

[*Music & Letters*, 76 (1995), 1-18]

MUSIC AND THE QUADRIVIUM IN EARLY TUDOR ENGLAND

ROGER BRAY

[Author's Note 2017: I have taken the opportunity of uploading this to *Academia* to bring one or two footnotes up to date and to provide a cross-reference giving fuller detail explaining one of my assertions. My work in the mid-1990s consisted of several related streams (the quadrivium, numbers and proportion; and thereby Greek and Medieval music theory; the Tudor Mass and thereby the quadrivium; and finally Music, Number and Proportion in general, with music manuscript source studies always hovering in the background). The supporting research for this work would have been too detailed to publish on its own, and so the results of this research surfaced in articles such as this and in the editorial comments in my *Early English Church Music* volumes (43, 53 and 58). but the backwork may be useful for students of these areas, if only because it lays out some of the materials and issues, and a site such as *Academia* is ideal in allowing others to comment, add, criticise etc in a relatively informal way, which is why I am gradually transferring it to *Academia*. Now on to the article. PTO, or at least Please Scroll Down.]

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ROGER BRAY

We musicians proudly assert the venerability of our subject by pointing to its inclusion within the medieval Quadrivium, the four mathematical subjects which together with the three expressive subjects made up the seven liberal arts and provided the basis of the medieval (and later) educational system.¹ There is, however, considerable uncertainty about what this meant to musicians at the time and about the extent to which there was any link between quadrivial music, as we may call it, and music composed and performed, especially since Boethius's definitions of music and musicians are so far removed from our own. Indeed, Boethius has received a broadly unfavourable reception from modern musicologists, at least one of whom would extend this coolness also to 'most of the medieval treatises' authors [who] pay their respects to Boethius in an introductory chapter or two and then turn, with evident relief, to more pressing topics'.² It has been suggested that 'the ranging of music among the sciences hampered its development as an art', while 'real progress in music ... came from the practical singing schools that preserved and developed the music of the Church'.³ Was scholasticism still 'firmly entrenched at Oxford', or was Boethius 'largely a dead letter by the sixteenth century'?⁴ Was Boethius' point of view 'never that of a real musician' which 'could well have put a

¹ The four subjects of the *Quadrivium* were arithmetic, geometry, astronomy and music; the three subjects of the *Trivium* were grammar, rhetoric and dialectic. The Latin terms designated respectively the four paths and three paths (to knowledge), and the derived English terms (quadrivial and trivial) describe the relative importance of the studies; see below, p. 6.

² Donald J. Grout, *A History of Western Music*, 4th edn. rev. Claude V. Palisca, New York, 1988, p. 75.

³ In Paul Henry Lang, *Music in Western Civilization*, New York, 1941, p. 59, and Richard Hoppin, *Medieval Music*, New York, 1978, pp. 21-22, respectively.

⁴ *The New Oxford History of Music*, iv: *The Age of Humanism, 1540-1630*, ed. Gerald Abraham, London, 1968, p. xxi; John Caldwell, *The Oxford History of English Music, i: From the Beginnings to c. 1715*, Oxford, 1991, p. 499.

stop to all musical development'?⁵ Was *musica practica* 'opposed' to speculative music, while 'fortunately, humble performers and composers continued to evolve new types and styles of music, leaving the critics to catch up as best they could'?⁶

If Boethius was such an unconstructive influence, it is surprising that his work remained so firmly at the centre of the quadrivial approach to education as a whole (and not merely Music). And if speculative music was totally separated from, and opposed to, composed music, we would not expect composers to have taken such pains to qualify themselves in it. But this is what they did, at least in England, where the link between speculative and practical music (the latter meaning composition, not performance) is much clearer than in other countries because it is here that we find the most thoroughly developed triangular connection between music, education and the Church. This connection hinged on the typically English institutionalization of composers and their music, whereby composers were recognized by the universities on the evidence of sacred musical works. The compositional theory arising from *musica speculativa* pervaded the musical profession so completely that it was espoused even by composers not seeking degrees, was assimilated into compositional technique, and was practised not only in every single surviving Tudor Mass but also in many later sixteenth-century works. Its influence is particularly clear in a group of obscurely-notated Masses, notably the anonymous *O quam suavis* and Fayrfax's *O quam glorifica* which I examine below.

Important documentary evidence is found in John Tucke's notebook (London, British Library, Add. MS 10336), which apparently records the notes he made as a student and lecturer at Oxford between 1504 and 1515.⁷ Although Tucke is not known as a composer, his notes describe various features of the composer's technique as it was taught at Oxford as part of the Quadrivium, notably notational practice in the lists of colours and proportions, and rhetorical practice in the lists of rhetorical devices. For example, in a series of six lists or illustrations (which are, however, not entirely consistent within themselves) Tucke describes notational devices using seven different colours, which appear (in the order indicated, where relevant) as given in Table I. Lists B and C, for example, read (f. 98):

⁵ Lang, *Music in Western Civilization*, p. 59; Hoppin, *Medieval Music*, p. 22.

⁶ John Caldwell, 'Music in the Faculty of Arts', in James McConica. *The History of the University of Oxford*, iii: *The Collegiate University*, Oxford, 1986, pp. 201-12, at p. 203.

⁷ See Ronald Woodley, *John Tucke: a Case Study in Early Tudor Music Theory*, Oxford, 1993, which also gives much detail of Tucke's life and career.

List B: 'colors requesyt to musical proporsyons bye **p** thes: blake, grene, blew, rede, yellow'

List C: Colores in ordine sunt isti ['the colours in order are these']; blake, grene, yelwe, blewe, rede, sangwyn, purpull.

TABLE 1

	Lists					
	A	B	C	D	E	F
silver					1	
black	✓	1	1	✓	2	1
gold or yellow	✓	5	3		3	2
blue	✓	3	4	✓	4	3
red	✓	4	5	✓	5	4
green	✓	2	2		6	5
sanguine (=dark red?)			6			
purple			7			

Note :Lists A-E are derived from London, British Library, Add. MS 10336, ff. 97'(A), 98(B,C), 100(D), 20'(E). List F (f.21') ostensibly illustrates list E.

I do not intend to devote much space to a discussion of these colours given Ronald Woodley's detailed transcription, translation and discussion of this manuscript. However, a few points need to be made about these lists. Silver appears only in list E (which deals with 'heraldic' colours, whatever role they had– though the mention of the word 'heraldic' alerts us to the heightened formal territory into which some manuscripts had evidently moved), and sanguine and purple are included only in list C. Furthermore, neither sanguine nor purple appears in the illustrative chart (list F), nor indeed does silver, even though the chart purports to illustrate list E in which silver has just appeared. The only clue to the 'heraldic' list (E) is that longs of each colour involve the regular addition/ subtraction of one breve depending on which way one works through the list.⁸ Until we know more, we must leave on one side silver, sanguine and purple in normal use. The correct order of the others matters only when one has to choose a third colour to show a cross-mensuration in a Tenor, for black and red are the first two colours in the surviving manuscripts, whatever Tucke says about their position in the pecking order. But it is important to note that Tucke is thinking principally of long notes (especially *longae* rather than *breves*) and therefore of the composition of cantus firmi rather than of other parts. There are several places

⁸ This calls to mind a passage from the Mass *O quam suavis* where breves (not longs) adding up to 9 (consisting of semibreves worth 8 + 1, 7 + 2 ... 1 + 8) are used, which is not quite the same as Tucke's description but is apparently similar in intent.

where this is implied,⁹ of which the following (list A) deals in longs and illustrates how colours can indicate proportions:

'Rede to blacke ys sequealtra [sic]. The blake long contenyth as much as $\square$ e rede and halfe as much more ... Yelow to blake ys superseptipartiens nonas or 16 ad 9 ... Blew to blake ys sesquetercia, sicut 4 ad 3. Grene to blake ys sesqueoctaua ... Fild red to fild blake, and voyd red to voyd blake ys alway sesquealtra ... voyd blake to fild blake, or voyd red to fild rede ys alway dupla ... voyd rede to fild blake ys tripla ... voyd blake to voyd (sc. 'filled') rede ys sesquetercia.'

From the same date as the beginning of Tucke's notebook (1504) comes an enigmatic poem, 'A Treatise bitwene Trouth and Enformacion', purportedly by the composer William Cornysh the younger.¹⁰ Its exact meaning is unclear because on one level it appears to be a plea to Henry VIII to have Cornysh released from the Fleet prison, where he had been sent unjustly. This plea is expressed in the form of a debate or contest between Truth and Information (Truth representing Cornysh, and Information an accuser), and the debate takes the conceit of a disputation on techniques of musical performance, in which (as in Tucke's notebook) certain forms of notation are described - together with the qualities of some musical instruments - before the main contest in which Cornysh and his opponent are represented as giving opposed interpretative opinions of performance and perhaps of compositional practice. Cornysh says:

'In musike I have lernyd iiii colours as this
blak ful blaake wide (i.e., void), and in likewyse reede
By thes colours many subtill alteracions ther is
that will begile one thow in cunnyng he be wele spedde.'

His comments on coloured notation tally with Tucke's at least as far as black and red are concerned, and his mention of void as well as full notes describes a more workaday copying tradition in which black void and red void are a simpler and more practical method of showing what in a more formal manuscript would be shown by other colours (for example, Tucke gives three ways of showing sesquitercia: blue to black, and void black to void (recte filled) red, as we have

⁹ See particularly ff. 19, 21', 23. 27', 28, 30, 31, 94', 97', 105'.

¹⁰ London, British Library, RM 18.d.2, f. 163, also published in *Pithy Pleasaunt and profitable works of maister Skelton, Poete Laureate*, London, 1568. See Nan Cooke Carpenter, 'Skelton's Hand in William Cornysh's Musical Parable', *Comparative Literature*, xxii (1, 1970), 157-72. The same manuscript contains the so-called Leconfield Proverbs (f. 198), including some reference to colours in musical notation.

seen, and later (f. 98), yellow to blue). Also, the opponent's presumptuousness is explained in academic terms ('Informacion wil teche a doctor his game'), as is Cornysh's search for support:

'I called Masters of Musike cunyng and discrete
And the first prynciple whose name was Tuballe
Guido[,] Boice, John de Murris, Vitryaco and them al' ...

Despite their problematic natures, Tucke's notebook and the Cornysh/Skelton poem are nevertheless the only substantial texts which come close to describing any feature of musical activity during the early part of the century, and it is noticeable that both refer to colours in notation. But just as Tucke's notebook describes quadrivial music from the academic viewpoint, Fayrfax's Mass *O quam glorifica* illustrates a composer's response, for this was his Oxford doctoral exercise, and, as we shall see, it was written to illustrate the academic precepts. It is highly likely that the anonymous Mass *O quam suavis*, too, was written as a degree exercise. The latter survives in its presentation version,¹¹ with a cryptically encoded Tenor, but the former does not. So it becomes a question of examining Fayrfax's Mass to see if there is any evidence of particularly academic features: these might, bearing in mind *O quam suavis*, include its originally having been written in a format different from that in which it survives today.

First, however, we must establish the context in which both the notebook and the Masses were written. In England at the beginning of the sixteenth century, the only route to a reasonably paid and respected musical career was through church music. The universities of Oxford and Cambridge were unique in their musical provision among European universities in their combining generous choral provision (in their college choirs) with the offering of degrees in

¹¹ Cambridge University Library, MS Nn.6.46, which also contains an even more cryptically notated antiphon, 'Ave regina caelorum' (the work to which the puzzle-ascription 'hoc fecit matres [or some such word] maris: is actually attached). As a humble contribution to the debate on the identity of this composer, I would like to suggest reinstatement of the name of John Lloyd, first suggested by Thurston Dart ('Cambrian Eupompus'. *The Listener*, No. 1359 (17 March 1955): 497). It is true that the cryptic inscription does not appear to read 'iohannes maris' as Dart thought, but 'matres' is an anagram of 'master', leaving only the 'maris' to be understood. and this can still mean 'sea' (= flood, Flud, Lloyd). If it is the work of Lloyd, we have Hawkins's statement that he was a Cambridge graduate (*A General History of the Science and Practice of Music*, London, 1776, ii. 522), together with the ascription to a puzzle canon in London, British Library, Add. MS 31922, f. 27 ('Flude in armonia graduat'). The fact that Lloyd is never called 'Doctor' supports the hypothesis that it was a Mus.B. exercise (hence 'master').

Music, even if the college choirs were independent of the university. Some European universities (such as Wittenberg and Leipzig) may have had a university choir, although at Leipzig it seems that this was the municipal choir lightly disguised. Others used the neighbouring cathedral choir or its singers paid casually; Paris, for example, came near to the fifteenth-century English collegiate system but favoured its links with Notre Dame, thus adhering to the fourteenth-century English model as exemplified by The King's Hall Cambridge, which did not have its own chapel until 1488.¹² Although some of the colleges at Paris employed an organist, it does not seem that they maintained a choir on the same scale as Magdalen or New College, Oxford, or King's College, Cambridge, or even the more modestly endowed Queen's or All Souls, Oxford. On the academic side, some Italian universities (such as Padua) included Music as part of their quadrivial studies, and Bologna even had a short-lived Chair in the fifteenth century, but although no university anywhere offered degrees in Music on a systematic basis, Oxford and Cambridge were unique in devising a method whereby degrees could be awarded on the basis of composing ability.¹³

As is well known, Boethius, whose *De institutione musica* (*Concerning the Fundamentals of Music*) provided the basis of the study of music within the Quadrivium, defines three kinds of music, *musica mundana* (cosmic music), *musica humana* (human music) and *musica instrumentalis* (heard, composed music). He specifically links *musica mundana* to Plato and *musica humana* to Pythagoras, quoting Plato's conclusion (in the *Timaeus*) that 'the soul of the universe was joined together according to musical concords'.¹⁴ He also defines three classes of musician:

'There are three classes of those who are engaged in the musical art. Those of the class which is dependent on instruments and who spend their entire effort there ...are excluded from comprehension of musical knowledge, since ... they act as slaves. None of them makes use of reason; rather, they are totally lacking in thought. The second class (consists) of those who compose songs ... a class led to song not so much by thought and reason as by a certain natural instinct ... This class, too, is separated from music.

¹² A. R. Cobban, *The King's Hall within the University of Cambridge in the Later Middle Ages*, Cambridge. 1969, p. 183', Nan Cooke Carpenter, *Music in the Medieval and Renaissance Universities*, Norman. Oklahoma, 1958 (repr. New York, 1972), 141 ff., 252 ff.. 261 f.f

¹³ Claude V. Palisca, *Humanism an Italian Renaissance Musical Thought*, New Haven & London, 1985, p. 8; Carpenter, *Music in the Medieval and Renatisance Unwersities*, pp. 32-34.

¹⁴ Boethius, *De institutione musica*, Lib. I, cap. xxxiv, trans. Calvin M. Bower as *Fundamentals of Music*, New Haven & London, 1989, pp. 6-7.

The third class is that which acquires an ability for judging, so that it can carefully weigh rhythms and melodies and the composition as a whole. This class, since it is totally grounded in reason and thought, will rightly be esteemed as musical ... That person is a musician (*musicus*) who exhibits the faculty of forming judgments according to speculation or reason relative and appropriate to music.¹⁵

Elsewhere he explains what he means by this faculty of forming judgements, commenting that the *musicus* cannot 'find pleasure in melodies without also coming to know how they are structured internally by means of sound ratios'¹⁶ His reference to speculation establishes the difference between the two apparently incompatible types of music, *musica speculativa* and *musica practica*. Although he implies that the *musicus*, judging by speculation, is entirely distinct from those who simply compose, the English medieval university masters tried to clarify the relationship by defining the path from composer to *musicus* and by providing a route along this path. The procedure reconciled speculative music and practical music by requiring the candidate to compose a piece of actual music to show his academic ability. It was only in England that the awarding of degrees provided an opportunity for the reconciliation of Boethius' supposedly incompatible three kinds of musician - performer, composer and academic - and of *musica speculativa* and *musica practica*.

It is quite possible that the pattern which evolved by c. 1507 for the awarding of degrees in Music happened by accident. The first degrees were awarded by Cambridge in the 1450s or '60s: the first two recorded recipients were Thomas Saintjust (or Saintwix) in 1461-2, and Henry Abyngdon in 1463-4.¹⁷ Saintwix, who received a Mus.D., was to be Edward IV's appointee in 1463 as Master of The King's Hall.¹⁸ a major administrative post in a college much favoured at the time as a training ground for public servants and one with particular royal connections (then as now; it was refounded, amalgamated with neighbouring colleges, in 1546 by Henry VIII as Trinity College). Abyngdon (Mus.B.) was Master of the Children of the Chapel Royal, whence pupils were sent to The King's Hall from the age of fourteen. He at least was a musician, although apparently only a clerk and not a composer, but Saintwix is not known as a musician at all, and so it may be that the university, which had welcomed benefactions from the Lancastrian Henry VI (founder of King's College), was trying to ingratiate itself with the Yorkist Edward IV by honouring two of his

¹⁵ Ibid., p. 51.

¹⁶ Ibid., p. 8; see particularly Bower's note 34, as a result of which I have slightly changed his translation to take his suggested broader sense of 'vox'.

¹⁷ See Carpenter, *Music in the Medieval and Renaissance Universities*, p. 197, for evidence that, at Cambridge, Music had its own faculty.

¹⁸ Cobban, *The King's Hall*, p. 286.

servants in a way that had been indicated as suitable. However, since medieval Cambridge was at pains to assert its independence from Pope, Church and State, the authorities would hardly have wanted this to become a regular occurrence, and so we next find a system beginning to be established whereby the award was made on the strength of previous study and practice, together with payment of a fee.¹⁹ The earliest indications of this are on the next occasion when Cambridge awarded the Bachelor's degree, in 1470-71, when one Lessy, a member of the Duchess of York's private chapel (Cicely, Duchess of York was Edward IV's mother), was awarded it, declaring that he had studied both *musica speculativa* and *musica practica*²⁰. In the same year, one John Baudwyn was given similar approval.²¹ These records do not mention the length of study, but by 1496 Humphrey Frevill's does (two years' study at Cambridge and five years' practice elsewhere).²²

Thus the pattern begins to take shape: we see *musica speculativa* joined with *musica practica* - by some study, and perhaps study at Cambridge and practice elsewhere - but there is as yet no indication of how they were to be related. The first clear sign of anything more is at Oxford, for a Bachelor's degree in 1506-7, when Richard Ede was approved to lecture on any of the books of Boethius because he had spent ten years in the study of music, on condition that he compose a Mass and an

¹⁹ The following discussion is heavily indebted to Carpenter, *Music in the Medieval and Renaissance Universities*, pp. 159 ff. (Oxford) and 200 ff. (Cambridge).

²⁰ Ibid., p. 201: 'ut cum studio et speculatione in musica et cum practica eiusdem possit intrare in musica' ('that by study and speculation in music together with practice in the same he can be admitted as Bachelor of Music'). This is presumably Richard Lessy, who had previously been at Lincoln Cathedral (1445-8) and Eton College (1457-61). I am grateful to Roger Bowers for supplying biographical information concerning Lessy, Frevill (see n. 22, below) and Newton (see n. 32, below).

²¹ Loc. cit.: 'ut cum forma habita possit intrare in musica ut supra' ('that by the usual procedure he can be admitted as Bachelor of Music'). The use of the word 'habita' by 1470 is interesting.

²² Loc. cit.: 'ut studium duorum anorum in musica in ista universitate cum practica quinque annorum in eadem in patria sufficiat sibi ad intrandum in eadem' ('that two years' study in music in this university together with five years' practice of music in the country may be sufficient for him to be admitted as Bachelor of Music'). Frevill was a lay clerk at King's College from 1495 to 1499 and therefore in a position to combine practice and performance and spend two years in Cambridge.

antiphon to be sung on the day of the award of the degree.²³ Although the degree of B.Mus. is not actually mentioned, this has always been assumed to be the degree for which he was supplicating; he was already a BA ('Dominus'), and the nature of the requirement being placed upon him would have been most unusual for an MA. This requirement is known to have been extended to the doctorate by 1515-16, when, according to Anthony Wood (writing at the end of the following century and having access to records since lost), 'Robert Perrot Bach. of Musick, and about this time Organist of Magd. College, supplicated that he might be licensed to proceed in the said Faculty... His request was granted conditionally that he compose a Mass and one Song, before he really proceed.'²⁴ However, there is clear evidence that the requirement was in place four years earlier, by 1511, when Fayrfax, although incorporating from Cambridge, had a similar requirement (perhaps only a Mass) placed on him. At the head of the copy of his Mass *O quam glorifica* in the

²³ Ibid., p. 160: 'Eodem die [16 February 1506/7] supplicat Dominus Ricardus Ede, canonicus regularis et scholaris musice, quatenus studium 10 annorum extra universitatem in musica sibi sufficiat ut admittetur ad lecturam alicuius libri musices Boecii, non obstante quocunque statuto in oppositum. Hic est concessa, conditionata quod componat missam unam cum antiphona ante diem admissionis que eodem die admissionis sue solenniter cantetur' ('On the same day Master Richard Ede, regular canon and scholar of music, supplicates on the grounds that ten years' study of music outside the university might be sufficient to be admitted to lecture on any of the books of Boethius, notwithstanding any statute to the contrary. This is allowed on condition that he compose a Mass and an antiphon before the day of admission and that on the said day of his admission it be solemnly sung'). The formula is found again for the composer Hugh Aston, with the additional stipulation that the proctors are to retain the exercise; see *Hugh Aston, John Marbeck & Osbert Parsley*, ed. Percy C. Buck et al. (*Tudor Church Music*, x), London, 1929, p. ix: 'Vicesima die eiusdem [20 November 1510] sup. Hugo Haston scholaris facultatis musicae quatenus studium et praxis 8 annorum in eadem facultate sufficiant ut admittatur ad lecturam libri boecii sic quod componat unam missam et antiphonam cantandas in die admissionis suae. Haec est concessa sic quod missa et antiphona remaneant in manibus procuratorum' ('On the 20th day of the same (November 1510) Hugo Haston, scholar of the Faculty of Music supplicates that on the grounds of eight years' study and practice in that faculty he might be admitted to lecture on the books of Boethius on the condition that he compose a Mass and antiphon to be sung on the day of his admission. This is allowed on condition that the Mass and antiphon remain in the hands of the proctors').

²⁴ *Fasti Oxonienses*, i. 656, given in Carpenter, *Music in the Medieval and Renaissance Universities*, p. 162.

Lambeth Choirbook it is stated that the work is 'his forme in proceadinge to bee doctor'²⁵ This cannot be for his Cambridge doctorate (1501-2), for he was excused the normal requirement because 'his erudition can stand in place of the form to incept in Music'²⁶ and in any case we have just seen that at that time in Cambridge all that was required was simply a period of study). Nor can there be any confusion with his Bachelor's degree, which he had been awarded in the previous year on the strength of ten years' study in *musica speculativa et practica*.²⁷ So the Mass must have been written for his incorporation at Oxford in 1511, for which the contemporary record does not survive but which is listed by Wood, who again is so specific (as he was with Perrot) that he must have had access to contemporary documentation.²⁸ The composition requirement had spread to Cambridge by 1515-16, when John Watkins and John Firtun were both approved on the 'Oxford' conditions, a completed period of study (seven and eight years respectively) and the composition of a Mass and an antiphon.²⁹ Since by then Oxford had placed this requirement on Fayrfax, a Cambridge doctor no less, apparently not accepting the word of their Cambridge colleagues, we must conclude not only that the idea was Oxford's but also that Cambridge was stung into action.

Lest it be thought that the incorporation of composition within the requirements for the award of Music degrees was unusual, it should

²⁵ Lambeth Palace, MS I, p. 17. Although this ascription is in a less formal hand than the main text, I believe that it is at the very least contemporary, and quite possibly written by the original scribe.

²⁶ Carpenter, *op. cit.*, 202: 'Item: conceditur magistro ffayerfax erudito in musica quod post gradum baccalariatus sua eruditio potest stare pro forma ad incipiendum in musica.' ('It is allowed to Master Fayerfax, erudite in music, that beyond the level of bachelor his erudition can stand in place of the procedure to become Doctor of Music.').

²⁷ Loc.cit. 'Item habet Robertus fayrfax ut studium in musica speculatiua simul et in practica decem annos sufficiat ad intrandum in eadem' ('Robert Fayrfax proposes that ten years' study of speculative and practical music be sufficient to be admitted as Bachelor in that subject').

²⁸ *Fasti Oxontenses*, s.v. '1511, Incorporations': '1511. June 26, ROB.FAIRFAX doctor of music of Cambridge'.

²⁹ Carpenter, *Music in the Medieval and Renaissance Universities*, p. 203: 'sic quod missam et antiphonam pro forma componat' (Watkins): 'on condition that he compose a Mass and antiphon for the requirement'; 'sic quod faciat missam et antiphonam de sancta Maria' (Firtun): 'on condition that he make a Mass and antiphon of Holy Mary'), Firtun is stated to have been a member of St Stephen's Chapel, Westminster.

be made clear that it was as normal a specification as the university authorities could manage. Their model was the Bachelor of Arts degree, for which the minimum qualifying period of study at Oxford was three years and which was awarded on the basis not of an examination but of the candidate's having taken part in debates (disputations and responsions) and having attended lectures in grammar, logic, rhetoric and natural philosophy, eventually being certified by his college simply as having participated (but without any indication of standard). This allowed the candidate to enter (*intrare*), in the sense of joining the roll of Bachelors. In order to obtain the MA (or incept (*incipire*), in the sense of being in a position to begin serious study, a formula that remains to this day for the BA), the candidate still submitted no written work but took a more active part in the debates, having to determine or judge them so that once he was a master he could perform this role unsupervised and give some lectures on subjects not covered elsewhere. This mention of judging reminds us of Boethius' definition of the *musicus*: 'he who exhibits the facility of forming judgements. So qualification for the BA and MA was in this sense practical, in that it required no written examination or thesis; demonstration of ability was based on debating and lecturing - practical applications of one's knowledge - and the fulfilment of the requirements was certified by the college authorities who presented the candidate to the university. It is not surprising that the adaptation of these practices for Music degrees caused some difficulty. In the spirit of the requirements for the BA or MA, some sort of practice seemed desirable, but a candidate for the B.Mus. could hardly lecture to other students, because Music, as part of the Quadrivium, was for postgraduates, that is, those who already had the BA and were senior to him, and in any case he was not yet qualified to lecture on the books of Boethius. So, just as an applicant for a BA spent three years debating, a candidate for a B.Mus. spent (at least) three years doing the equivalent practical musical task, composing. When it came to the D.Mus. (the senior degree in Music, as was the MA in Arts), apparently no additional requirement could be found; moderating a debate was obviously not thought to be possible, presumably again because of a shortage of knowledgeable debaters, and so, rather lamely, the authorities came up with the same requirement as for the B.Mus. One additional qualification they could have required, actual lecturing on the books of Boethius (which some of the B.Mus. requirements specify), was apparently not insisted upon, presumably because it was acknowledged that very few masters of music could make a living at the university, and they would therefore be working elsewhere and not available to give such lectures. So the fact that the requirement for a Music degree was practical composition is not altogether surprising; composition was the equivalent of debating and lecturing. Assessment must have caused a problem; the masters were able to observe candidates for the MA at work before they put them forward, but there was no parallel requirement that a musical work should be performed before the award of the degree. (However, the canny scholars of both Oxford and Cambridge did sometimes specify that the Mass was to be performed at the award ceremony, thus saving themselves the fee for

a new work; history does not record what happened if the piece did not work, or fell apart, or proved unperformable.) My explanation also accounts for the curious hybrid position of Music. Although it was indeed a subject within the Quadrivium, there is little evidence that it was much taught; the graduates were seldom those who taught it (and in many cases were clearly not available in Oxford or Cambridge to do so); and there was a practical qualification for what (if Boethius were to be followed) should have been a strongly academic subject. These tensions are not unfamiliar to musicians.

If from this account it appears that the practice of requiring an exercise linking University with Church - and thus joining the academic, sacred and practical sides of the subject - was a chapter of coincidences, academic compromise and improvisation, then this is probably fair comment. It is nevertheless important to understand fully the background to the English degree in Music because, however it came about, it proved to be of major importance not only in the development of sixteenth-century music but also in the development of English music for many generations and centuries to come, setting a trend for producing 'academic' composers - Greene rather than Bach, Boyce rather than Gluck, Ouseley rather than Bruckner or Brahms, Parry and Stanford rather than Mahler or Debussy (to name only a few sets of contemporaries) - even up to the present day. In the sixteenth century, however, it had an entirely beneficial series of effects.

In the fifteenth century the composer was regarded as a servant, 'on a level comparable with that of the parish ladies who arrange the flowers ... of only limited value and esteem', an attitude which 'removed composition from consideration as a major art-form comparable with painting or illumination, the practitioners of which were considered to merit sufficiently generous patronage to enable them to engage in their art full-time'.³⁰ But it is clear that by the end of the century the position had changed: the *informatores* were paid; their duties and salaries included composing as well as performance; and they and their choirs took an active part in the liturgy, unlike the painter who made his contribution and left. This highlights the difference between the two creative forms, in that the composition of a musical work did not constitute the complete process, whereas the painting of a visual work did. Composers were indeed paid sufficiently to engage in their art (or science) full time; it is simply that it included performance as well as composition. Furthermore, the appearance by 1500 of a route to a degree and to academic respectability was alluring, not least because this avenue was not available to painters and the like. Composers were academically

³⁰ Roger Bowers, 'Obligation, Agency, and laissez-faire: the Promotion of Polyphonic Composition for the Church in Fifteenth-Century England', *Music in Medieval and Early Modern Europe: Patronage, Sources and Texts*, ed. Iain Fenlon, Cambridge, 1981, pp. 119, at pp. 13-14.

respectable, and they had developed a complex, private craft known only to themselves, a theoretical base to complement the physics of sound, and a specific reason to set Music apart from the other arts. So when *musica speculativa* and *musica practica* are described as the 'twofold approach to music everywhere characteristic of university studies'³¹ we should not interpret 'twofold' to imply in England an irreconcilable gulf between them; rather, the university exercise developed into an attempt to provide a bridge between speculative and practical. We must remember always that the way in which the candidate showed his expertise and qualification to lecture on the books of Boethius was to write this exercise, and therefore that the evidence of his suitability must have been demonstrated in the music he composed.

Although the objective was to bridge the gulf, the only two references to *musica speculativa* in English writings both stress its unperformable nature. Our hunt for *musica speculativa* leads us to the elusive but compelling Dr Newton,³² known mainly from the pages of Whythorne's autobiography and Morley's *Plaine and Easie Introduction to Practicall Musicke* (London, 1597). Whythorne compiled a list of musicians (known as the 'musical scrap') in the 1570s or '80s which fortunately became attached to his autobiography, and he places Dr Newton in Henry VIII's reign, as if in his mind speculative music is to be found at that time and no later. Indeed, his orderly, not to say pedantic, approach leads him, after some reflection (he inserted the name later), to place Newton at the head of his list of musicians - followed by Fayrfax and Cooper, and then Tye, these being the only four doctors 'of ancient time'.³³ - thus implying that Newton was even earlier than Fayrfax. Morley mentions him twice, once between Fayrfax and Cooper, and then in his list of authors next to Cooper.³⁴ Both writers attempted to arrange their lists of musicians broadly chronologically, so we can assume that Newton was roughly contemporary with Fayrfax and Cooper, who both took the Mus.D. at Cambridge during the first few years of the century. Whythorne helps

³¹ Carpenter, *Music in the Medieval and Renaissance Universities*, p. 89.

³² Presumably George Newton, an organist in the household chapel of Margaret, Countess of Richmond and Derby (mother of Henry VII, and known as 'Lady Margaret' and hence associated with St John's College, Cambridge, and (much later) Lady Margaret Hall, Oxford) from c. 1498 to 1505, at the same time as Robert Cooper, who was Master of the Choir in this chapel between c. 1503 and 1509 after having been a lay clerk at King's College, Cambridge, between 1492 and 1495. Neither is Mus.D. in the Richmond and Derby records.

³³ *The Autobiography of Thomas Whythorne: Modern Spelling Edition*, ed. James M. Osborn, London, 1961, p. 300.

³⁴ Thomas Morley, *A Plain and Easy Introduction to Practical Music*, ed. R. Alec Harman, London, 1952, pp. 123, 322.

us further in his 'musical scrap', when he says that 'There was in King Henry the Eighth's days a doctor of music named Doctor Newton. It is reported that he was both a Master of Art, a Bachelor of Divinity, and also a Doctor of Music, but the music which he made, was by speculation, and not by practice, for when he had made a song he could not sing a part of it when he had made it'.³⁵ And Newton was clearly in his mind when he wrote in the autobiography itself: 'There be another sort of musicians that be named speculators. That is to say, they that do become musicians by study without any practice thereof. There have been of such who had made songs and have pricked them out, and yet could not sing a part of them, them selves'.³⁶ It is unlikely that this remark refers simply to Dr Newton's inability to sing; there appears to be more to it than that, the implication being that the music is in fact too difficult to perform. Morley, too, commented on this apparent dichotomy:

'Music is either speculative or practical. Speculative is that kind of music which, by mathematical helps, seeketh out the causes, properties, and natures of sounds, by themselves and compared with others, proceeding no further, but content with the only (sc. 'only with the') contemplation of the art. Practical is that which teacheth all that may be known in songs, either for the understanding of other men's, or making of one's own. Augustine defineth practical music (which is that which we have now in hand): 'Recte modulando scientia' ('a science of well-doing by time, tune, and number'), for in all these three is 'modulandi peritia' occupied ... Those who have been since Gafurius's time have done it thus: 'Rite & bene canendi scientia' ('a science of duly and well singing', 'a science of singing well in tune and number').³⁷ Morley's amplification in translating these two remarks is particularly striking, with the addition in each case of 'number'. He reminds us that his book is about practical music; clearly, by 1597 the practical musician undertakes many of the duties of the *musicus*, including understanding other men's songs in order better to make one's own. But as we shall see, by the middle of the century there was an additional way to become a 'master'. Both Whythorne and Morley are writing retrospectively, the former in the 1570s or '80s and the latter in 1597, and the fact that we have to turn to them is a reminder that there are hardly any books of theory, description or comment in the sixteenth century in England. Yet they both provide us with similar definitions of the distinction between speculative and practical music, a distinction which is apparently sharper at the beginning of the century, as the case of Dr Newton suggests. We have now established that Newton would have had to write a Mass for his exercise, or, if he received it before the new arrangements of 1507 or 1515 came into place at Oxford and

³⁵ *The Autobiography of Thomas Whythorne*, ed. Osborn, loc. cit.

³⁶ *Ibid.*, p. 245.

³⁷ Morley, *A Plain and Easy Introduction to Practical Music*, ed. Harman, p. 292.

Cambridge respectively, he would have had to prove a period of study. We also know that he was a composer of a speculative bent. but not whether this unsingable piece was his doctoral exercise. That none of his music survives is unfortunate, though hardly surprising, for the music seems to have had within it the seeds of its own destruction: if he wrote unperformable music and could not perform it himself, it is hardly likely that anyone else would. It may very well be, however, that Newton's problem lay not so much in the difficulty of his music as in his unwillingness (or inability) to arrange it in a performable format, an issue to which I return shortly.

In the early years of the century, there was only this one route to professional musical status and to the title 'master' (for Bachelors of Music) or Doctor, these being the contemporary interpretation of Boethius' *musicus*. However, by about 1540 another route began to appear. Contemporary ascriptions of music in manuscripts and other writings, such as Whythorne's autobiography, show increasing care being taken to give composers their correct title. Until about 1520, we find only Christian names and surnames; in the 1520s, most sources continue this indifference to title except in relation to 'Doctor' Fayrfax: we have seen that the ascription of his Mass *O quam glorifica* in the Lambeth Choirbook not only calls him 'Doctor' but specifies that this is his doctoral Mass. However, elsewhere in this manuscript he is simply identified by his surname, while the Caius Choirbook (of the same date) deals only in surnames.³⁸ Both the Lambeth and the Caius choirbooks probably date from the mid to late 1520s, almost exactly the same time as the Forrest-Heyther Partbooks (Oxford, Bodleian Library, MSS Arch. f.e. 19-24, olim Mus. Sch. e.376-81), which are among the first sources to give composers their appropriate academic titles. Thus in this source Taverner is never 'master', even though he was the *informator* of Cardinal College, Oxford, the institution for which it is thought the books were compiled. Indeed, of the composers in the first layer (probably copied between about 1526 and 1528) the only ones with a title are Dr Fayrfax and Master Avery (Burton, because his Christian name is being used), and (in addition to Taverner) Marbeck, Raser, Ashwell and Norman are untitled, as is Aston in this layer even though he had a degree. In the second layer, copied in the 1540s or '50s, Aston, Sheppard and Alwood (who was a priest) are 'master', while Tye is 'Doctor' (or indeed, in one part-book,

³⁸ I will present my view of the dating of the Caius Choirbook (Cambridge, Gonville and Caius College, MS 667) in a forthcoming study. [2017 Note: I discussed this briefly in my edition, *Robert Fayrfax III: Regali, Albanus and Sponsus amat sponsam, Early English Church Music*, 53 (London, British Academy, 2010), xvii, The full argument supporting my conclusions there, which are based on the behaviour of the scribe of Caius and Lambeth, is now available in my article 'The Decline of Perfection in Late Medieval Notation Coloration and Alteration in Henrician and Elizabethan copies of Fayrfax's Mass and Magnificat *O bone Iesu*', *Academia.edu*, 2017. If the link below does not work automatically, then it should nevertheless work if you copy and paste it into your browser. <https://www.academia.edu/31829760/>

'master doctor Tye'³⁹ which is a particularly correct form of address). On the other hand, the Peterhouse Partbooks (Cambridge University Library, Peterhouse MSS 471-4), probably copied between 1538 and 1541 but this time for a non-academic environment, are very casual about titles, and even Fayrfax is usually identified only by his surname. But by the time we reach the next major source, the Gyffard Partbooks (much of which was probably copied in the 1550s), a clear pecking order has emerged whereby, in addition to those with degrees, *informatores choristarum* and Gentlemen of the Chapel Royal appear to qualify for the title 'master', a custom confirmed in sources from the end of the century (such as Baldwin's collections).⁴⁰ Even so, Whythorne in his lists of musicians draws a distinction between those who have degrees (Doctors and Bachelors) and those without ('unkommensid'), while Morley appears to be selective in his use of titles in his lists of musicians in *A Plaine and Easie Introduction*.

This hierarchical system explains certain other puzzling silences. Morley's taciturnity on almost every useful technique needed by a serious composer, beyond species counterpoint and proportions, is matched by the complete absence of any contemporary comment on the very problems which cause musicologists of today such concern - pitch, vocal scoring, *musica ficta*, instrumental performance options etc. - for such matters were for the experts, the 'masters of music cunning and discreet' as Cornysh calls them. The proof of the composition was in the studying, not in the performance, and much of the composer's art (especially in an academic, religious or court show-piece) lay in concealing art. It is not surprising, therefore, that it is through the analysis of music, the untangling of facts surrounding the institutions for which it was written, and the interpretation of hints provided by errors of copying that our understanding gradually increases. The learned composers of the time were playing elegant academic games with each other, and over the centuries we have become heirs to their puzzles, pitting our wits against theirs with the additional handicap of our imperfect knowledge of the rules of the game and of the prevailing context.

What, then, do we find in these academic Masses? The only one of certain academic provenance is Fayrfax's *O quam glorifica*, but I have suggested that *O quam suavis* is another, and that it survives in its presentation form.⁴¹ H. B. Collins's edition of the Mass *O quam suavis*

³⁹ Oxford, Bodleian Library, MS Arch. f.e.20, after his Mass *Euge bone*.

⁴⁰ See Roger Bray, 'British Museum Add. MSS 17802-5 (the Gyffard Part-Books): an Index and Commentary', *R.M.A. Research Chronicle*, vii (1969), 31-51, and idem, 'The Part-Books Oxford, Christ Church, MSS 979-83: an Index and Commentary', *Musica Disciplina*, xxv (1971), 179-97.

⁴¹ In the original article I gave a detailed analysis of Fayrfax's Mass *O quam glorifica*, as an Appendix. Here in the *Academia Bumper Bundle I*

(London, 1927) solved the elegant puzzles of the original, which states the Tenor in cryptic fashion with equally cryptic canons. The accompanying antiphon, 'Ave regina caelorum' is even more obscurely notated, with one whole voice part in (apparently) equal note-values, an even more cryptic canon, and a puzzle poem together with the controversial ascription. The version of the music in this presentation manuscript has clearly been arranged so as to appear academic, and the Tenor of the Mass and almost the whole of the antiphon would have been quite unperformable as they appear, needing a performing realization before they could have been sung. Or, to put it another way, nobody could sing a part of them when they were pricked in this way.

Close inspection of Fayrfax's *O quam glorifica* reveals that the notation of this Mass is even more misleading. All the surviving manuscripts present broadly the same version, with two voices in C and three voices in O throughout, but the differences are striking, particularly since they occur between the versions transmitted by the Lambeth and Caius choirbooks, sources which are thought to have been prepared at the same time and at the same place. These differences are found mainly in the notes of the Tenor and in the lengthy rests indicating periods when a voice is silent for a whole passage of the music; when taken with the highly eccentric layout of the notes of the Tenor (even when the sources agree), they indicate that the surviving versions are a contemporary performing arrangement of a prototype that was much more complex. I discuss this at greater length elsewhere,⁴² but the extent of the arrangement may be seen from the fact that an original in which the first section of each movement is in C (in all voices) and the second section of each movement is in O has been arranged to look as if three voices are in O throughout and two voices in C. Quite apart from the neat symbolism (2's and 3's, imperfect and perfect) of this conceit, we can see that the performing version also illustrates in audible music (*musica instrumentalis*) the Boethian concept - based on 2 and 3 as inherited from Pythagoras and Plato - that the proportions and harmony of music reflect the harmony of the spheres and of the human body (Boethius' *musica mundana* and *musica humana*) by its examination of the difference between O and C (respectively, the mensuration in which the Tenor was conceived and that into which it was arranged). Furthermore, once the Mass is restored to its original mensuration, its finely judged structure becomes apparent and an even more esoteric technique emerges, whereby the passages into which the polyphony is divided are related in length to each other. Indeed, when all passages in a particular texture (full choir around the cantus firmus, or reduced forces not on

append a detailed analysis of both the Mass *O quam suavis* and Fayrfax's Mass *O quam glorifica*.

⁴² 'Editing and Performing Musica speculativa', *English Choral Practzce, 1450-1620*, ed. John Morehen, Cambridge, forthcoming, and in my forthcoming edition of this Mass for *Early English Church Music*. [Both now published.]

the cantus firmus) or in a particular mensuration (the first section of each movement in $\odot$, and the second in $\circ$) are added together, a most remarkable set of relationships is found between lengths that ostensibly have nothing to do with each other. This is a perfectly feasible medieval interpretation of Boethius' comment that the *musicus* cannot 'find pleasure in melodies without also coming to know how they are structured internally by means of sound ratios' (see p. 5, above). I believe that this remensuration was partly also for practical reasons, in order to make performable the passages in complex proportions. Certainly, if the work had been presented to performers in its original mensuration it would have been unperformable, but if it was presented to the examiners in a version at all like *O quam suavis*, with cryptic encoding of the Tenor, it would have been ideal as an academic exercise, looking suitable on paper, with the use of several colours, and paying the Oxford masters the compliment of assuming that they were 'in cunning ... well sped' indeed and able to understand the difficult passages in proportions. The procedure with an exercise such as this appears therefore to have been to compose it, arrange it into an esoteric format (as exemplified by *O quam suavis*) and then rearrange, or perhaps unarrange, it for performance (as exemplified by *O quam glorifica*). It is not surprising that the Cambridge masters wisely side-stepped the problem of judging Fayrfax's erudition; one wonders what the Oxford masters made of this Mass, and whether there was really anybody who could understand the music in its esoteric format by looking at it in its choirbook layout.

The Masses *O quam glorifica* and *O quam suavis* are not the only works that show evidence of contemporary arrangement into a performing version. Although the practice of writing complex music - with passages that needed remensuration, and with carefully judged proportions and overall lengths - seems to have started with Fayrfax (who built upon a fifteenth-century tradition apparent in Dunstable's works and in Masses such as Leonel's *Alma Redemptoris mater*),⁴³ it was soon imitated by composers who are not known for their academic qualifications, notably Ashwell and Taverner. Fayrfax's own Mass *Albanus*, while not esoteric to the extent of *O quam glorifica*, nevertheless has some passages that have been arranged for

⁴³ See Brian Trowell, 'Proportion in the Music of Dunstable', *Proceedings of the Royal Musical Association*, (1978-9), 100-141. Leonel's Mass *Alma Redemptoris mater* is edited by Gareth Curtis (Newton Abbot, 1982). Fayrfax's approach to careful esoteric structuring is not unlike that of, say, Dufay or Obrecht, although it has characteristics that are peculiar to England; see Margaret V. Sandresky, 'The Continuing Concept of the Platonic/Pythagorean System', *Music Theory Spectrum*, i (1979), 107-20, at p. 114, and Marcus van Crevel's lengthy introduction to his edition of Obrecht's Mass *Mana Zart* (*Opera omnia, editio altera*, ed. Albert Smijers & Marcus van Crevel, i/ 7 (Amsterdam, 1964), i-clxiv).

performance in their contemporary version. A clue to this process can sometimes be found when a comment against the music betrays the existence of a different version in an earlier exemplar. The surviving fragment of the Tenor of Ashwell's Mass *Sancte Cuthberte* in London, British Library, Add. MS 30520, is at least partly esoteric in notation, while both his completely surviving Masses, *lesu Christe* and *Ave Maria*, have notational and mensural irregularities which indicate that the surviving versions are contemporary arrangements, notable among which are the (sometimes incorrect) annotations in *Ave Maria* that try to describe proportional passages which cannot adequately be shown in the black full and black void notation of the surviving version. At least two of Taverner's Masses, *Gloria tibi Trinitas* and *Corona spinea*, also contain evidence of contemporary arrangement, notably *Gloria tibi Trinitas* in the presence of extra semibreves - indeed, it is likely that the final passage of each movement has been renotated.

The music produced in this intellectual culture is therefore much more profound than at first appears; at the beginning of the sixteenth century, indeed, one of the objectives of the composer was to conceal such profundity from all but the most informed eyes. The most learned pieces were at first reserved for the Church, but this was largely because the liturgy required the longest and most substantial works which, for want of anything comparable in the secular field, became the medium through which this academic approach could best be expressed. By the end of the century, the carefully proportioned structural method of composition had been adapted to suit the more syllabic style of Anglican and secular music, thus proving its resilience and continuing to present challenging constraints to later composers. But the most significant developments were those of the early years of the century, and it is reassuring to find that at that time *musica speculativa* was not some alien concept but was music composed, performed and analysed.

Appendix

Anonymous (Lloyd?), Mass *O quam suavis*

Although there is some doubt of the identity of the composer of this work, it has come to be accepted as the work of John Lloyd (d.1523).⁴⁴

⁴⁴ R. Thurston Dart announced his identification of the composer in a very brief article in *The Listener* (53 (1955), 497). One of the voices of the motet *Ave regina celorum*, which appears in the same manuscript, has the ascription 'Hoc fecit ...?... maris', which has been taken by Dart to mean that the composer was Lloyd. The word omitted from the above title looks somewhat like 'iohannes', but may be 'matres', or one of any number of similar words. Various suggestions have been made, but I still prefer Lloyd because at least 'maris' is quite clear (= of the sea, flood, Fludd, Lloyd) Furthermore 'matres', if indeed that is the word, is at least an anagram of 'master', which would indicate

The most obvious complexity (the use of puzzle-canons) in this mass is to some extent the least of the problems, thanks to Collins's work.⁴⁵ The mass certainly provides support for the method of analysis which has been adopted in the discussion of the other masses, for in every case but two the puzzle inscriptions exclude consideration of the *finalis*. There are some passages (e.g. 'Domine Deus' in the Gloria, and 'in excelsis' in the Sanctus) in which the Tenor may be intended in a mensuration different from that of the other voices. In the former case the effect is on the number of semibreves, not breves, while in the latter the effect is on the number of longs, not breves, so the analysis in breves will be relatively straightforward. There are two occasions ('Quoniam to solus' and 'Christe' in the Gloria) at which there is an extended rest in the Cantus Firmus which is within the puzzle, but which may be regarded either as part of the Full passage in the middle of which it comes or as a Reduced passage between two Full passages. Both these passages occur within a single extended passage ('Qui sedes', Gloria), and the passages in question have been treated as if they were still part of the Cantus Firmus/Full texture.

The two *finales* which are taken into account occur at the end of 'Qui sedes' in the Gloria, and the end of the 'miserere nobis' of the first Agnus. As Collins has shown, these are both puzzles, but it does seem that on these occasions the *finalis* is part of the canon.

Table 1: Lloyd, Mass *O quam suavis*: layout of complete work

Gloria	voices	``	S	B	Comments
Et in terra	1,2,4,5		42	14	
Laudamus te	1,3,5		48	16	
Gratias agimus		F CF	81	27	
Domine Fili	2,3,4		45	15	
Domine Deus		F CF	81	27	Tenor: 54 x S3?
Qui tollis...miserere	3,4,5		68	34	
Qui tollis...suscipe	1,2,3		88	44	
Qui sedes		F CF	153	51	
Christe	2,3,5		16	8	
Cum sancto		F CF	60	20	
Credo					
Patrem	1,2,4,5		66	22	
Et in unum	1,3,5		51	17	
Et ex Patre		F CF	84	28	
Genitum	1,2,5		54	18	
Qui propter nos		F CF	72	24	
Et incarnatus est	2,3,5		72	36	
Crucifixus	1,2,4		80	40	

that its composer had submitted the two works for a B Mus degree. Finally, Lloyd shows in his secular music that he likes obscure canons.

⁴⁵ *Missa O quam suavis*, ed. H.B. Collins, London, Plainsong and Medieval Music Society, 1927.

Et resurrexit	3,4,5			50	25	
Et ascendit	1,2,3			56	28	
Et iterum		F	CF	88	44	
Et exspecto	2,3,5			42	14	
Et vitam		F	CF	48	16	
Sanctus						
Sanctus 1	1,2,4,5			42	14	
Sanctus 2	1,2,4			24	8	
Sanctus 3	1,3,5			36	12	
Dominus Deus		F	CF	60	20	
Pleni sunt	1,3,5			51	17	
gloria tua	1,2,4			63	21	
Osanna		F	CF	30	10	
in excelsis		F	CF	54	18	
Benedictus	3,4,5			96	48	
qui venit	1,2			44	22	
in nomine	1,2,3			76	38	
Osanna		F	CF	45	15	
in excelsis		F	CF	54	18	
Agnus						
Agnus Dei	1,2,4,5			72	24	
qui tollis	1,3,5			54	18	
miserere nobis		F	CF	72	24	
Agnus Dei	2,3,5			48	16	
qui tollis	1,4			36	12	
miserere nobis		F	CF	72	24	
Agnus Dei	3,4,5			80	40	
qui tollis	1,2			44	22	
peccata	2,3,4,5			40	20	
Dona	2,3,4			27	9	
nobis	1,2,3,5			9	3	
pacem		F	CF	54	18	Tenor 36S, 12B

Gloria

Cantus Firmus/Full	27	27	/	51	/	20
Non-CF/Reduced	14	16	15	/	34	44
Total	14	16	27	15	27	/ 34 44 51 8 / 20

The latter part of section 2 has been taken as a passage of 51 breves on the Cantus Firmus, even though there is a long period of rest in the course of it. It comprises 21B on the Cantus Firmus, 16B rest (which, however, falls into the puzzle scheme), and 14B more with the Cantus Firmus present, up to and including the finalis on 'Iesu' but excluding the fermata. The end of section 2 can therefore be broken down as 21, 16, 14 for the 51, and then the final 8. This pattern (21, 16, 14, 8) shows its own internal balances between alternate passages, of 21:14 (3:2) and 16:8 (2:1).

On the larger scale, taking the 51 and the figures tabulated above, section 2 shows a 2:3 proportion between 34 and 51. In section 1 the two Cantus Firmus passages present an obvious balance (27, 27), while the two non-CF passages present a 2:1 proportion between the first two ($14 + 16 = 30$) and the last (15). The end of section 1 ($15 + 27 = 42$) is as 3:2 to the last two passages of the movement ($8 + 20 = 28$). The movement also shows proportions built upon 19, viz. $14 + 16 + 27 = 57$, then $15 + 27 + 34 = 76$, and $44 + 51 = 95$, 57:76:95 being as 3:4:5, a proportion with particular Pythagorean connections (and one which reappears in the Cantus Firmus rhythm of the Agnus).

Credo

Cantus Firmus/Full	28	24 /	44 /	16
Non-CF/Reduced	22 17	18 /	36 40 25 28	/ 14
Total	22 17 28 18	24 /	36 40 25 28 44 /	14 16

The final passage (24) of section 1 presents the same problem of analysis as the passage, already discussed, at the end of section 2 of the Gloria, and may more precisely be described as $8 + 8 + 8$, during the central part of which the Cantus Firmus is silent. However, this is part of the puzzle canon (see below) and so has been taken as one long Cantus Firmus passage. When broken down into its constituent parts it produces a Cantus Firmus analysis of 28, 8, 8, 8 / 44 / 16, which may be simplified as 44, 8, 44, 16 producing obvious simple proportions between alternate passages not unlike those found in the problematic passage of the Gloria.

The non-CF figures present equally straightforward proportions; the opening $22 + 17 = 39$ is as 3:5 to the $40 + 25 = 65$ in section 2, the end of section 1 (18) is as 1:2 to the beginning of section 2 (36), and the end of section 2 (28) is as 2:1 to section 3 (14).

The movement as a whole also shows simple proportions at the end of section 1 (28 followed by $18 + 24 = 42$, 28:42 being as 2:3) and for the outer passages of section 2 (36 at the beginning and $28 + 44 = 72$ at the end). This leaves section 3, the first passage of which (14) is in the same scheme as the 28 and 42. On an even larger scale the structure is not unlike the Gloria's 3:4:5 based on 19. Here in the Credo it is based on 13, with $22 + 17 = 39$, (leaving aside the next 28), then $18 + 24 + 36 = 78$, then $40 + 25 = 65$, 39:78:65 being as 3:6:5. The 28 omitted from these calculations balances the 28 towards the end of section 2. However, this still leaves the end of section 2 and section 3 unaccounted for, except that they have been described as part of the Cantus Firmus or non-CF structure.

Sanctus

Cantus Firmus/Full	20	10 18 /	/ 15 18
Non-CF/Reduced	14 8 12	17 21 /	48 22 38 /
Total	14 8 12 20	17 21 10 18 /	48 22 38 / 15 18

The structure of the Cantus Firmus passages is extremely straightforward. The first two passages (20, 10) are as 2:1, and together (30) are as 2:1 to the penultimate passage (15), and the two passages of 18 balance each other. In addition, 10:15 is as 2:3. Section 3 ($15 + 18 = 33$) uses the symbolic 33 at an appropriate passage of text ('Osanna').

In the non-CF category section 1 (72) is as 3:4 to section 2 (108). Both sections end with passages of 38 (that in section 1 being $17 + 21$). The remaining passages produce a straightforward balance, the $14 + 8 = 22$ (which could in any case be regarded as a single passage of 22B for voices 1,2,4,5) in section 1 balancing the 22 in section 2, and the remaining passage of section 1 (12) producing a proportion of 1:4 with the remaining passage of section 2 (48). The first three passages of section 1 ($14 + 8 + 12 = 34$) are as 2:1 to the next (17).

In the Total figures, for the movement as a whole, sections 1 and 3 end with passages of 18. The first two passages ($14 + 8 = 22$) not only balance the passage of 22 in section 2, as already noted, but are now seen to produce a proportion of 2:3 with the last passage of the movement ($15 + 18 = 33$). Furthermore the 33 of section 3 is related to the passages spanning the division between sections 1 and 2 ($18 + 48 = 66$) as 1:2. Within sections there is some emphasis upon multiples of 10, with a 20 ($8 + 12$) near the beginning followed by an actual 20, and later by a 10, and in section 2 by a 60 ($22 + 38$). This analysis gives a structure for the movement as a whole of 14 20 20 38 10 66 60 33, in which 10:20:60 is as 1:2:6 (and therefore also incorporates 1:3 (2:6)), and 66:33 is as 2:1. However, if one seeks even larger combined passages one finds an opening 22 ($14 + 8$) related to the 66, which, as noted above, is as 2:1 to section 3, while the remainder of section 1 yields $12 + 20 + 17 + 21 + 10 = 80$ and the remainder of section 2 yields 60 ($22 + 38$), giving an overall structure of 22 80 66 60 33, in which 22:66:33 is as 2:6:3 (and therefore also provides proportions of 2:3, 1:3, and 2:1), and 80:60 is as 4:3.

Agnus

Cantus Firmus/Full	24	24 /	/	18
Non-CF/Reduced	24 18	16 12	/ 40 22 20 /	9 3
Total	24 18 24 16 12	24 / 40 22 20 /	9 3 18	

In the Cantus Firmus figures the first passage is one of those in which, exceptionally, the finalis is included. The Cantus Firmus is notated in a typically obscure way, with red notes or ligatures alternating, and, as Collins has shown, the finalis is an integral part of the scheme. When the finalis is included it provides a precise balance with the later passage in section 1 (24, 24). Each of these is as 4:3 to the 18 of section 2.

In the non-CF figures the first two passages ($24 + 18 = 42$) are as 3:2 to the next two ($16 + 12 = 28$). Each of the ingredients is related to the

other as 4:3 (24:18, and 16:12), and alternate sections are also related, this time as 3:2 (24:16, and 18:12), while the outer shell ($24 + 12 = 36$) and the inner core ($18:16 = 9:8$) provide simple Boethian proportions. In section 2, the 40 and 20 are as 2:1, while the last two passages ($22 + 20 = 42$) balance the 42 and 28 found already in section 1.

In the figures for the movement as a whole, the relationship between the beginning of section 1 ($24 + 18 = 42$) and the end of section 2 ($22 + 20 = 42$), and between the passages which respectively follow and precede these ($24 + 16 = 40$ in section 1, and 40 alone at the beginning of section 2) is self-evident. Between these we find that the end of section 1 not only shows a simple 1:2 proportion (12:24) but also refers to section 3 ($9 + 3 = 12$, followed by 18). In any case section 3 includes $3 + 18 = 21$ which is in the same scheme as the 42 already mentioned.

A combination of these schemes yields an overall structure for the movement of 42 40 36 40 42 30, in which 42 and 40 occur twice and 40:30 is 4:3, and (slightly differently interpreted) 24 42 28 24 40 42 30, in which 42 and 24 occur twice, 40:30 is 2:1, and 42:28 is 3:2.

Table 2: Overall Structure of Mass *O quam suavis*

	Gloria	Credo	Sanctus	Agnus	Total
Total	256	312	261	230	1059
Cantus Firmus/Full	125	112	81	66	384
Non-CF/Reduced	131	200	180	164	675
Section 1	99	109	120	118	446
Section 2	137	173	108	82	500
Section 3	20	30	33	30	113
Section 1 + 3	119	139	153	148	559

Within categories, Gloria and Sanctus totals are nearly equal (256, 261); in the Cantus Firmus category Gloria + Agnus (191) balances Credo + Sanctus (193); in the Non-Cantus Firmus category Gloria + Credo (331) approximately balances Sanctus + Agnus (344).

Within movements there are further balances. In the Gloria, non-Cantus Firmus balances section 2 (131, 137), and therefore Cantus Firmus balances section 1 + 3 (125, 119). In the Credo the third section is to be interpreted with section 2, not section 1, and Cantus Firmus now balances section 1 (112, 109) while Non-Cantus Firmus balances sections 2 + 3 (200, 203). In the Sanctus there are no balances, but there are simple proportions, between Cantus Firmus and section 1 ($81:120 = 2:3$) and between Non-Cantus Firmus and section 1 ($180:120 = 3:2$). In the Agnus likewise the emphasis is on proportions, notably between Non-Cantus Firmus and section 2 ($160:82 = 2:1$).

Fayrfax. Mass *O quam glorifica*

In Table 3 the length of each passage is shown in all appropriate note values, and the lengths of the constituent sections or sub-sections are compounded together to give the length in breves and longs.⁴⁶

⁴⁶ See also my edition *Robert Fayrfax II: Masses Tecum principium and O quam glorifica*, *Early English Church Music*, 45 (London, British Academy, 2004), pp xxii + 150

Table 3. Fayrfax: Mass *O quam glorifica*: layout of complete work

Gloria

section	text	voices		M	S	B	cumul	
							B	L
1a	Et in terra pax	2,3		54	18	6		
1b	Laudamus te	1,4,5		72	24	8	14	
1c	Gratias agimus	Full	CF	198	66	22	22	12
1d	Domine Fili unigenite	3,4,5		90	30	10	10	
1e	Domine Deus	Full	CF	234	78	26	26	12
2a	Qui tollis...miserere	1,2,3		198	99	33		
2b	Qui tollis...suscipe	3,4,5		180	90	30	63	
2c	Qui sedes	Full	CF	432	216	72	72	45

Credo

1a	Patrem omnipotentem	2,4		72	24	8		
1b	Visibilium omnium	1,3,5		63	21	7	15	
1c	Et in unum Dominum	Full	CF	162	54	18	18	11
1d	Genitum non factum	3,4,5		81	27	9	9	
1e	Qui propter nos	Full	CF	243	81	27	27	12
2a	Et incarnatus	1,2,3		270	135	45		
2b	Crucifixus	3,4,5		216	108	36	81	
2c	Et resurrexit	Full	CF	378	189	63	63	48

Sanctus

1a	Sanctus 1	2,3		72	24	8		
1b	Sanctus 2,3	1,4,5		63	21	7	15	
1c	Dominus Deus sabaoth	Full	CF	162	54	18	18	11
1d	Pleni sunt caeli	3,4,5		135	45	15		
1e	gloria tua	1,2,3		108	36	12	27	
1f	Osanna	Full	CF	162	54	18	18	15
2a	Benedictus	1,2,3		216	108	36		
2b	qui venit	1,5		216	108	36	99	
2d	Osanna	Full	CF	270	135	45	45	48

Agnus

1a Agnus Dei 1	2,4		81	27	9		
1b qui tollis	1,3,5		108	36	12	21	
1c miserere nobis	Full	CF	162	54	18	18	13
1d Agnus Dei 2	3,4,5		162	54	18		
1e qui tollis	1,2,3		81	27	9	27	
1f miserere nobis	Full	CF	162	54	18	18	15
2a Agnus Dei 3	3,4,5		162	81	27	27	
2b qui tollis ... dona	Full	CF	378	189	63	63	30

Table 4. Mass *O quam glorifica*: analysis in minims

Gloria

CF/Full			198		234 /		432
Non-CF/Red	54		72		90	/ 198	180
Total	54	72	198	90	234 / 198	180	432

Credo

CF/Full			162		243 /		378
Non-CF/Red	72		63		81	/ 270	216
Total	72	63	162	81	243 / 270	216	378

Sanctus

CF/Full			162		162 /		270
Non-CF	72	63	135	108	/ 216	162	216
Total	72	63	162	135	108	162 / 216	216

Agnus

CF/Full			162		162 /		378
Non-CF/Red	81		108		162	81	/ 162
Total	81	108	162	162	81	162 / 162	378

Table 5. Mass *O quam glorifica*: summary analysis in minims

	Gloria	Credo	Sanctus	Agnus	Total	
Total length	1458	1485	1566	1296	5805	
CF/Full	864	783	594	702	2943	
Non-CF/Reduced	594	702	972	594	2862	
Section 1	648	621	702	756	2727	
Section 2	810	864	864	540	3078	
Sec 1 Full/CF		432	405	324	324	1485
Sec 1 Non-CF/Red	216	216	378	432	1242	
Sec 2 Full/CF		432	378	270	378	1458
Sec 2 Non-CF/Red	378	486	594	162	1620	

Here Gloria + Credo (1458 + 1485 = 2943) balances CF/Full music (2943), and consequently Sanctus + Agnus balances non-CF music. Moreover the 1458 and 1485 are mirrored in the figures for section 2 Full/CF and section 1 Full/CF respectively. There are also some examples of Pythagorean proportions (Gloria:Agnus 1458:1296 is as 9:8). It should also be noted that some of these minim-totals are the same as those in the analysis of *color* in the cantus firmus. Indeed, it is by deconstructing a grid like this (rather like a magic square) that it has proved possible to establish Fayrfax's method of devising the mathematical structure of the mass.

Although it would appear that the minim was Fayrfax's unit of calculation there are further correspondences in breves:

In breves

Gloria

CF/Full			22		26 /		72
Non-CF/Red	6	6	8		10	/ 33	30
Total	6	8	22	10	26 / 33	30	72

The CF/Full figures for sections 1 (22 + 26 = 48) and 2 respectively 48:72, are as 2:3. In the Non-CF/Reduced figures the 33 represents Christ, and the remaining passages (6 + 8 + 10 = 24 in section 1, and 30 in section 2, are as 4:5 (24:30). In the movement as a whole, the whole of section 1 (6 + 8 + 22 + 10 + 26 = 72) balances the final passage (72) of section 2, while the 33 joins with the 30 that follows it, also for Non CF (33 + 30 = 63) to make a 7:8 proportion with the final passage (72).

CF/Full			18		27 /		63
Non-CF/Reduced	8	7		9	/ 45	36	
Total	8	7	18	9	27 / 45	36	63

The CF figures produce a 2:3 in section 1 (18:27) and 5:7 between the section 1 total (18 + 27 = 45) and section 2 (63). In the NonCF/Reduced dfigures the combined opening passages (8 + 7 = 15) are as 1:3 to the opening Non CF passage (45) of section 2, leaving a 1:4 proportion between the residue of section 1 (9) and the residue of section 2 (36). However, the more striking relationships are in the Total figures, where an opening 33 (8 + 7 + 18), again representing Christ, is as 1:3 to the final two passages (36 + 63 = 99), leaving a 4:5 in the middle (9 + 27 = 36 followed by 45); notice how this even manages to accommodate not only two 36s but also a 9² (or 3³) at the beginning of section 2 (45 + 36 = 81)

Sanctus

CF/Full			18			18 /			45
Non-CF/Red	8	7		15	12	/ 36	27	36	
Total	8	7	18	15	12	18 / 36	27	36	45

I shall leave the reader to analyse this movement, based on the experience of having seen what was in the Gloria and Credo. You will easily find another 33, another 99, another 81, several 3:4s and 2:3s, and a 1:3 involving the number 144.

Agnus

CF/Full				18			18 /		
									63
Non-CF/Reduced	9		12		18	9	/ 27		
Total	9		12	18	18	9	18 / 27		63

In the Agnus the final 63 is not the only 63 to be found, while the final 90 is as 2:1 to an earlier combination of passages. The opening 9 + 12 = 21 produces a number we have not yet had, but this is related to a later passage. Christ (33, or a multiple thereof) is never absent.

Table 6. Mass O *quam glorifica*: summary analysis in breves

	Gloria	Credo	Sanctus	Agnus	Total
Total length	207	213	222	174	816
CF/Full	120	108	81	99	408
Non-CF/Reduced	87	105	141	75	408
Section 1	72	69	78	84	303
Section 2	135	144	144	90	513
Section 1 CF/Full	48	45	36	36	165
Sec 1 Non-CF/Red	24	24	42	48	138
Section 2 CF/Full	72	63	45	63	243
Sec 2 Non-CF/Red	63	81	99	27	270

The achievement of mathematical correspondences in minims as well as in breves is quite remarkable. The overall structure of the complete work presents various balances, but the most significant feature is the precise balance between music for CF/Full and music for non-CF/Reduced (408).