voices of fifteenth-century compositions. These counts made it easily observable that even in the course of one composition there can be (and very often are) drastic shifts from one type of movement to the other.

If we suppose for the moment that the tempo in compositions such as these were to remain stable – regardless of the rhythmic movement – it is clear that this would lead to marked and clearly audible shifts of sound: in breve-semibreve movement the temporal duration of the notes would generally be longer than in semibreve-minim movement, therefore the succession of the notes in each voice would be less quick, and the sound less "dense."[5]

One of the findings of Hamm's research, however, was that in compositions by Dufay from after about 1430, breve-semibreve movement was used only in sections written in ¢ and ¢3. In these two mensurations the stroke calls for diminution by half

[3] Musicology of the fifteenth century could considerably profit from employing statistical methods more often, particularly when techniques related to those of connoisseurship in art history are employed. In connoisseurship – as it was defined by the nineteenth-century art historian Giovanni Morelli – the least significant details of works of art (for instance, fingernails, nostrils and ear lobes in paintings) are studied and classified systematically, since it is believed that these require the least energy and thought of the artist, and thus reveal the artistic personality most clearly (rather than the more general aspects of structure, compositional devices, proportions, etc., which any lesser talented artist could copy) – a point of view borne out by modern psychology. So far, the most interesting and promising attempt in musicology to approach a problem of authorship with techniques of connoisseurship has been D. GILLER's *The Naples L'Homme armé Masses and Caron: A Study in Musical Relationships*, in: *Current musicology* 32 (1981), p. 7–28, in which the relative frequencies of certain standard head motifs and closing formulas in the six *L'Homme armé* Masses of NapBN 40 and Caron's five preserved Masses were compared with those in thirty-one other Masses from the period c. 1450–80. Although it would improve the credibility of Caron's authorship for the Naples Masses if Giller's test were carried out on a larger sample, and if it were extended to include more stylistic features, Giller's figure 1 (*ibid.*, p. 16) does clearly show that with regard to the two chosen features the deviations in both Caron's Masses and the anonymous *L'Homme armé* Masses fall outside even the broadest critical level of significance (*within* which they could be ascribed to coincidence). Regardless of whether on this basis one accepts Caron as the author of the anonymous cycles or not, Richard Taruskin's criticism of Giller's hypothesis is therefore irrelevant. (R. TARUSKIN, Communications, *JAMS* 40 [1987], p. 149–51.) I have no doubt that if methods of connoisseurship such as the one proposed by Giller are combined with statistical methods, they will in the future play a very important role in questions of authorship and chronology.

[4] C. HAMM, *A Chronology of the Works of Guillaume Dufay Based on a Study of Mensural Practice* (Princeton 1964).

[5] For instance, in fifteenth-century English music "not all pieces can sensibly be taken at the same speed, and there is evidence pointing to variations within single works. The most important issue concerns changes from ϕ to ¢ (or the synonymous O to C change). After changing from ϕ to ¢ many late fifteenth- and early sixteenth-century [English] works employ more long notes and less very short ones, so that if the semibreve beat were constant less movement would result and rhythmic impetus would be lost" (H. BENHAM, *Latin Church Music in England 1460–1575* [London 1977], p. 29).

(though the horizontal tempo relationship with ○ and C was probably smaller than 2:1), and the tempo unit is the breve instead of the semibreve. We may therefore conclude that whenever Dufay wrote breve-semibreve movement after c. 1430, the expected lessening of the "note-density" of the sound was compensated by a tempo increase, specified by the signatures ¢ or ¢3. Or rather, the signatures ¢ and ¢3 were chosen first, and since these mensurations called for a tempo increase Dufay shifted to movement in larger note-values, in order to avoid an *increase* of the note-density of the sound.[6]

That there must have been some correlation between tempo and rhythmic movement in the fifteenth century is, of course, not a revolutionary assertion. Many editors of fifteenth-century music have adopted the practice of reducing the note-values in ○ or C to one half and those in ¢ to one fourth. By thus distinguishing between the reduction rates of ○/C and ¢ they compensate for the larger note-values usually found in the latter mensuration, and are in fact writing out a tempo relationship of 2:1 in the edition. This happens not only in editions of fifteenth-century music. Over the period c. 1200–1600 there has been a historical tendency for note-values to get smaller and smaller, starting from long-breve movement around 1200 to minim-semiminim movement around 1600.[7] By applying corresponding changes in the scale of reduction, editors acknowledge that this development points to a progressive slowdown of the tempi in the course of the centuries: the note-values of Notre-Dame compositions are usually reduced to one-sixteenth, those of late thirteenth- and early fourteenth-century music to one-eighth, those of later fourteenth-century music to one-fourth, and the note-values of fifteenth- and early sixteenth-century music are usually either halved or quartered. In transcriptions of later sixteenth-century music the original note-values tend to be retained.[8] Since changes of the reduction rate are actually written-out tempo changes, we may conclude from the described editorial practices that generally speaking, tempi must have become about sixteen times slower in the course of the period c. 1200–1600.

The rationale of the changes of the reduction rate is that tempo and rhythmic movement are two variables which mutually compensate one another in order that a third variable (which we have called "note-density of the sound") can remain more or less constant. If we denote tempo by the symbol T, the movement of the note-values by the symbol V (of value), and the note-density by the symbol D, this rationale can be expressed in the following equation:

$$\frac{T}{V} = D \qquad (1)$$

[6] "A composer changing to a mensuration moving faster than the one he has been using will tend to use larger notes. This is not to suggest that [a composer] himself kept track of the number of breves, semibreves, and minims he was using, but that he could vary the proportions of these instinctively in different mensurations" (HAMM, *A Chronology*, p. 39). "Later in the [fifteenth] century, ... 'cut' mensurations came to be used as a conventional signal for imprecise diminution which enabled longer note values to be written" (M. BENT, *Notation*, in: *The New GroveD* 13 [London 1980], p. 370). According to Thomas Morley, the sign ¢ was proper to motets "specially when the song is prickt in great notes" (T. MORLEY, *A Plaine and Easie Introduction to Practicall Musicke* [London 1597], p. 23; Morley illustrates his statement with a musical example in which V (¢) = 1.031).

[7] C. SACHS, *Rhythm and Tempo. A Study in Music History* (New York 1953), p. 200–2.

[8] J. CALDWELL, *Editing Early Music* = Early Music Series V (Oxford 1985), p. 13–4.

in which D is constant.[9] It can easily be observed that if in this equation the numerator, tempo, increases (i. e., if there are more "beats" or "pulses" per temporal unit), the denominator, rhythmic movement, must increase proportionally (i. e., there must be an equivalent shift to larger note-values), in order to maintain a constant relationship between the two variables. No one will seriously doubt that this equation is broadly valid for the described long-term developments which took place over the period c. 1200–1600, nor that it explains the correlation between the shifts of movement and certain changes of mensuration in a number of works by Dufay. The problem, of course, is to what extent the equation, and the underlying rationale, can be helpful in tackling the questions raised in the first paragraph of this essay.

Ultimately, it must be by testing the equation that we can decide whether it is valid on a more detailed level, but prior to any test we would have to make sure that the thesis framed in the equation cannot be rejected on the basis of factors not related to tempo. In the first place we have to optimize the degree of precision with which the equation describes the relationship between tempo T, rhythmic movement V and the note-density of the sound D. Obviously the degree of precision of the equation cannot be any greater than the degree of precision of the individual variables. For instance, if rhythmic movement V is seen as a variable which can assume only two possible values, *viz.* "breve-semibreve movement" and "semibreve-minim movement," we cannot expect the equation to tell us anything more than that there are two possible values for tempo T, "quick" and "slow." Clearly, in

[9] Strong support for this theory comes from the fields of ethnomusicology, music psychology and the study of music perception. In these fields concepts synonymous with my "note-density of sound" have been formulated ("tempo figure," "inner tempo," "*Ereignisdichte*," "*melodische Informationsdichte*"), since it has appeared that it is this quality, rather than the absolute (metronomic) tempo, which determines the impression of whether music is "quick" or "slow."

In 1959 the ethnomusicologist Mieczyslaw Kolinski framed the concept of "tempo figure," by which he meant "the average amount of consecutive notes within one minute" (M. KOLINSKI, *The Evaluation of Tempo*, in: *Ethnomusicology* 3 [1959], p. 45–57). Kolinski assumed that "the average value of the total amount of individual tempo figures gives a summary evaluation of the average tempo [figure] of a musical style" (p. 47), and demonstrated conclusively that in a number of non-Western music cultures the note-density remains on a more or less constant level, while the actual (metronomic) tempi can differ considerably (*ibid.*, p. 47–55). Similar concepts were developed by K. REINHARD (*Eine von der rhythmischen Belebung abhängige Tempobezeichnung*, in: *Bericht über den 7. Int. Musikwissenschaftlichen Kongreß Köln 1958* [Kassel 1959], p. 229–30) and D. CHRISTENSEN (*Inner Tempo and Melodic Tempo*, in: *Ethnomusicology* 4 [1960], p. 9–14). See also B. NETTL, *Folk and Traditional Music of the Western Continents* (Englewood Cliffs, N. J., 1973), p. 24. (I should add here that in a graduate seminar on tempo in eighteenth-century music, taught by Reinhard Strohm at Yale University in 1985, the notion of "density of rhythmic events," as independent of tempo, was postulated in order to explain better the link between metre and note-value; private communication of Professor Strohm, 3 April 1987.)

In the field of music perception a particularly important and useful study was published by K.-E. BEHNE (*Der Einfluss des Tempos auf die Beurteilung von Musik* = Veröffentlichungen des Staatlichen Instituts für Musikforschung Preussischer Kulturbesitz VII [Cologne 1972]). Here the concept of "*melodische Informationsdichte*" was formulated (*ibid.*, p. 29), a concept virtually identical with note-density (*ibid.*, p. 27). On the basis of empirical research (with several groups of 29 testees each) Behne demonstrated that the "*Tempoeindruck*" (tempo impression, i. e. the subjective judgement of whether music is "quick" or "slow") is very strongly determined by this "density of melodic information," rather than by the actual (metronomic) tempo (p. 82). Similar empirical conclusions had been reached earlier by G. KLEINEN (*Experimentelle Studien zum musikalischen Ausdruck* [Hamburg 1968], p. 73) and H. DE LA MOTTE-HABER, *Über einige Beziehungen zwischen Rhythmus und Tempo*, in: *Mf* 20 [1967], p. 281–4).

Behne also showed that there is a strong correlation between the relative "density of melodic information" and the subjective judgement as to which tempo is the most appropriate ("*angemessen*") for a given composition. In a number of compositions from the period 1760–1830 the most "appropriate" tempi chosen by the testees were completely different for each composition, but turned out to have in common the same "density of melodic information" of 114–210 melody-carrying tones per minute (BEHNE, *op. cit.*, p. 126). This is in agreement with the results of Kolinski's research, and tends to support the hypothesis formulated in the present essay.

order to improve the degree of precision of the equation we have to improve the degree of precision of the variables, particularly rhythmic movement.

Also, we need to know more about the third variable, which I have called note-density of the sound (D). As stated above, we understand by this variable the relative rapidity with which the notes in one voice succeed one another (expressed in average numbers of notes per minute), and it is assumed that this variable was more or less constant. Within certain relatively broad limits this assumption will probably be true for the period c. 1200–1600, since virtually all the music from this period was vocal, and hence the "rapidity of note-succession" was confined at least by the technical limitations of the human voice. But note-density of sound must also to a certain extent have been a style-determined variable, and for the period c. 1200–1600 "relatively broad limits" have to include possible variations in note-density between, for instance, large choruses and ensembles consisting of three or four virtuoso singers, between large-scale works lasting one hour and short miniaturistic pieces of two or three minutes, and between works designed for large churches and chamber music, etc.[10] To return to the question of precision, it is possible that variations such as these could considerably weaken the precision and usefulness of the equation.

There is, however, an easy way of circumventing this difficulty. For, even though note-density is at best constant only within certain limits (which are probably rather broad when large periods are considered), we know that the narrowest limits must be those that exist within one composition: here none of the variations outlined in the previous paragraph is likely to occur. Returning to Dufay, if in a number of pieces he wrote breve-semibreve movement in ¢ and ¢3 in order to compensate for the tempo increase specified by this signature, we actually assume that he intended the note-density of the sound under ¢ to remain equal to that under ○: D (¢) = D (○). If we indicate tempo and rhythmic movement under ○ and ¢ by T(○), V(○), T(¢) and V(¢), respectively, we can express this by turning equation (1) into the following equation:

$$\frac{T(○)}{V(○)} = \frac{T(¢)}{V(¢)} \quad \text{hence:} \quad \frac{T(¢)}{T(○)} = \frac{V(¢)}{V(○)} \tag{2}$$

On the assumption that variations of the note density between consecutive sections of the same composition are so small as to be negligible, we have derived equation (2), which defines the relationship between tempo and rhythmic movement in the different mensurations of a single composition. The advantage is that we have eliminated the potentially vague and imprecise variable "note-density," and can concentrate on the relationship between tempo and rhythmic movement.

Concerning the problem of the precision of the variable V, rhythmic movement, a very interesting solution was proposed by Arthur Mendel at the International Josquin Festival-Conference, June 1971:[11]

[10] Kolinski has shown that the average note-densities of sound of different (non-Western) music cultures can differ considerably (KOLINSKI, *op. cit.*, p. 47–56).

[11] A. MENDEL, *Towards Objective Criteria for Establishing Chronology and Authenticity: What Help Can the Computer Give?*, in: *Josquin des Prez: Proceedings of the International Josquin Festival-Conference*, ed. E. E. Lowinsky (London 1976), p. 298–9.

One of the many questions about music of this time to which we have no definite answers is what its tempi were – not only the absolute tempi, but the relations between tempi of different works or sections of the same work. When two voices that are to be performed simultaneously have two different mensuration signs, it is clear what the tempo relation implied by the presence of the two signs is. When C and ¢ occur simultaneously, for example, it is clear that two semibreves of ¢ are equal to one semibreve of C. But is this true when the two signs do not occur simultaneously? Is the semibreve of a whole piece marked ¢ to last only half as long as that of a whole piece in C? Towards finding an answer to such questions, Charles Hamm counted the frequency of the different note-values in each of several pieces – a tedious job.

The computer, however, has no taste in jobs. For each mensuration (and for each voice, sub-section, section, or Mass) it can add the durations of all the notes occurring in that mensuration and divide the total duration of all the notes by the total number of notes, thus arriving at the average note-value. If the average note-value in ¢ turns out to be twice that in C, there will be support for the idea that a breve in ¢ is intended to have about the same duration as a semibreve in C. If the average note-value in ¢ is greater than in C but less than twice as great, we may take this as suggesting that a breve in ¢ is shorter than a breve in C, but longer than a semibreve.

How precise is the variable V if it is expressed in average note-values? The answer is: very precise. Let us suppose that we wish to compare two sections (1) and (2) of the same, hypothetical fifteenth-century composition. We assume that the composer had very definite, fixed tempi in mind, for instance, in the first section $T_1 = 70$ semibreve beats per minute, and in the second $T_2 = 69$ semibreve beats per minute. (I realize that this is a rather unrealistic example, but it is my purpose here to examine whether average note-values are so precise that they can in theory express differences of rhythmic movement corresponding to differences of tempo this small.) We assume that the composer conceived the two sections with the same note-density, or "rapidity of note-succession," in the top voice, say, approximately 95 notes per minute. Then it follows that in section (1) 95 notes per minute correspond to 70 semibreves per minute, while in section (2) 95 notes correspond to 69 semibreves. Consequently, the notes in the top voice of section (1) would have an average value of $70/95 = 0.737$ semibreve in the notation, while the notes in the top voice of section (2) would have an average value of $69/95 = 0.726$ semibreve.

We may conclude from this hypothetical example that average note-values can in theory express differences of rhythmic movement corresponding to extremely small differences of tempo (provided that the differences of note-density within one composition are negligible). This means that if we measure rhythmic movement by average note-values and put the obtained results in equation (2), we can expect the equation to give us very precise answers to the question of what tempo relationships possibly existed between the different mensurations in a single composition. Of course, we cannot be certain that these answers are correct, since we do not as yet know whether the equation is valid on a detailed level or not. However if – after repeating this procedure in a number of related compositions – a consistent, regular pattern is to be observed in the various relationships between the average note-values of different mensurations, this would bear out the equation, since the observed pattern would very probably reflect a standard tempo relationship.

This means that we now have a hypothesis about the relationship between tempo

and rhythmic movement (i. e. equation 2) which can be tested empirically in a representative sample of fifteenth-century music. We can accept the hypothesis for a chosen repertory if in this repertory there appears to be a consistent relationship or correlation between the various values found for e. g. V(○) and V(𝅵). We must reject the hypothesis if there is no such relationship or correlation. In the first case we can also attempt to determine the nature of the relationship between the various values (in the form of an equation), and this can be of importance for the question of standard tempo relationships. Inevitably, to draw conclusions such as these from a given number of empirically obtained figures must involve making use of statistical evaluation procedures. These procedures can help us to decide whether or not there is a 'reasonable' correlation between the two sets of found values, and, if we have decided that there *is* a correlation, to determine which equation best fits the obtained values.[12]

Needless to say, we would expect the test of the hypothesis to be more reliable if the chosen repertory were smaller, for instance if it were confined to one style, one composer, one geographical area, or one chronological period: thus we would minimize the chances that we might reject the theory on the basis of factors not related to tempo. For this reason I have concentrated on English sacred polyphony from the fifteenth century, and I have selected a test repertory that is closely unified with regard to musical form and style, and spans a relatively short historical period. But even within such confines there can be the danger that certain stylistic changes distort the results. For example, in a recent article I have used the method of average note-value in the sacred works by Johannes Ockeghem, in order to obtain evidence in the light of which a particular problem of authorship could be judged.[13] The chosen repertory was confined to one composer, who worked in the same musical centre in France from at least 1454 to 1497. The figures presented in my article were based on counts which included all voices of each composition. It is known, however, that during Ockeghem's career stylistic changes evolved which must have considerably affected the rhythmic movement in the tenor and bass, particularly changes of cantus firmus treatment and the handling of "harmonic movement." This did not matter for the authorship problem I dealt with. Yet obviously it could be dangerous to draw conclusions about relative tempi by now comparing the average note-values given there for e. g. Ockeghem's *Missa Caput* and *Missa Fors seulement*. In order to eliminate possible distortions caused by these stylistic changes, we should have to restrict the counts to those voice-parts that were least affected, i. e. the superius and (first) contratenor, and allow for a margin of uncertainty if the chosen repertory covers a relatively large period. I will do this in the repertory I have selected for the present essay.

[12] I realize that the equations presented here are actually a pedantic way of stating what is self-evident to many scholars (cf. notes 5, 6 and 11). It should be stressed that the aim of the present essay is merely to raise existing, tacit assumptions about the relationship between tempo and rhythmic movement to an explicit level, to formulate them in the form of a hypothesis, and to test them in a selected repertory of fifteenth-century music. I make no claim that the "tempo-rhythmic movement compensation" theory as such is my invention.

[13] R. C. WEGMAN, *An Anonymous Twin of Johannes Ockeghem's 'Missa Quinti toni' in San Pietro B 80*, in: *TVer* 37 (1987), p. 28–30.

Another issue that is of importance concerns the relationship between mensuration signs and rhythmic movement. What are we to decide about the relative tempo of a section if the signature and the rhythmic movement are in conflict? If we decide to give most weight to the rhythmic movement, we are in fact assuming that each section has its own "inherent" tempo – implied by its rhythmic movement –, and that this automatically overrules a conflicting mensuration sign if it occurs. Conversely, if we decide to follow the mensuration sign instead of the rhythmic movement, we admit that there are instances in which equations (1) and (2) are not valid.

A good example of a conflict between signature and rhythmic movement is to be found in Antoine Busnois's *Missa L'Homme armé*. In this Mass the main signatures are O2 and O, which in theory have a tempo relationship of 2:1. In view of the prescribed tempo increase in O2 one would expect to find a clear shift in rhythmic movement in this mensuration. Such a shift, however, does not occur: in the upper two voices of the Mass V(O) = 0.632 semibreve and V(O2) = 0.685 semibreve. This means that either (1) we decide that there was practically no difference in speed between O and in O2, thus ignoring the *dupla* proportion in O2 (or rather, considering it to indicate only a change in the mensural relationships), or (2) we hold on to the literal meaning of the sign O2, and accept that there is a sharp increase in the note-density of the sound which may bring some singers into trouble. The first interpretation was adopted by Bruno Turner in his 1978 recording of the *L'Homme armé* Mass with Pro Cantione Antiqua (where the speed of the semibreve is c. 60–66 M. M. in either mensuration),[14] and the second by Richard Taruskin in his recent essay on Busnois's *Missa L'Homme armé* (where he assumed that in O2 there are "dizzy prestissimos" because of the "breakneck speed" at which the voices have to move).[15] Examples of similar conflicts are, for instance, Ockeghem's Requiem Mass, in which the tempo relationship ¢:C as suggested by the average note-values is more than 2.5:1,[16] and the various fifteenth-century works in which the tempo relationship ϕ:O as suggested by the average note-values seems to be c. 1:1. *A priori* decisions about these and similar conflicts cannot be made: in each individual case there should be a discussion of the source problems (since much depends on the reliability of the scribe: instances in which mensuration signs are incorrect, or at least at variance with those in other sources, occur all too often). Since the present essay deals with English sacred music, attention will be given only

[14] *Busnois: Missa L'Homme armé; Binchois: Motetten*, Pro Cantione Antiqua, London, directed by B. Turner, Archiv 2533 404 (1978).

[15] R. TARUSKIN, *Antoine Busnoys and the L'Homme armé Tradition*, in: *JAMS* 39 (1986), p. 255 and 269.

[16] It should be added, however, that there is evidence that Ockeghem's Requiem Mass is not a work of one piece. In the course of the Mass, the musical style, voice ranges, and mensural usage change completely. The first movements are written in a relatively early style, and are strongly reminiscent of the Proper sections of the anonymous Mass for St. Anthony Abbot which survives uniquely in TrentC 89 (fols. 59v–71r; I am indebted to David Fallows for making his transcription and the BBC recording of the latter Mass available to me). The later movements of the Requiem are more progressive, more demanding technically, and display several mensural complexities. ¢ occurs only in the first movements, C only in the later ones. The unusual and improbable tempo relationship 2.5:1, as suggested by the average note-values of these mensurations, adds to the suspicion that the Requiem is in fact a composite Mass. Both the "early" and "late" parts of the Requiem are written in styles which are untypical of Ockeghem.

to the problems that arise in this field.[17] The most important issue that confronts us here is the confusion about the strokes in perfect and imperfect time.

In the very few surviving, mostly fragmentary, English sources from the period c. 1420–80 virtually all music is written in O with semibreve-minim movement and C with breve-semibreve movement. In spite of the shift to movement in larger note-values in C, the stroke through the signature is rigorously avoided, possibly because in England there was no need to distinguish between imperfect time with breve-semibreve movement and imperfect time with semibreve-minim movement. On the Continent, however, both types of imperfect time belonged to the standard mensuration repertory and the use of the stroke was therefore necessary to avoid confusion. As a consequence, the insular habit of not employing the stroke when according to Continental usage it should have been, led to confusion when English compositions were imported into the mainland. Some Continental scribes left the English notation as it was, but in a great number of Continental sources attempts were made to bring the mensuration sign C and the rhythmic movement under it into agreement. In order to adapt English works with breve-semibreve movement under C to Continental notational practice, scribes could either put a stroke through C, or renotate the music in halved note-values (thus applying what we now call "editorial reduction"). There is plenty of evidence that the first method of adaptation was widely applied. There is also evidence that the second method was sometimes used.

Now since the large majority of the preserved English sacred polyphony from the period c. 1420–80 is transmitted in Continental manuscripts, the notation of the repertory as it is now to be found in the sources is inevitably confusing and contradictory. Let us remember, however, that English notation itself was clear and consistent, and that the only problem we encounter in insular sources is the conflict between mensuration sign and rhythmic movement in C with breve-semibreve movement. This conflict can easily be resolved in favour of rhythmic movement: the received view is that the shift to larger note-values in C must have called for a tempo increase, despite the absence of the stroke in English sources. Hence, when the signature ¢ is found in English compositions transmitted in Continental sources we may readily identify this signature with "English C," since C and ¢ in fifteenth-century English music are merely different bottles filled with the same wine. However, there may occur instances of scribal renotation (reduction by one half in the source), and we must therefore look with suspicion upon cases where average note-values in C are found that are smaller than or equal to those in O.

[17] For the following two paragraphs see: HAMM, *op. cit.*, p. 46–7 and 91–5; A. PLANCHART, *The Relative Speed of Tempora in the Period of Dufay*, in: *Royal Musical Association Research Chronicle* 17 (1981), p. 33–51; M. BENT, *Fifteenth-Century Liturgical Music* II, *Four Anonymous English Masses* = Early English Church Music XXII (London 1979), p. x and xiv; G. R. K. CURTIS, *Jean Pullois and the Cyclic Mass – or a Case of Mistaken Identity?*, in: *ML* 62 (1981), p. 54; ID., *Stylistic Layers in the English Mass Repertory, c. 1400–1450*, in: *PRMA* 109 (1982–3), p. 23–38; M. BENT, *Trent 93 and Trent 90: Johannes Wiser at Work*, in: *I codici musicali trentini a cento anni dalla loro riscoperta (Atti del Convegno "Laurence Feininger: la musicologia come missione")*, edd. N. Pirrotta and D. Curti (Trent 1986), p. 84–110.

## 2. *Test Results*

For the test of the hypothesis I have chosen a group of thirty-five English Masses or fragments of Masses from the period c. 1420–70 (listed in the appendix, p. 58ff.). In Table 1 (see below) the average note-values of the upper two voices of these Masses are presented, divided into four groups (three Masses are unclassifiable); in each group the values are arranged in descending order of magnitude. The numbering of the Masses corresponds to the numbering in the appendix. The unit for the average

| Group | No. | Composer | Title | V(C) | V(O) |
|---|---|---|---|---|---|
| 1 | 1 | Leonel Power | *Alma redemptoris mater* | 0.997 | 0.967 |
| | 2 | John Dunstable | *Jesu Christe fili Dei* | 0.933 | 0.878 |
| 2 | 3 | John Dunstable | *Rex seculorum* | 1.266 | 0.950 |
| | 4 | an. | *Caput* | 1.149 | 0.952 |
| | 5 | John Dunstable | *Da gaudiorum premia* | 1.151 | 0.949 |
| | 6 | an. | *Pax vobis ego sum* | 1.162 | 0.871 |
| | 7 | an. | *Veterem hominem* | 1.113 | 0.809 |
| | 8 | an. | *Christus surrexit* | 1.008 | 0.782 |
| 3 | 9 | an. | *Salve sancta parens* | 1.593 | 0.924 |
| | 10 | John Benet [?] | [*Sine nomine*] | 1.520 | 0.903 |
| | 11 | an. | *Meditatio cordis* | 1.470 | 0.901 |
| | 12 | an. | *Quem malignus spiritus* | 1.419 | 0.865 |
| | 13 | John Bedyngham | [*Sine nomine*] | 1.441 | 0.851 |
| | 14 | an. | [*Sine nomine*] | 1.353 | 0.893 |
| | 15 | John Bedyngham | [*Sine nomine*] | 1.334 | 0.915 |
| | 16 | John Bedyngham | *Dueil angoisseux* | 1.327 | 0.856 |
| | 17 | Walter Frye | *Nobilis et pulchra* | 1.297 | 0.831 |
| | 18 | an. | *Fuit homo missus* | 1.238 | 0.804 |
| | 19 | Walter Frye | *Flos regalis* | 1.193 | 0.787 |
| | 20 | an. | *De Sancto Andrea* [?] | 1.103 | 0.761 |
| | 21 | an. | [*Sine nomine*] | 1.078 | 0.759 |
| | 22 | an. | [*Sine nomine*] | 0.997 | 0.716 |
| 4 | 23 | an. | *Veni creator Spiritus* | [1.432] | 0.816 |
| | 24 | Standley | *"Ad fugam reservatam"* | [1.456] | 0.744 |
| | 25 | Richard Cox | [*Sine nomine*] | 1.387 | 0.743 |
| | 26 | an. | [*Sine nomine*] | 1.368 | 0.777 |
| | 27 | an. | [*Sine nomine*] | 1.352 | 0.783 |
| | 28 | an. | [*Sine nomine*] | 1.311 | 0.754 |
| | 29 | Standley | [*Sine nomine*] | 1.287 | 0.769 |
| | 30 | an. | *Rex dabit mercedem* | 1.198 | 0.725 |
| | 31 | an. | *O rosa bella III* | 1.135 | 0.710 |
| | 32 | John Plummer | [*Sine nomine*] | [1.174] | 0.684 |
| – | 33 | Walter Frye | *Summe trinitati* | [1.548] | |
| | 34 | an. | *O rosa bella I* | | 0.721 |
| | 35 | W. de Rouge [?] | *Soyez aprantiz* | | 0.712 |

Table 1: Average note-values of the upper two voices of thirty-five English or presumably English Masses from the period c. 1420–70 (numbered as in appendix).

note-values is the semibreve [S]; for example, imperfect breves are counted as 2.0 S, minims as 0.5 S, dotted semiminims as 0.375 S, etc. The average note-values are divided into two categories: those of imperfect time and those of perfect time, indicated by V(C) and V(O), respectively. For the reasons explained above, no distinction has been made between imperfect time notated with a stroke through C and imperfect time notated without a stroke through C.

In five Masses, *viz.* 1, 2, 23, 24, and 32, the average note-values in imperfect time are smaller than or roughly equal to the average note-values in O, and we must investigate the possibility of whether this could be the result of renotation in the source. In Masses 1 and 2 this possibility can safely be discarded, since in these two cycles the relationship between C and O when they are combined vertically is 1:1 (with semibreve equivalence), and the relationship V(C)/V(O) is in virtual agreement with this vertical relationship (1.031 in Mass 1, and 1.063 in Mass 2). In Masses 23, 24 and 32, in the fourth group, the average note-values in imperfect time are smaller than those in O (and very much smaller than the average note-values in C in any other English Mass from this period). I believe that this must be the result of scribal reduction in the source; if the note-values in these three Masses are doubled, it can be seen that they fit in easily within the same central tendency as the other Masses of the fourth group (doubled average note-values are placed between square brackets). Walter Frye's *Missa Summe trinitati* (33) has a very small average note-value in C (0.774), which is not normally found in English compositions prior to the Eton Choirbook EtonC 178 (c. 1500); although in this Mass there is no value for V(O) to compare V(C) with, it seems very likely that here, too, we are dealing with a case of renotation.[18]

In the Masses 3–22 and 25–31, clear shifts to movement in larger note-values in imperfect time are to be observed, and there can be little doubt that these shifts reflect corresponding increases of the speed. Yet if we survey each series of average note-values as a whole it is remarkable to find that the various values within each group do not center on certain mean values ("standard tempi"), but do in fact cover rather wide ranges. As a consequence, the shifts to movement in larger note-values in C are *relative* shifts, i. e. relative to the movement in O in the same Mass, but not to that in O in other Masses. For instance, the "fast tempo" suggested by V(C) = 0.997 in Mass 22 (as compared to its value of 0.716 for V(O)) is rather moderate in comparison with the average note-values of Mass 9, where "fast tempo" in C is suggested by a value approximating 1.6.

In each of the groups 1, 2, 3 and 4, comprising Masses 1–2, 3–8, 9–22 and 23–32, respectively, there appears to be a linear correlation between the two sets of values. This means that the relationship between the values can be described relatively well by a linear equation, i. e. an equation of the type $V(C) = aV(O) + b$. If the average note-values are plotted in a scatter diagram, they can be relatively well approxi-

[18] Not all possible cases of renotation should necessarily have taken place on the continent; Plummer's Mass (32), for instance, is found in an English source (ArunC M543) but in this source the note-values used in C are not twice as long as those in BrusBR 5557 (where the average note-value in C is 0.587). See: R. BOWERS and A. WATHEY, compilers, *New Sources of English Fifteenth- and Sixteenth-Century Polyphony*, in: *Early Music History* 4 (1984), p. 304–13.

mated by a straight line. In figure 1 (see below), for instance, the average note-values of group 3, comprising Masses 9–22, are presented graphically, and it is not difficult to visualize a straight line which best fits the points in the diagram.

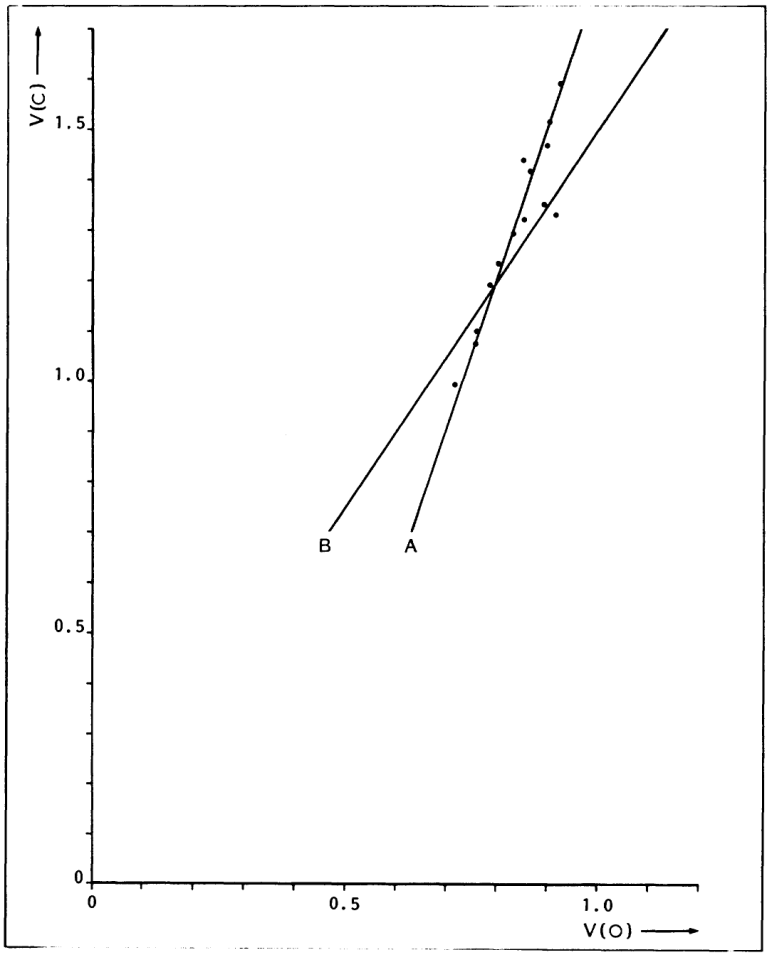


Figure 1. Scatter diagram of the average note-values of the Masses of group 3 (9–22). Line A represents the function V(O) = 0.350 V(C) + 0.382. Line B represents the function 2 V(C) = 3 V(O), or C𝅗𝅥 𝅗𝅥 𝅗𝅥 𝅗𝅥 = ○ 𝅗𝅥 𝅗𝅥

In statistics[19] a measure of the degree of linear correlation between two sets of variables is given by Pearson's linear correlation coefficient $R$. This coefficient expresses in a quantitative manner how well the relationship between two series of variables can be described by a linear equation. The value of $R$ varies between 0 and 1 if the relationship is positive (V(C) = $a$V(O) + $b$). The correlation coefficient is an objective measure, so that the values of $R$ from different sets of data can be directly compared: if $R$ = 0 there is no correlation, if $R$ = 0.5 there is some correlation, if $R$ = 0.75 the correlation is good, and if $R$ = 1 there is perfect correlation. In our case, the

[19] For the methods used here, see: R. FLOUD, *An Introduction to Quantitative Methods for Historians*, 2nd ed. (London 1983); M. J. MORONEY, *Facts from Figures* (Harmondsworth 1960); and M. R. SPIEGEL, *Theory and Problems of Statistics* = Schaum's Outline Series n. n. (New York 1961).

correlation coefficient between V(O) and V(C) has a value of 0.778 in group 2, 0.924 in group 3, and 0.734 in group 4 (no value for *R* is given here for group 1, since in this group there are only two values for the two variables, and hence the line connecting the two data points in a graph cannot but fit them perfectly). The correlation between the average note-values in groups 2–4 is, in other words, good to very good, and we may safely conclude that there is a linear relationship between the series of values found for V(O) and V(C) in each group.

This result tends to support the hypothesis, formulated above, that the relationships between the average note-values of O and C are equivalent with the tempo relationships between these mensurations. It would therefore be interesting, in view of the tempo discussion, if we could now also *define* the actual relationships between the average note-values. Let us once again visualize this problem graphically (see figure 1): if the sets of data of one group are plotted in a scatter diagram, it is not difficult to imagine a straight line which best fits the data points; one might even draw it freehand. This best-fitting line represents a linear equation, and it is this equation that we want to define. In statistics there is a method to calculate the equations describing the best-fitting lines of any given set of data (the so-called "least-squares method"). If this method is applied to the data presented in table 1, it appears that for groups 2–4 the resulting, so-called "regression equations" are:

| | | |
|---|---|---|
| Group 2 | V(C) = 0.845 V(O) + 0.393 | V(O) = 0.716 V(C) + 0.069 |
| Group 3 | V(C) = 2.443 V(O) + 0.742 | V(O) = 0.350 V(C) + 0.382* |
| Group 4 | V(C) = 2.114 V(O) − 0.276 | V(O) = 0.255 V(C) + 0.416 |

These equations indicate the relationship, on average, between the two variables V(C) and V(O). The lines are only estimates, since they do not pass exactly through all the data points, but merely as close as possible to them (the equation marked by the asterisk corresponds with line A in figure 1). Whether or not the regression equations given here are realistic from the musical point of view is a matter to be discussed in the following paragraph: here we have concentrated only on the test results and the statistical conclusions that can be drawn from them.

By testing the hypothesis formulated in the first paragraph we have been able to establish that the note-values used in duple and triple time sections of fifteenth-century English Masses relate approximately consistently in one of four ways. Hence, the hypothesis formulated in the first paragraph is valid for the repertory chosen in the present essay.

### 3. *Interpretation of the Test Results*

The test results presented in the previous paragraph and the statistical methods used to evaluate them have removed us rather far from musical reality. Yet the advantage has been that the counts and calculations are objective and cannot be influenced by musical prejudice. Our task in the following paragraph is to interpret the obtained data and to attempt to translate them in musical terms.

The first question concerns the nature of the relationship between the average note-values in O and C. We have seen that the chosen repertory can be divided into four groups, and that in each group the relationship between V(C) and V(O) can be described quite well by a linear equation. According to the hypothesis formulated in the first paragraph this points to the existence of standard tempo relationships: apparently composers had fixed, very definite tempi (*"tempi giusti"*) in mind when they composed their Masses, and in the course of writing a Mass these tempi tended to be reflected in the rhythmic movement. If this assumption is correct, there are two possible explanations for the regularity and consistency with which the average note-values follow the central tendencies described in the previous paragraph:

1. The tempo relationships between perfect and imperfect time were achieved with the help of easily communicable rules of thumb or other consciously applied devices. If this was the case, then the relationships between V(C) and V(O) cannot be *explained* by the regression equations calculated above, since these lack the communicability and simplicity required for standard tempo rules; we should therefore be looking for equations which make more musical sense and fit the obtained values nearly as well.
2. The tempo relationships between perfect and imperfect time were determined by more or less instinctive, universal musical habits. If this was the case, then the regression equations give the most adequate descriptions of these habits.

The second explanation is unlikely, since in order for it to be true the relationship between V(C) and V(O) should be the same for all chosen Masses. Since there are actually four different relationships between V(C) and V(O) in the chosen repertory, we must assume that the differences between these relationships are caused by differences of applied tempo rules. Hence, according to explanation (1), we have to devise alternative equations for the regression equations presented in paragraph 2, and examine whether they meet the requirements of "musical sense" as well as "goodness of fit." In table 2 (see p. 54), I have listed for each group a number of alternative equations together with one regression equation. For each equation the corresponding relative standard error of estimate is given, a value which indicates in a percentage the degree to which the equation approximates the data points.[20] The smaller this percentage, the better the equation fits the values.

In group 1 there can be little doubt that the horizontal tempo relationship between V(C) and V(O) is 1:1, since this relationship is suggested both by the average note-values and by the vertical tempo relationships between perfect and imperfect time (see above).

In group 2 a proposed tempo relationship of 4:3 between V(C) and V(O) fits the obtained average note-values slightly less well than the regression equations, since the value for the relative standard error of estimate is 1 % larger than that of the

[20] By relative standard error of estimate I understand the ratio of the (absolute) standard error of estimate *s* to the mean value for V(C) in one group. This measure has properties analogous to those of the coefficient of variation (*V*): it expresses in a percentage the margin of the outcome of the equation which will include c. 68 % of the empirical average note-values obtained in a sample (see table 1).

regression equation of V(O) on V(C). Yet obviously this relationship makes much more musical sense, and it fits the data well enough for us to assume that the intended tempo relationship between C and O in Masses 3–8 was 4:3.

In groups 3 and 4 we encounter some difficulties, since simple tempo relationships such as the ones proposed in groups 1 and 2 fit the obtained average note-values rather awkwardly. For instance, a proposed tempo relationship of 3:2 in group 3 leads to a relative standard error of estimate which is nearly three times larger (8.06 %) than those of the regression equations (2.93 % and 2.89 %); a graphic presentation of the average note-values of group 3 (figure 1) shows that the line 3 V(O) = 2 V (C) fits the average note-values very poorly indeed. Two reasonably good alternatives for the regression equations of groups 3 and 4 suggest a possible integer ratio of 3:4 between the relative values for V(C) of these groups:

Group 3 V (C) = 3 (V(O) – 0.4)
Group 4 V (C) = 4 (V(O) – 0.4)

However, I have not been able to discover any easy rule or device with which corresponding tempo relationships could have been achieved, and it is difficult to imagine how corresponding tempo relationships can be achieved at all without the help of a metronome. Further research will have to determine whether the implied tempo relationships between V(C) and V(O) in groups 3 and 4 can be explained in practical musical terms.

| Group | Equation | Relative standard error of estimate |
|---|---|---|
| 1 | V(O) = V(C), or: ○ ◇ = C ◇ | 4.59 % |
| 2 | V(O) = 0.716 V(C) + 0.069 | 4.97 % |
| | V(O) = 0.750 V(C), or: ○ ◇◇◇ = C ◇◇◇◇ | 5.98 % |
| 3 | V(O) = 0.349 V(C) + 0.382 | 2.89 % |
| | V(O) = 0.333 V(C) + 0.4 | 2.93 % |
| | V(O) = 0.667 V(C), or: ○ ◇◇ = C 𝄜 ◇ ◇◇◇ | 8.06 % |
| 4 | V(O) = 0.255 V(C) + 0.416 | 3.29 % |
| | V(O) = 0.25 V(C) + 0.4 | 4.49 % |

Table 2: Alternative equations for the relationships between V(C) and V(O) in groups 1–4 of table 1, with their relative standard errors of estimate.

The second question concerns the problem of absolute speeds. It is nowadays agreed that tempi in the fifteenth century were stable, and that the present-day principle of unlimited tempo variability did not as yet exist. Yet one of the unexpected results of our inquiry is that the obtained average note-values do not centre on certain standard values (which could correspond to stable standard tempi), but are in fact distributed over rather wide ranges. If one just compares the two extreme examples of group 3, Masses 9 and 22, it is evident that all cycles cannot sensibly be performed at the same absolute speeds. So we must conclude that

either (1) tempi were not stable, and several alternative tempi for the same mensuration could be chosen at the same time (which seems rather unlikely, in view of the absence of tempo indications), or (2) tempi tended to increase or decrease slowly in the course of the years. It should be noted that the second possibility is not necessarily in conflict with the theory of tempo stability: if tempo changes evolved rather slowly over periods of years, it is easily conceivable that they were not noticed by the musicians and composers themselves, unless they could have disposed of metronomes. Empirical research has shown that the subjective impression of tempo ("quick," "slow") is very strongly determined by the note-density of sound (rather than by the actual metronomic value; see note 9 above). Thus is appears likely that while musicians kept the note-density of sound more or less constant, tempi were allowed to change slowly.[21]

[21] It may be asked to what extent the tempi and tempo relationships in present-day performances of fifteenth-century music are in agreement with those suggested by the average note-values. Although twentieth-century recordings are obviously of limited value when it comes to making judgements about tempo in the fifteenth century, it is important to make sure that tempo theories are not completely out of touch with musical reality. Since very few of the thirty-five English Masses have as yet been recorded, I have tested thirteen recordings of motets from EtonC 178 which contain both sections in duple and triple time. In the following table are listed the average tempi T(C) and T(O) in each performance (there are slight fluctuations of tempo within each of the recorded motets), the average note-values V(C) and V(O), the tempo relationships between C and O, and the relationships between the average note-values:

| Motet | T(C) | T(O) | V(C) | V(O) | $\frac{T(C)}{T(O)}$ | $\frac{V(C)}{V(O)}$ |
|---|---|---|---|---|---|---|
| *Gaude virgo*, Cornysh[3] | 70 | 53 | 1.058 | 0.560 | 1.321 | 1.889 |
| *Gaude virgo*, Cornysh[4] | 86 | 56 | 1.058 | 0.560 | 1.536 | 1.889 |
| *Magnificat*, Nesbet[1] | 116 | 69 | 1.180 | 0.644 | 1.681 | 1.832 |
| *Stabat mater*, Davy[3] | 66 | 56 | 1.018 | 0.647 | 1.179 | 1.573 |
| *Gaude rosa*, Fawkyner[1] | 76 | 62 | 0.854 | 0.612 | 1.226 | 1.395 |
| *Stabat mater*, Browne[1] | 65 | 58 | 0.836 | 0.655 | 1.121 | 1.276 |
| *Stabat mater*, Browne[3] | 56 | 52 | 0.836 | 0.655 | 1.077 | 1.276 |
| *Salve regina*, Cornysh[4] | 73 | 66 | 0.943 | 0.762 | 1.106 | 1.238 |
| *Stabat iuxta*, Browne[3] | 60 | 56 | 0.923 | 0.760 | 1.071 | 1.214 |
| *Stella caeli*, Lambe[2] | 51 | 55 | 0.751 | 0.620 | 0.927 | 1.211 |
| *Salve regina*, Wylkinson[1] | 70 | 59 | 0.969 | 0.820 | 1.186 | 1.182 |
| *Salve regina*, Wylkinson[2] | 61 | 54 | 0.969 | 0.820 | 1.130 | 1.182 |
| *Salve regina*, Browne[2] | 60 | 56 | 0.928 | 0.790 | 1.071 | 1.175 |

[1] *Eton Choirbook (record 2)*, Purcell Consort of Voices and Choristers of All Saints, Margaret Street, directed by G. Burgess (Argo ZRG 557, 1968)
[2] *Salve regina. Music from the Eton Choirbook*, The Sixteen, directed by H. Christophers (Meridian E77039, 1981)
[3] *Stabat mater. Music from the Eton Choirbook*, The Sixteen, directed by H. Christophers (Meridian E77062, 1982)
[4] *William Cornysh. Stabat mater*, The Tallis Scholars, directed by P. Phillips (Gimell CDGIM 014, 1988)

The data listed in the table warrant the following conclusions:

1. There is reasonable correlation between the average note-values and the tempi chosen by the performers ($R = 0.683$). About 46.6 % of the variation of the values for T(O) and T(C) can be ascribed to the rhythmic movement in the notation (coefficient of determination $R^2 = 0.466$). About 53.4 % of the variation must be attributed to other causes (e. g. fluctuations, inaccuracies, differences of interpretation, etc.).
2. There is a strong correlation between the actual (recorded) tempo relationships between C and O and the relationships between their average note-values ($R = 0.847$).
3. The average tempo increase in C, however, is smaller than one would predict on the basis of the average note-values (the observed average tempo increase is c. 85 % of the expected tempo increase). As a consequence, the average note-density in C tends to be lesser than that in O. In the thirteen performances, D(O) = c. 86 notes per minute, while D(C) = c. 73 notes per minute (both are averages with a variation coefficient of c. 15 %). The sections in duple time therefore make a somewhat more "relaxed" impression than those in triple time (i. e. the tempo increases are not in themselves large enough to compensate entirely for the shifts to larger note-values).

Although it would obviously be premature to reach definitive verdicts about the complex interaction between notation and performance in late-Medieval music, the results given here do seem to indicate that rhythmic movement is indeed the most important single determinant of tempo in performances of fifteenth-century music.

It could be argued that if the absolute tempi did change, musicians would have immediately noticed these changes when they performed compositions that were written one or several decades earlier; their observation would then be in conflict with the judgements of several contemporary theorists who stated that the tempi in mensural music were stable. Yet it can be shown conclusively that at least some differences of rhythmic movement within single mensurations must have been chronologically determined: in the Eton Choirbook, for instance, whose repertory covers the period c. 1475–1500, nearly all average note-values in C (and the synonymous ¢) are included between 0.7 and 1.1, and nearly all average note-values in O (and the synonymous ϕ) are included between 0.6 and 0.8. This is in marked contrast with the Masses from the period c. 1420–70, as the following comparison shows:

| Eton repertory: | Masses c. 1420–70: |
|---|---|
| $0.7 < V(C) < 1.1$ | $0.95 < V(C) < 1.6$ |
| $0.6 < V(O) < 0.8$ | $0.7 < V(O) < 0.95$ (with the possible exception of Masses 23, 24, 32, 33; see above) |

Clearly, the note-values used by the Eton composers were considerably smaller than those used in English Masses during the period c. 1420–70. This is consistent with the historical tendency during the period c. 1200–1600 for note-values to get smaller and smaller (described in the first paragraph of this essay). Obviously the assumption of gradually changing tempo practices could have important implications for questions of chronology and authenticity. I wish to deal with these possible implications in the following paragraph.

The evaluation of the obtained test results has shown that in a number of Masses (1–8) the relationships between the average note-values for duple and triple time can be satisfactorily explained by assuming simple tempo relationships such as 1:1 and 4:3. However, in most of the Masses (9–32) the relationships seem to be of a more complex nature, and cannot as yet be adequately explained. The evidence of the average note-values suggests that the tempi employed in England during the period c. 1420–70 were subject to gradual change. It can be demonstrated that tempi became slower in the long term, since the note-values used by the Eton composers are considerably smaller than those found in the English Masses from the period c. 1420–70.

### 4. *Possible Implications for Chronology and Authenticity*

The considerations on gradual tempo change pointed out in the previous paragraph seem to favour a hypothesis in which the average note-values listed in table 1 are interpreted as time series data. Interesting though such a hypothesis may be, it

cannot be tested in the repertory assembled here (and is hence not falsifiable), since this repertory does not contain a single work which can be dated with any confidence.[22] It is only with the help of accurate dates that we can determine whether gradual changes of the average note-values were chronologically determined, whether different standard tempo relationships (e. g. groups 1–4 in table 1) succeeded one another in the course of time, or overlapped, or were geographically determined, and whether absolute tempi were always the same at any one time in different musical centres. Of course, this does not mean that a chronological interpretation of the average note-values in table 1 must necessarily be incorrect, merely that *until* we have reliable dates such an interpretation must remain gratuitous. Application of the method of average note-values in better dated repertories might possibly yield evidence to support a chronologic interpretation, but that is still a task for the future.

Nonetheless, average note-values can sometimes be of help in questions of chronology and authenticity, provided that they are used with considerable care. For instance, if there is close agreement between the average note-values of two compositions which for some reason are assumed to have been written by the same composer at the same time, this can be seen as providing additional support for that assumption. Thus, my contention that the anonymous three-voice Mass fragment in VatSP B80 is a twin of Ockeghem's *Missa Quinti toni* was supported (or at any rate not contradicted) by its average note-values.[23] Similarly, the close agreement between the values for V(O) in Masses 34 and 35 in table 1 provides additional support for the assumption that these Masses too, are twins.[24] And Gareth Curtis's

[22] Tentative dates have been suggested for Dunstable's Mass *Da gaudiorum premia* (1431) and Fry's *Missa Flos regalis* (1468); see: F. Ll. HARRISON, *Music in Medieval Britain* (London 1958), p. 244–5, and R. C. WEGMAN, *New Data Concerning the Origins and Chronology of Brussels, Koninklijke Bibliotheek, Manuscript 5557*, in: *TVer 36* (1986), p. 10–11. I propose a tentative date of 1447–52 for the anonymous Mass *Quem malignus spiritus* (12). This Mass is based on the first responsory at Matins in a rhymed office of St. John of Bridlington (BENT, *Four Anonymous Masses*, *cit.*, p. xvi, 174 and 189–90). John of Bridlington was England's most recent saint. When he was canonized, in 1401, the pope had provided seven years and seven forty-day periods of remission for visits to his shrine in Bridlington on his feast day (10 October; see R. C. FINUCANE, *Miracles and Pilgrims. Popular Beliefs in Medieval England* [London 1977], p. 45). Throughout the year, however, the saint's relics were also visited by pilgrims who came to seek miraculous cures for their diseases. There is considerable evidence that King Henry VI developed a special devotion to St. John of Bridlington around 1447–8. When he confirmed the Charters of the Prior and Convent of Bridlington in 1447, he made it a personal oblation to the saint (B. WOLFFE, *Henry VI* [London 1981], plate 16b, facing p. 245). In the same year, a choir for the Lady Chapel in the Priory was created on the proceeds of certain exemptions from taxation granted by Henry VI (R. BOWERS, *Obligation, Agency, and 'Laissez-faire': The Promotion of Polyphonic Composition for the Church in Fifteenth-Century England*, in: *Music in Medieval & Early Modern Europe. Patronage, Sources and Texts*, ed. I. Fenlon [Cambridge 1981], p. 7). Henry probably visited Bridlington in 1448 on the saint's feast day, for the one occasion in his life when he is known to have been as close to Bridlington as Beverley (about 30 kilometers south-west of Bridlington) was on 9 October in that year (WOLFFE, *op. cit.*, p. 367). I suggest that the *Missa Quem malignus spiritus* was an *ex voto* for St. John of Bridlington on behalf of Henry VI. The text of the cantus firmus reads: "Quem malignus spiritus adeo tenebat obcessum quod *rabiem mentis* incurrebat. Fusa prece Domino ipsum expellebat" (my italics). Possibly King Henry suffered from temporary fits of mental illness before the onset of his madness in 1453. His devotion to the saint, and his possible pilgrimage to Bridlington, could then have been inspired by the hope that the saint might miraculously cure him, and grant him "*longue joie breve langour*", as the enigmatic rebus of the cantus firmus in CambriU I. i.5.18 reads (for a different interpretation of this rebus, see: R. STROHM, *Music in Late Medieval Bruges* [Oxford 1985], p. 126). The Mass *Quem malignus spiritus* was copied in TrentC 93 and TrentC 90 around 1451–2 (S. E. SAUNDERS, *The Dating of Trent 93 and Trent 90*, in: *I codici musicali trentini*, *cit.*, p. 68–75).

[23] WEGMAN, *An Anonymous Twin*, *cit.*, p. 28–30.

[24] *Ibid.*, p. 35–6, n. 32–5.

suggestion that the Mass by Benet [?] (10) is a "brother" of the Mass by Pullois [?] is consistent with the average note-values of these two cycles.[25] Conversely, the case for Dunstable's authorship of the anonymous five-part motet *Gaude flore virginali* (LonBL 54324), in which V(O) = 0.602, seems rather weak, considering the fact that none of the compositions safely attributed to Dunstable has average note-values in C smaller than 0.8.[26]

If the works of one composer are studied it may be possible to distinguish several different trends in the use of note-values, and roughly to date the groups of works adhering to these trends with the help of copying dates. Thus, it seems likely that the third of the three groups I have distinguished in the sacred works of Johannes Ockeghem roughly covers the 1470s.[27] But there is as yet no evidence to prove that average note-values became gradually smaller or larger as time progressed.

While many of the questions raised in the introduction to this essay must remain unanswered, the methods which have been formulated and tested here have led to promising results. These results suggest that English composers of the fifteenth century did conceive their works in fixed "*tempi giusti*," that these tempi probably changed gradually over the course of the years, that there existed established conventions for the horizontal tempo relationships between different mensurations, and that rhythmic movement functioned more or less as the late Medieval tempo mark. Needless to say, it would be of considerable importance if other repertories were also studied systematically in this way. Apart from the evident importance for questions of tempo, this could possibly shed new light on some of the many pressing questions about fifteenth-century music and performance practice to which we still have no definite answers.

## APPENDIX

Manuscript sigla have been taken from the *Census-Catalogue of Manuscript Sources of Polyphonic Music 1400–1550* = Renaissance Manuscript Studies I (Neuhausen-Stuttgart 1979).

Abbreviations:

| | |
|---|---|
| APFEL | E. Apfel, *Studien zur Satztechnik in der mittelalterlichen englischen Musik* (Heidelberg 1959). |
| BENT | M. Bent, ed., *Fifteenth-Century Liturgical Music* II, *Four Anonymous Masses* = Early English Church Music XXII (London 1979). |

[25] In Pullois's [?] Mass V(O) = 0.886 and V(C) = 1.438. In table 1, this cycle would go between Masses 11 and 12. In Benet's [?] Mass (10), V(O) = 0.903 and V(C) = 1.520. See: CURTIS, *Jean Pullois and the Cyclic Mass*, *cit.*, p. 46–8.
[26] See. M. and I. BENT, *Dufay, Dunstable, Plummer – A New Source*, in: JAMS 22 (1969), p. 399–403 and 415–24; M. BENT, Dunstaple (London 1981), p. 50.
[27] WEGMAN, An Anonymous Twin, cit., p. 29.

| | |
|---|---|
| *CMM* 1 | G. Dufay, *Opera Omnia*, ed. H. Besseler = *CMM* 1 (Rome 1951–66). |
| *CMM* 19 | W. Frye, *Collected Works*, ed. S. W. Kenney = *CMM* 19 (Rome 1960). |
| *CMM* 38 | R. Loyan, ed., *Canons in the Trent Codices* = *CMM* 38 (Rome 1967). |
| CURTIS | L. Power, *Mass Alma Redemptoris Mater*, ed. G. Curtis (Devon 1982). |
| *DPLSER* | *Documenta polyphoniae liturgicae Sanctae Ecclesiae Romanae*, ed. L. Feininger (Rome 1947–52). |
| *DTÖ* 22 | G. Adler and O. Koller, eds., *Sechs Trienter Codices. Zweite Auswahl* = *DTÖ* 22 (Vienna 1904). |
| *DTÖ* 38 | O. Koller *et al.*, eds., *Sieben Trienter Codices. Dritte Auswahl* = *DTÖ* 38 (Vienna 1912). |
| *DTÖ* 61 | R. Ficker, ed., *Sieben Trienter Codices. Fünfte Auswahl* = *DTÖ* 61 (Vienna 1924). |
| *DTÖ* 120 | R. Flotzinger, ed., *Trienter Codices. Siebente Auswahl* = *DTÖ* 120 (Graz-Vienna 1970). |
| KOVARIK | E. Kovarik, *A Newly-Discovered Dunstable Fragment*, in: *JAMS* 21 (1968), p. 21–33. |
| *MB* 8 | J. Dunstable, *Complete Works*, ed. M. Bukofzer = *MB* 8, 2nd revised edition by M. Bent, I. Bent and B. Trowell (London 1970). |
| *MB* 15 | K. Elliott and H. M. Shire, eds., *Music of Scotland 1500–1700* = *MB* 15 (London 1957). |
| *MPLSER* | *Monumenta polyphoniae liturgicae Sanctae Ecclesiae Romanae*, ed. L. Feininger (Rome 1947–65). |
| PLANCHART | A. Planchart, ed., *Missae Caput* (New Haven 1964). |
| *SnowMMC* | R. J. Snow, *The Mass-Motet Cycle: A Mid-Fifteenth-Century Experiment*, in: *Essays in Musicology in Honor of Dragan Plamenac*, edd. G. Reese and R. J. Snow (Pittsburgh 1969), p. 301–20. |
| *SnowP* | R. J. Snow, *The Manuscript Prague, Strahov Monastery D.G. IV.47* (Ph.D. diss., University of Illinois, 1968). |

1. Leonel Power: *Missa Alma redemptoris mater*

   Sources:
   AostaS D19, fols. 219v–226r;
   TrentC 87, fols. 3v–8v;
   TrentC 90, fols. 112v–114r [Gloria];
   TrentM 93, fols. 142v–144r [Gloria].

   Editions:
   *DPLSER*, Ser. 1A, No. 2 (Rome 1947); CURTIS.

2. John Dunstable: Gloria and Credo *Jesu Christe Fili Dei*

   Source:
   TrentC 92, fols. 159v–165r.

   Editions:
   *DPLSER*, Ser. 1, No. 8 (Rome 1950); *DTÖ* 61, 114–9; *MB* 8, 35–40.

3. John Dunstable: *Missa Rex seculorum*

   Sources:
   AostaS D19, fols. 39v–40r and 72v–74r [Gloria];
   CambriE 300, fol. 1r [part of Kyrie];
   MunBS Lat. 14274, fols. 121v–123r [Gloria];
   TrentC 90, fols. 110v–112r [Gloria], 274v–275v [Sanctus];
   TrentC 92, fols. 39r–40r [Gloria], 46v–49r [Credo and Sanctus], 94v–95r [Agnus Dei];
   TrentM 93, fols. 140v–142r [Gloria], 347v–348r [Sanctus].

Edition:
*MB* 8, 47–57 [all movements except Kyrie], 172–5 [Kyrie].

4. An.: *Missa Caput*

Sources:
CovC A.3, fol. 1r–v [part of Agnus Dei];
LonBL 54324, fol. 6r–v [part of Kyrie];
LucAS 238, fols. 17v–20v [parts of Kyrie, Gloria and Agnus Dei];
TrentC 88, fols. 31v–35r [Kyrie and Agnus Dei];
TrentC 89, fols. 246v–256r;
TrentC 90, fols. 96v–98r [Gloria], 168v–170r [Credo], 228v–230r [Sanctus];
TrentM 93, fols. 126v–128r [Gloria], 236v–238r [Credo], 297v–299r [Sanctus].

Editions:
*DTÖ* 38, 17–46; *MPLSER*, Ser. 1, Vol. 2, No. 1 (Rome 1951); *CMM* 1, Vol. 2 (Rome 1960), 75–101; PLANCHART, 1–52.

English authorship now generally accepted. See especially: TH. WALKER, *A Severed Head: Notes on a Lost English 'Caput' Mass*, in: *Abstracts of Papers Read at the Thirty-Fifth Annual Meeting of the American Musicological Society* (Saint Louis 1969), p. 14–5; A. E. PLANCHART, *Guillaume Dufay's Masses: Notes and Revisions*, in: *MQ* 58 (1972), p. 1–23; M. and I. BENT, *Dufay, Dunstable, Plummer – a New Source*, in: *JAMS* 22 (1969), p. 394–424; R. STROHM, *Quellenkritische Untersuchungen an der Missa "Caput"*, in: *Quellenstudien zur Musik der Renaissance* 2, *Datierung und Filiation von Musikhandschriften der Josquin-Zeit*, ed. L. Finscher (Wiesbaden 1983), p. 153–76.

5. John Dunstable: *Missa Da gaudiorum premia*

Sources:
AostaS D19, fols. 226v–230r [Credo and Sanctus];
CambriE 300, fol. 2v [part of Kyrie];
Cambri(Mass.)H 8948, fol. 2r [part of Gloria].

Editions:
*MB* 8, 169–72 [Kyrie], 212 [Gloria], 41–6 [Credo and Sanctus]; KOVARIK, 24–6 [Gloria].

6. An.: Gloria and Credo *Pax vobis ego sum*

Source:
TrentC 88, fols. 109v–113r.

Edition:
*MPLSER*, Ser. 1, Vol. 2, No. 6 (Rome 1952).

English authorship assumed by C. HAMM, *A Catalogue of Anonymous English Music in Fifteenth-Century Continental Manuscripts*, in: *Mus. Disc.* 22 (1968), p. 70.

7. An.: *Missa Veterem hominem*

Sources:
PragP 47, fols. 140r–147r [all movements except Kyrie];
TrentC 88, fols. 264v–266r [Kyrie], 1v–9v [other movements];
Thomas Morley, *A Plaine and Easie Introduction to Practicall Musicke* (London 1597), p. *v–*2.

Editions:
*MPLSER*, Ser. 1, Vol. 2, No. 2 (Rome 1951); BENT, 110–63.

English characteristics noticed by E. SPARKS, *Cantus Firmus in Mass and Motet 1420–1520* (Berkeley-Los Angeles 1963), p. 452, n. 29. English authorship assumed by HAMM, *A Catalogue, cit.*, p. 72.

8. An.: *Missa Christus surrexit*

   Source:
   TrentC 89, fols. 342v–349r [Gloria, Credo and Sanctus].

   Edition:
   *MPLSER*, Ser. 1, Vol. 2, No. 3 (Rome 1951).

   English authorship assumed by HAMM, *A Catalogue, cit.*, p. 72.

9. An.: *Missa Salve sancta parens*

   Sources:
   TauntS 29, fol. 2v [part of Kyrie];
   TrentC 90, fols. 98v–100r [Gloria], 170v–172r [Credo], 230v–234r [Sanctus and Agnus Dei];
   TrentM 93, fols. 128v–130r [Gloria], 238v–240r [Credo], 299v–303r [Sanctus and Agnus Dei].

   Edition:
   BENT, 78–109.

   English authorship assumed by HAMM, *A Catalogue, cit.*, p. 71. Preserved in an English source (see: R. BOWERS and A. WATHEY, compilers, *New Sources of English Fourteenth- and Fifteenth-Century Polyphony*, in: *Early Music History* 3 [1983], p. 156–73).

10. John Benet [?]: *Missa [Sine nomine]*

    Sources:
    AostaS D19, fols. 208v–210r [Gloria], 194v–195r [Sanctus], 207r–208r [Agnus Dei];
    CambraiBM 11, fols. 20v–22r [Gloria];
    CambriE 300, fols. 1v–2r [parts of Kyrie];
    TrentC 87, fols. 37v–39r [Credo], 103v–104v [Sanctus], 106r–107r [Agnus Dei];
    TrentC 90, fols. 118v–120r [Gloria], 193v–195v [Credo], 254v–257v [Sanctus and Agnus Dei];
    TrentC 92, fol. 98r [part of Agnus Dei];
    TrentM 93, fols. 148v–150r [Gloria], 263v–265r [Credo], 326v–329v [Sanctus and Agnus Dei].

    Editions:
    *DTÖ* 61, 108–10 [Gloria], 121–6 [Credo, Sanctus and Agnus Dei]; *MB* 8, 138–45 [all movements except Kyrie], 176–9 [Kyrie].

11. An.: *Missa Meditatio cordis*

    Sources:
    PragP 47, fols. 85v–92r [all movements except Kyrie];
    TrentC 88, fols. 284v–286r [*Gaude Maria*, which constitutes Mass-motet cycle with the Ordinary movements].

    Edition:
    *SnowP*, 277–315.

    English authorship assumed by HAMM, *A Catalogue, cit.*, p. 72.

12. An.: *Missa Quem malignus spiritus*

    Sources:
    CambriU I.i.5.18, fols. 219v–228r;
    LucAS 238, fol. 24 *bis* r–v [part of Gloria];
    TrentC 90, fols. 100v–103r [Gloria], 172v–175r [Credo], 234v–239r [Sanctus and Agnus Dei];

TrentM 93, fols. 130v–133r [Gloria], 240v–243r [Credo], 303v–308r [Sanctus and Agnus Dei].

Edition:
BENT, 35–77.

English authorship assumed by HAMM, *A Catalogue, cit.*, p. 71. Preserved in an English source.

13. John Bedyngham: *Missa [Sine nomine]*

Sources:
OxfB C87*, fol. 223v [Sanctus];
TrentC 88, fols. 46v–54r;
TrentM 93, fols. 30v–36r [all movements except Kyrie and Agnus Dei].

Edition:
APFEL, vol. 2, 139–42 [Sanctus].

14. An.: *Missa [Sine nomine]*

Source:
TrentC 89, fols. 107v–116r.

No edition.

English authorship assumed by HAMM, *A Catalogue, cit.*, p. 73.

15. John Bedyngham: Sanctus and Agnus Dei *[Sine nomine]*

Source:
TrentC 90, fols. 389v–395r.

No edition.
See: R. C. WEGMAN, *An Anonymous Twin of Johannes Ockeghem's 'Missa Quinti toni' in San Pietro B 80*, in: *TVer* 37 (1987), p. 34–5.

16. John Bedyngham: *Missa Dueil angoisseux*

Sources:
TrentC 88, fols. 17v–21r [Sanctus and Agnus Dei], 27v–31r [Gloria, Credo and Benedicamus Domino (= Cum sancto)];
TrentC 90, fols. 383v–389v [Gloria and Credo].

Edition:
*DTÖ* 61, 127–35.

17. Walter Frye: *Missa Nobilis et pulchra*

Source:
BrusBR 5557, fols. 38v–48r.

Edition:
*CMM* 19, 40–61.

18. An.: *Missa Fuit homo missus*

Sources:
TrentC 88, fols. 35v–38v [Kyrie and Agnus Dei];
TrentC 90, fols. 103v–105r [Gloria], 175v–177r [Credo], 239v–241r [Sanctus];
TrentM 93, fols. 133v–135r [Gloria], 243v–245r [Credo], 308v–310r [Sanctus].

Editions:
*MPLSER*, Ser. 1, No. 9 (Rome 1950); BENT, 1–34.

English authorship assumed by HAMM, *A Catalogue, cit.*, p. 71.

19. Walter Frye: *Missa Flos regalis*

Source:
BrusBR 5557, fols. 30v–38r.

Edition:
*CMM* 19, 62–83.

20. An.: *Missa De Sancto Andrea [?]*

Sources:
LucAS 238, fol. 30*bis* r–v [parts of Credo and Sanctus];
VatS 14, fols. 65v–75r.

Edition:
*MPLSER*, Ser. 1, Vol. 2, No. 5 (Rome 1952).

English figures; simultaneous rests in duos; bipartite Kyrie; cantus firmus layout identical to that of Masses *Caput* [4] and *Veterem hominem* [7]. Preserved in an English section in LucAS 238.

21. An.: *Missa [Sine nomine]*

Source:
EdinNL 5.1.15, fols. 16v–26r.

Edition:
*MB* 15, 9–29.

22. An.: *Missa [Sine nomine]*

Source:
EdinNL 5.1.15, fols. 42v–51r.

No edition.

23. An.: *Missa Veni creator Spiritus*

Source:
PragP 47, fols. 132r–138r.

Edition:
*SnowP*, 385–405.

English authorship assumed by WEGMAN, *An Anonymous Twin, cit.*, p. 26.

24. Standley: *Missa "Ad fugam reservatam"*

Sources:
TrentC 88, fols. 314v–322v;
TrentC 89, fols. 120v–121r [*Que est ista*, which constitutes Mass-motet cycle with the Ordinary movements].

Editions:
*DPLSER*, Ser. 1, No. 6 (Rome 1949) [Mass] and Ser. 4, No. 1 (Rome 1950) [motet]; *CMM* 38, 40–60.

25. Richard Cox: *Missa [Sine nomine]*

Source:
BrusBR 5557, fols. 20v–30r.

No edition.

26. An.: *Missa [Sine nomine]*

Sources:
TrentC 88, fols. 253v–260r [only Credo and Sanctus complete];

TrentC 90, fols. 430v–432r [Gloria only];
VatSP B80, fols. 61v–70v;
VerBC 759, fols. 20v–25r.

No edition.

English figures; simultaneous rests in duos. English authorship assumed by R. STROHM, *Music in Late Medieval Bruges* (Oxford 1985), p. 141.

27. An.: *Missa [Sine nomine]*

Source:
TrentC 88, fols. 295v–304r.

No edition.

English authorship assumed by HAMM, *A Catalogue, cit.*, p. 72.

28. An.: *Missa [Sine nomine]*

Source:
BrusBR 5557, fols. 90v–99r.

No edition.

Written in three-part English discant texture. English figures; simultaneous rests in duos. Closely related to Walter Frye's *Sospitati dedit.*

29. Standley: *Missa [Sine nomine]*

Source:
PragP 47, fols. 53r–v [Kyrie], 164r–165r [Gloria], 167v–171r [Credo, Sanctus and Agnus Dei].

Edition:
*SnowP*, 252–76.

30. An.: *Missa Rex dabit mercedem*

Source:
VerBC 755, fols. 54v–63r.

No edition.

English authorship assumed by HAMM, *A Catalogue, cit.*, p. 73.

31. An.: *Missa O rosa bella III*

Sources:
ModE M.I.13, fols. 104v–117r;
PragP 47, fols. 152v–161r;
TrentC 89, fols. 330v–339r.

Edition:
*DTÖ* 22, 28–69.

Possibly English. English figures; simultaneous rests in duos; typical mensural usage; *prosula* text in Kyrie (though not a characteristically English one).

32. John Plummer: *Missa [Sine nomine]*

Sources:
ArunC M543, fols. Ar–Br [parts of Sanctus and Agnus Dei];
BrusBR 5557, fols. 10v–20r.

No edition.

33. Walter Frye: *Missa Summe trinitati*

Sources:
BrusBR 5557, fols. 2v–10r;
TrentC 88, fols. 70v–71r [*Salve virgo*, which constitutes Mass-motet cycle with the Ordinary movements].

Edition:
*CMM* 19, 21–39.

34. An.: *Missa O rosa bella I*

Sources:
LucAS 238, fols. 24*ter* r–v [part of Gloria];
MilD 1, fols. 123v–124r [*O admirabile commercium* (= *O pater eterne*), which constitutes Mass-motet cycle with Ordinary movements];
PragP 47, fols. 160v–161r [*O pater eterne* (= *O admirabile commercium*), which constitutes Mass-motet cycle with Ordinary movements];
TrentC 88, fols. 363v–372r.

Editions:
*DTÖ* 22, 1–12 [Mass]; *SnowMMC*, 315–20 [motet].

English traits noticed by STROHM (*Music in Late Medieval Bruges*, p. 125), while attributing the Mass to Gilles Joye. Preserved in an English section in LucAS 238. English authorship assumed by WEGMAN, *An Anonymous Twin, cit.*, p. 35–6. Motet *O admirabile commercium/O pater eterne* belongs to this Mass, not to *Missa O rosa bella III* [31] (*ibid.*, p. 36). This Mass-motet cycle is a twin of the Mass-motet cycle on *So ys emprentid* [35]. Probably not by the same composer as *Missa O rosa bella II*, as claimed by STROHM (*Music in Late Medieval Bruges*, p. 125).

35. W. de Rouge [?]: *Missa Soyez aprantiz*

Sources:
TrentC 88, fols. 11v–13r [*Stella celi extirpavit*, which constitutes Mass-motet cycle with Ordinary movements];
TrentC 90, fols. 310v–318r;
VatSP B80, fols. 71r–80r.

Edition:
*DTÖ* 120, 47–61 and 95–108.

English authorship assumed, and attribution to Rouge questioned, by WEGMAN, *An Anonymous Twin, cit.*, p. 35–6. This Mass-motet cycle is a twin of the Mass-motet cycle on *O rosa bella* [34].