The Performing Pitch of William Byrd's Latin Liturgical Polyphony: A Guide for Historically Minded Interpreters

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The choosing of a suitable performing pitch is a task that faces all interpreters of sixteenth-century vocal polyphony. As any choral director with the relevant experience will know, decisions about pitch are inseparable from decisions about programming, since some degree of transposition—be it effected on the printed page or by the mental agility of the singers—is almost invariably required to bring the conventions of Renaissance vocal scoring into alignment with the parameters of the more modern SATB ensemble. To be sure, the problem will always admit the purely pragmatic solution of adopting the pitch that best suits the available voices. Such a solution cannot of itself be to the detriment of a compelling, musicianly interpretation, and precedent for it may be cited in historic accounts of choosing a pitch according to the capabilities of the available bass voices (Ganassi 1542, chapter 11) and transposing polyphony so as to align the tenor part with the octave in which chorale melodies were customarily sung (Burmeister 1606, chapter 8). At the same time, transpositions oriented to the comfort zone of present-day choirs will almost certainly result in sonorities differing appreciably from those the composer had in mind. It is therefore to those interested in this aspect of the composer's intentions, as well as to those curious about the why and the wherefore of Renaissance notation, that the following observations are offered.

The historic relationship between vocal notation and performing pitch may be characterised as a process of gradual evolution from the relative to the absolute. At the outset of that process, the four-line staff of plainchant, with its range of less than an octave, represented a restricted segment of the diatonic scale that could be located anywhere within the physical

limitations of the human voice. The process may be said to have culminated in the almost universal adoption in 1939 of 'concert pitch' (Mendel 1978, 90) which for convenience will here be referred to as 'A+0' (following Haynes 2002); subsequently, voices no less than instruments, and the pitches indicated by conventional notation, have been tethered to a grid of equally spaced semitones based on the tuning of *a′* to 440 Hz (i.e. Hertz, or vibrations per second).

The polyphony of the late Renaissance thus lies at a mid-point on the evolutionary continuum, in certain respects looking back to the indeterminateness of chant notation, in others looking forward to the pitch standardisation of more recent times. Yet thanks to the rise of instrument-making in the sixteenth century, performing pitch had by 1600 already started on its long journey towards twentieth-century uniformity, and the well-documented use of organs and other instruments in churches can mean only that church musicians of the period were bound to observe a certain pitch standard, albeit a more or less localised one (Haynes 2002, 55–114).

Exceptions to A+0 are, of course, nowadays routine in the interpretation of certain historic repertories. This is notably the case in period-instrument performances of Baroque music, which since the late 1960s have reverted to the pitch area at which chamber and orchestral works are known to have been performed in the eighteenth century, approximately a semitone lower than A (Haynes 2002, 159–182). While that transposition—which may for convenience be formulated as A–1—remains uncontroversial, the same cannot be said for the rule current since the 1920s that much Renaissance polyphony, and English polyphony in particular, should be sung a minor third higher than notated—at A+3.

The A+3 rule was purely pragmatic in origin, its primary objective being to bring the characteristically low-lying contratenor parts of Renaissance scores within effective reach of modern altos (female or male). Owing to the misinterpretation of certain documentary evidence concerning the pitch of old English organs, however, and with the influential performer-scholar David Wulstan as its chief proponent, the doctrine took root that A+3 really was the historic English pitch. Notwithstanding the obvious practical difficulties of treble parts that ascended to *b″* and *c‴*, Wulstan and his followers performed and recorded the English repertory thus

transposed, with results that, while commendably attention-grabbing, were so for largely the wrong reasons (Johnstone 2003, 521–22). Not surprisingly, in the last twenty years or so the A+3 doctrine has been the object of a reaction among a widening sector of specialist interpreters, the majority of whom reject any degree of transposition in favour of performance at notated pitch, or A+0. Yet this new orthodoxy is really no more historically justifiable than the old, and it is practicable because today's professional vocal ensembles are endowed with greater adaptability and superior vocal technique than the choral societies and church choirs for whom the A+3 rule was practicable.

The history of performing pitch has been studied, on and off, since the late nineteenth century (e.g. Ellis 1880, Mendel 1978, Haynes 2002), its basis being the evidence offered by historic treatises on instruments and instrument-making, archival records (especially of church organs), and those wind instruments and organ pipes that have survived the ravages of time with their original pitch intact. As a result, more is known about the pitches used at different times and places than could ever be put into practice by even the most versatile of early music specialists. Though many and various frequencies in the environs of 440 Hz can be shown to have taken their turn as reference points for pitch standards, it has to be admitted that modern practicalities preclude fine-tuning the music of the past by any degree smaller than the equal semitones of the A+0 pitch grid. The choice of a performing pitch on historical as opposed to pragmatic grounds must nonetheless yield to the pragmatism of rounding to the nearest modern semitone. Unless it makes this single compromise, the study of pitch history will most likely remain a purely academic exercise.

Byrd's Latin liturgical polyphony, issued by him in five separate publications between 1592 or 1593 and 1607, is highly amenable to a study such as the present one. First, its scope—124 movements ranging in length from the eight-bar three-voice Kyrie to the 200–bar five-voice Credo—is both circumscribed enough to be manageable and extensive enough to be

meaningfully representative.[1] Secondly, its intended use in celebrations of the mass entailed the intermingling of five ordinary movements sharing a common final, signature and clef combination (Kyrie, Gloria, Credo, Sanctus and Agnus Dei) with five proper movements sharing what must in some cases have been a different common final, signature and clef combination (Introit, Gradual, Alleluia, Offertory and Communion), a situation in which it is hard to imagine issues of pitch and transposition were not resolved by rule of thumb. Thirdly, the Catholic Byrd spent much of his professional life as a musician in—though of course not exactly of—the established Protestant church, performing and contributing to a vernacular repertory whose strict uniformity of notation and vocal ranges can confidently be correlated with the known pitch of contemporary liturgical organs; hence the composer's Latin liturgical polyphony may prove capable of historical pitch interpretation by analogy with his vernacular church music. Fourthly, the three Masses and virtually all movements of the *Gradualia* are freely available in a reliable internet edition by David Fraser (www.cpdl.org/wiki/index.php/Byrd) which serious performers need not scruple to use. Fifthly, and needless to say, the excellence of the material is beyond question.

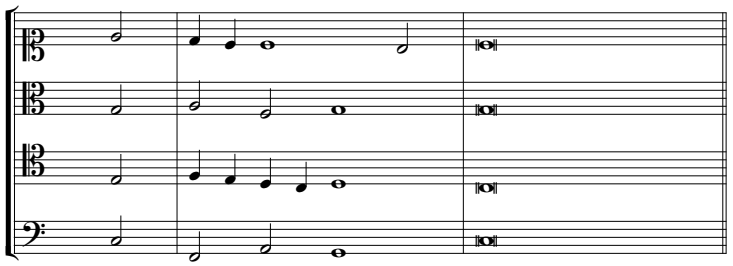
Vocal Scoring and Transposition in Late Renaissance Polyphony

Though not free from idiosyncrasies, Byrd's method of laying out vocal scores clearly derives from norms he absorbed from continental composers such as Clemens and Lassus. Those norms are themselves rooted in the Platonic idea that, just as there are four elements and four seasons, there are four types of human voice (Zarlino 1558, book 3, chapter 58; the number of voice-*types*, note well, is not to be confused with the number of voice-*parts*). That idea, and its corollary that every choral singer must be classed as a soprano, an alto, a tenor or a bass, has continued to dictate the structure of mixed-voice choirs ever since, despite the widespread existence of the 'in-between' voice-types mezzo-soprano and baritone. As we shall see,

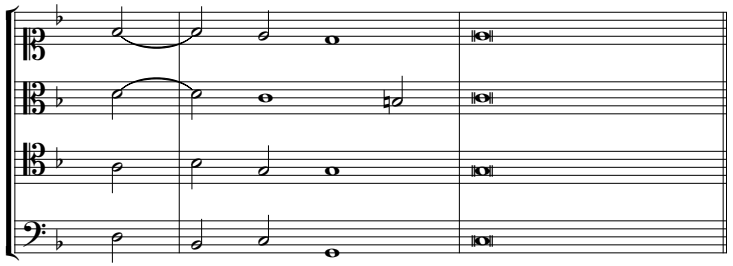
[1] The three settings of the mass ordinary are reckoned to consist of five movements each, the Sanctus and Benedictus being counted as a single movement. The bar totals are given for guidance only, and will not necessarily be found to be the same in all editions.

Ex. 1. Tenor-C4 notation (constructed examples)

(a)

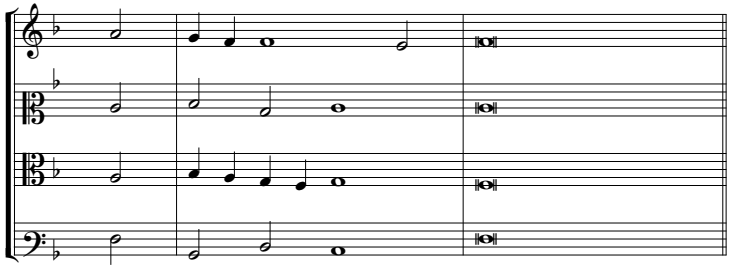


(b)

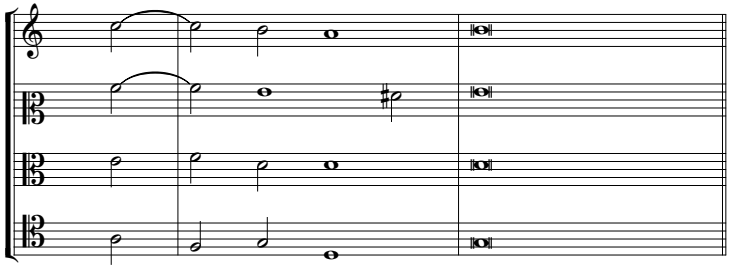


Ex. 2. Tenor-C3 notation (constructed examples)

(a)



(b)



polyphonic compositions comprising five or more voice-types are not hard to find. But a Renaissance composer who wished strictly to abide by the rules took care that a fifth or sixth voice-part was a duplicate of one of the four basic voice-types. Hence collections of five-part music were copied or printed in soprano, alto, tenor and bass partbooks plus a fifth partbook, designated 'quintus', in which parts for second soprano, second alto, second tenor and second bass could be gathered together. Similarly, collections of six-part music added a sixth partbook, designated 'sextus', in which could be entered, for example, a second bass part for a composition that already had a second tenor part.

Obviously, the four basic voice-types could not all be incorporated in compositions with only two or three voice-parts. Nor did the four types all have to be incorporated in compositions with four or more parts, since it was acceptable for a four-part composition to consist of, say, two altos, tenor and bass. Hence a Renaissance composition that incorporated all four types was said by the Italians to be scored *a voce piena* (for full voice), while a composition that substituted one type with a duplicate of one of the others was said to be scored *a voci pari* (for paired voices) (Carey 1991). Byrd, in classifying the contents of his printed partbooks, relied not on contemporary Italian terminology but simply on the number of voices required ('*cantionum trium vocum*', '*cantionum quatuor vocum*', etc.). Yet the presence within the *Gradualia* of a majority of items scored *a voce piena* and a minority scored *a voci pari* confirm that in principle both conventions were familiar to him. Before fully exploring the application of these continental principles in Byrd's Latin liturgical music, however, we must examine the means whereby voices were differentiated in Renaissance polyphony in general: their clefs.

Whereas in a modern vocal score soprano, alto and tenor parts are notated invariably in treble clefs (the tenor part being sung an octave lower than notated), it was formerly the custom to use a different clef for each of the four voice-types. From the seventeenth century to the nineteenth, the four types respectively became synonymous with what are now known as the soprano, alto, tenor and bass clefs. In terms of the letter-name of the note represented by the clef (be that *c′* or *f*) and the staff-line on which the clef is placed (the lowest line being numbered 1

and the highest 5), these clefs can be respectively described as C1, C3, C4 and F4. As defined by the limits of each staff, the range of the C1 soprano lies a fifth higher than the range of the C3 alto, that of the alto a third higher than the C4 tenor, and that of the tenor a fifth higher than the F4 bass. The manner of notating a vocal score in these clefs, which will be referred to here as 'tenor-C4 notation', is illustrated in ex. 1.

Though the tenor-C4 clef combination had been in use throughout the sixteenth century, it was not the only one in widespread use at that time. A second combination—yielding what will be referred to here as 'tenor-C3 notation', illustrated in ex. 2—comprised the clefs G2, C2, C3 and F3 (or, for reasons to be explained below, C4), each defining a range nominally a third higher (or in the case of the C4 clef, a fifth higher) than that defined by the corresponding clef in the tenor-C4 combination. These *chiavette* or 'little clefs' (as they later became known) have respectively become synonymous with the voice-types treble, mezzo-soprano, alto and baritone, but misleadingly so because in sixteenth-century prints and MSS they invariably connote the four usual voice-types soprano, alto, tenor and bass. The voice-type connoted by a given clef thus depends on its context: a C3 clef connotes an alto part in one combination and a tenor part in the other. Hence also an F3 clef connotes a bass part only when it appears in the tenor-C3 combination; not unless it is intermingled with the four clefs of the tenor-C4 combination may it may be said to connote a baritone part.

Since whenever the bass part was notated in an F4 clef the corresponding soprano part was notated in a C1 clef, it was only in extraordinary circumstances that the F4 and G2 clefs were used simultaneously. So used in English music, the G2 clef connotes an instrumental part or the treble voice ('triplex'), something by no means unknown in Byrd's *œuvre* as a whole (see, for example, the consort songs the composer adapted to partsongs for publication in his *Psalmes, Sonets and Songs* of 1588, describing them in his preface as 'musicke of great compasse'). This manner of scoring occurs nowhere in Byrd's Latin liturgical music, however, hence its implications for performing pitch will not be considered here.

Why were most sixteenth-century polyphonic pieces notated in one or the other of the two clef combinations? The answer lies in three principles of sixteenth-century theory and practice: first, that in judging the mode of a polyphonic composition Renaissance theory looked to the mode of the time-honoured *cantus firmus*–bearing voice, the tenor; secondly, that the ranges of the bass, alto and soprano parts existed in more-or-less fixed relationships with the range of the tenor (the bass lying roughly half an octave below the tenor, the alto half an octave above it, and the soprano a whole octave above); and, thirdly, that in the sixteenth century, in MS and (especially) in print, ledger lines were but sparingly used.

It was thus the mode of a composition scored *a voce piena* that determined the clef combination (provided, as we shall see, that the mode concerned appeared in its natural or untransposed position). In a composition of the first mode, the range of the tenor (roughly *d*–*d′*) corresponded to the C4 clef, that of the bass (roughly *A*–*a*) to the F4 clef, that of the alto (roughly *a*–*a′*) to the C3 clef, and that of the soprano (roughly *d′*–*d″*) to the C1 clef. Similarly in a composition of the fifth mode, the range of the tenor (roughly *f*–*f′*) corresponded to the C3 clef, that of the bass (roughly *c*–*c′*) to the F3 clef, that of the alto (roughly *c′*–*c″*) to the C2 clef, and that of the soprano (roughly *f′*–*f″*) to the G2 clef.

Of the eight ecclesiastical modes, only the second did not naturally correspond in this manner to either of the two common clef combinations, for in a composition of that mode the range of the tenor (roughly *A*–*a*) lay too low even for the C4 clef. Hence in this case a lower clef such as C5 or F4 was used for the tenor, and correspondingly lower clefs for the other voices. There was not general agreement, however, as to the second mode's 'correct' clef combination; rather, in practice other means of notation, to be described shortly, were used instead.

The collection of short instrumental pieces *Octo tonorum melodiae* by the German composer Thomas Stoltzer (d. 1526, edn in Albrecht 1942) is perhaps the oldest known evidence of a systematic association of the tenor-C4 combination with the first, third, fourth, sixth and eighth modes, of the tenor-C3 combination with the fifth and seventh modes, and of a lower clef combination with the second mode. Yet although this association was to be articulated by music

theorists from the middle of the sixteenth century to the end of the seventeenth (see, for example, Vicentino 1555, ff. 55r–57r, and Bononcini 1688, 129–30), in practice a mode was not necessarily wedded to a particular clef combination. The fifth mode, instead of appearing in its natural position in the tenor-C3 combination with final *f*, was frequently notated a fourth lower in the tenor-C4 combination with final *c* (compare the untransposed fifth-mode cadence shown in ex. 2a with the transposed form shown in ex. 1a). Likewise the seventh mode, instead of appearing in the tenor-C3 combination with final *g*, could be notated a fifth lower in the tenor-C4 combination, also with final *c* (compare the untransposed seventh-mode cadence shown in ex. 2b with the transposed form shown in ex. 1b). The second mode, moreover, seldom appeared in its natural position with final *d*, being instead notated either a fourth higher (in the tenor-C4 combination with final *g*) or even an octave higher (in the tenor-C3 combination with final *d′*).

The method of transposing the modes a fourth or a fifth from their natural positions of course relied on the use of one or more signature flats (signature sharps did not become current until the seventeenth century). Yet the presence of a signature flat did not of itself signal that the mode had been transposed. When writing in the untransposed fifth and sixth modes, composers almost invariably used a signature flat 'because,' the mid-sixteenth-century theorist Nicola Vicentino tells us, 'it is very convenient' ('*molto commodo*'; 1555, f. 56v). Hence when the fifth mode was transposed down a fourth, it *lost* its signature flat. Nor was it unknown for compositions with a final of *d* to appear with signature flats, meaning that a *second* signature flat was needed to transpose those compositions a fourth higher.

Uncertainty as to whether a given signature flat signalled transposition or simply softened the harsh contrast between pitch-classes 'F' and 'B-natural' fuelled an unending debate on the modes—their number (eight or twelve) and nature (flexible or inflexible)—that need not detain us here. Rather, the question most heavily laden with performance-practice issues is of whether music in tenor-C3 notation should be treated any differently from music in tenor-C4 notation. Many of today's early-music practitioners hold that it should not, and that the higher *written* range of the tenor-C3 combination should be actualised in a higher *sounding* range.

Musicologists, in contrast, have for the most part argued that it should be treated differently, albeit with some disagreement (summarised in Johnstone 2006, 29–31) as to the exact treatment of the tenor-C3 combination.

In discussing the practice of transposition in performance, sixteenth- and seventeenth-century theorists offered no specifically relevant guidance (Parrott 1984, 491–93) until Michael Praetorius stated the rule of thumb that tenor-C3 pieces *with* a signature flat were transposed down a *fourth*, thereby losing the signature flat, while those *without* a signature flat were transposed down a *fifth*, thereby gaining a signature flat (Praetorius 1619, 80–81). These two different degrees of transposition were related to the use of two different clefs for bass parts in tenor-C3 notation. Pieces with a signature flat tended to be notated with the F3 clef (ex. 2a), meaning that when transposed down a fourth their lowest limit was *E*, just a semitone lower than the lowest limit of tenor-C4 notation. Pieces without a signature flat tended to be notated with the C4 clef (ex. 2b), meaning that when transposed down a fifth their lowest limit was *F*, the same as the lowest limit of tenor-C4 notation (Johnstone 2006, 43–44). Yet pieces without a signature flat could instead be transposed down a fourth, thereby gaining in performance the effect of the signature sharp that had still to win acceptance on paper. Praetorius, at the same point in his treatise, actually recommended this degree of transposition in certain cases, noting the potentially lugubrious results of transposing by a fifth. We shall see, furthermore, that in using tenor-C3 notation Byrd did not consistently associate clefs, signatures and vocal ranges in a way that implies transposition sometimes by a fourth and sometimes by a fifth, and that in English sources generally the evidence for transposing down a fifth is considerably outweighed by that for transposing down a fourth, regardless of signature.

From as early as the 1530s, the prior existence of Praetorius' rule is evidenced by a not inconsiderable number of pieces which survive in two different notations, one in tenor-C3 and the other a fourth or a fifth lower (depending on whether or not the tenor-C3 version has a signature flat) in tenor-C4. The phenomenon is paralleled by some eight imitation masses by various composers that are notated a fifth higher or lower than the motets on which they are modelled

(Johnstone 2006, 35–43). Generally speaking, there is no discernible pattern in the use of one form of notation or the other: in some cases the lower form is employed in a printed source and the higher in a MS concordance, in others the two forms are employed *vice versa*. Some masses are notated lower than their models, others higher. The choice of notation therefore appears to have been simply a matter of scribal or editorial preference (the choice possibly depending on which form yielded the fewest ledger lines),[2] and it does not appear to have had any implications for the method of performance. Hence, while two copies of the same composition, or a mass and its model, might differ by a fourth or a fifth as regards their *notated* pitch, there are no grounds for supposing this to have implied any difference in their *sounding* pitch.

In addition to Praetorius' dictum that tenor-C3 pieces should be transposed downwards, there are two clear indications that it was tenor-C4 notation that increasingly served as the reference point for instrumental pitch standards. First, in certain madrigal collections published around 1600 instrumental parts were supplemented which—in the case of items employing tenor-C3 notation, and depending on whether or not those items had a signature flat—were notated a fourth or a fifth lower than the corresponding voice parts (Johnstone 2006, 36, 40). Second, from the early seventeenth century tenor-C3 notation became increasingly relegated to the domain of music theory books, the few applications it retained in practice being self-conscious archaisms (Barbieri 1991). From this time on, tenor-C4 notation began to predominate in the practical sphere, the Italian organist Adriano Banchieri being among the first to show that by invoking the usual transpositions the eight modes could be notated without recourse to tenor-C3 notation (Banchieri 1605, 41, 59; Banchieri 1614, 71–87). (The use of tenor-C4 notation for the eight modes engendered a system known as the *tuoni ecclesiastici* or 'church keys', one peculiarity of which was that the seventh mode was not an exact transposition of its natural form: see Barnett 2002, 414–30).

[2] Since the two notations were a third apart while the intervals of written transposition were a fourth and a fifth, a note on the first ledger line below the staff in tenor-C4 notation would not require a ledger line in tenor-C3 notation, while a note on the first ledger line above the staff in tenor-C3 notation would not require a ledger line in tenor C4 notation. Hence tenor-C3 notation, though nominally higher, was actually better suited to pieces of a lower tessitura.

The only English theorist to touch on the subject of clefs and transposition was Byrd's pupil Thomas Morley (1597, 165–6). Morley stated quite straightforwardly that 'the high and low keys [i.e. tenor-C3 and tenor-C4 notation] come both to the one pitch, or rather compass', but went on to confuse matters by asserting a difference in character between them, claiming 'more life' for the one and 'more gravety and staidness' for the other (the implications of these apparently contradictory assertions are discussed, albeit inconclusively, in Andrews 1962, 35–7). Contemporary English musical sources, however, furnish ample evidence that the two forms of notation were considered to be interchangeable to at least the extent they were on the continent. No fewer than twenty of Byrd's published Latin compositions exist in MS concordances notated a fourth lower or higher, or a fifth higher, than their respective printed versions (see Table 1).[3] All were copied for Byrd's friend and fellow Catholic Edward Paston (Brett 1964), and the tenor-C3 notation employed in the majority of them may in some cases have been transmitted from pre-publication versions obtained from the composer and subsequently switched to tenor-C4 notation for the press. It is noteworthy that in the whole of Paston's vast collection only two items by Byrd differ from other sources by the interval of a fifth, these being higher versions of two motets printed in tenor-C4 notation. The collection thus offers no evidence that any of Byrd's music was sung a fifth lower than it was printed, only a fourth lower.

Conclusions about the notation used in Paston's MSS are complicated by three lute books containing intabulations of vocal pieces that must have been either irregularly transposed by their arranger (Brett 1993) or, much more plausibly, intended for lutes of different sizes and tunings (Sequera 2010, 97–111). Nevertheless, three concordances in the vocal partbooks MSS Tenbury 374–78 establish the point that a work printed by Byrd in tenor-C3 notation could coexist with a MS version notated a fourth lower. On that basis, a relationship may be posited between tenor-C3 notation, the tenor-C4 notation of Byrd's English vernacular church music, and the pitch area in which that music is known to have been sung. The results of positing this relationship will be examined below.

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[3] On Byrd's published secular compositions with MS concordances in alternative notation see Andrews 1962, 31–2.

Table 1. Byrd's published Latin compositions with MS concordances in alternative notations

Prints

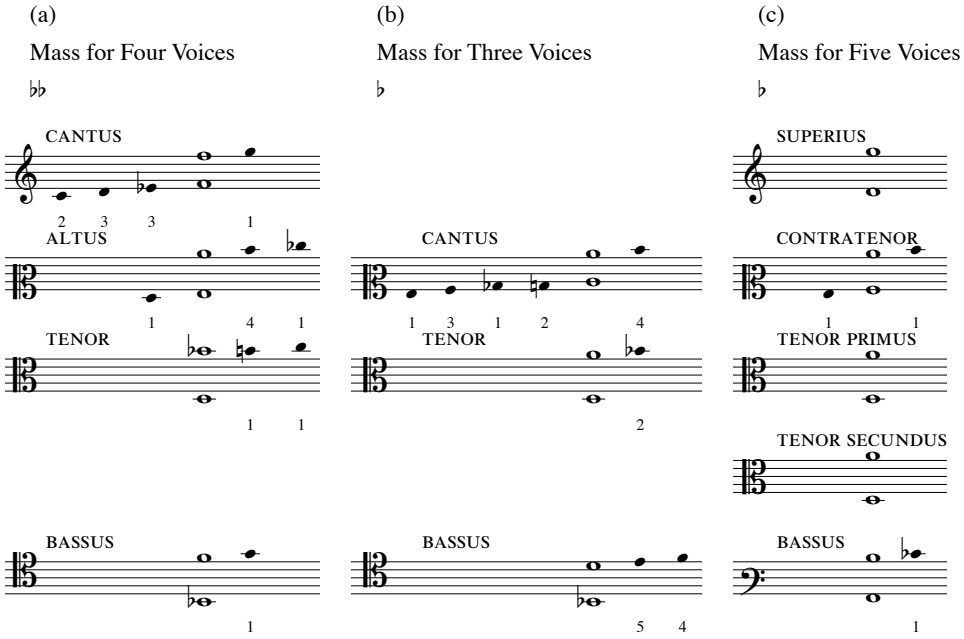
1575	*Cantiones*
1589	*Cantiones sacrae I*
1591	*Cantiones sacrae II*
1605	*Gradualia I*
1607	*Gradualia II*

Manuscripts

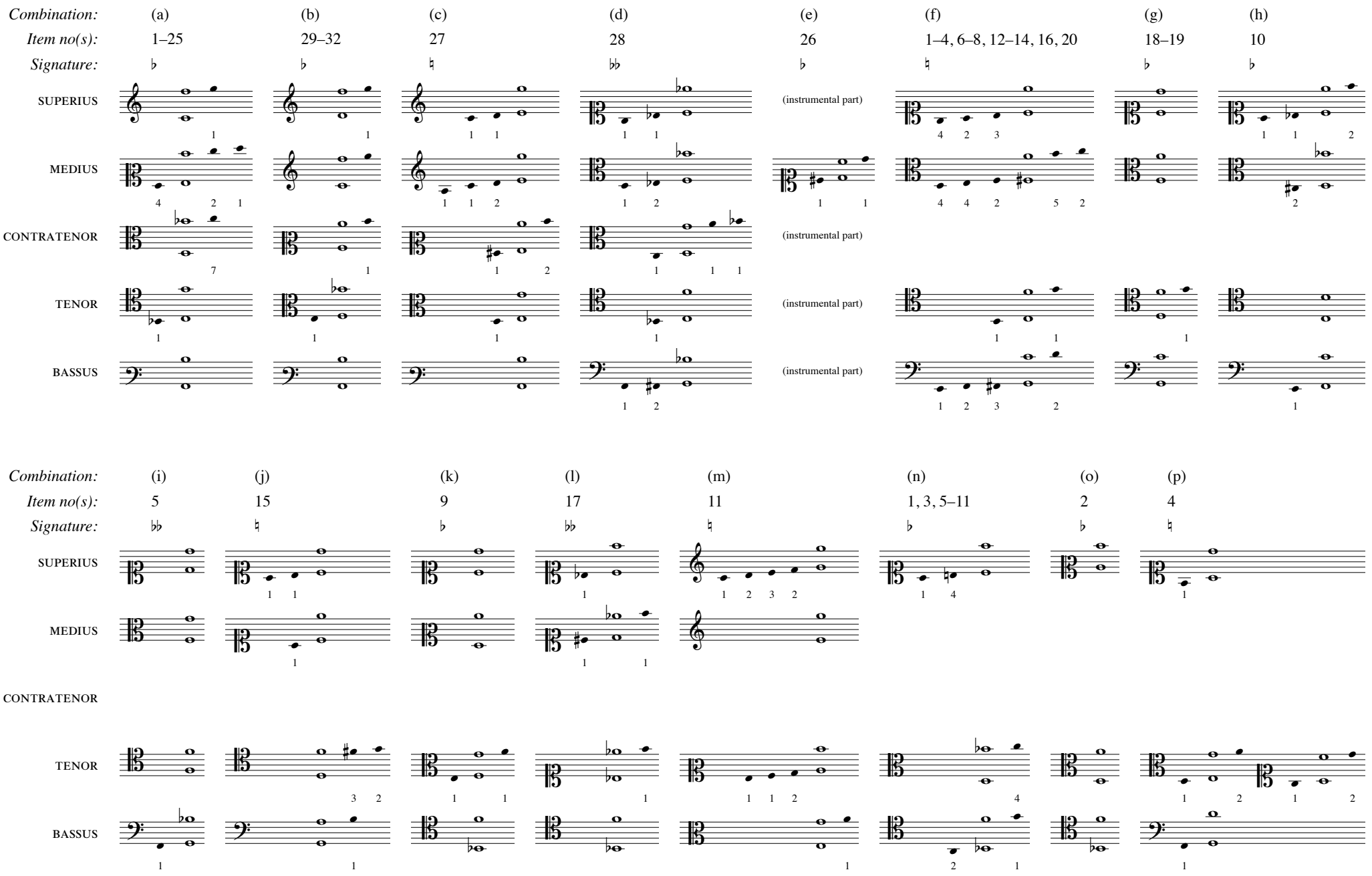
30810	London: British Library Add. MSS 30810–15
41156	————Add. MSS 41156–58
2036	London: Royal College of Music MS 2036
349	Oxford: Bodleian Library MSS Tenbury 349–53
374	————MSS Tenbury 374–78
1469	————MSS Tenbury 1469–71

Print / item no.	*Incipit*	*MSS –4th*	*MSS +4th*	*MSS +5th*
1575/10	Aspice Domine quia facta		30810	
1575/11	Attollite portas		30810	
1575/12	O lux beata trinitas		30810	
1575/18	Memento homo		1469	30810
1589/27–8	O quam gloriosum + Benedictio et claritas	374		
1591/23	Domine non sum dignus			30810
1591/31	Domine salva nos		30810	
1591/6–7	Salve regina + Et Jesum benedictum		349	
1605a5/29	Gaudeamus omnes (excerpt)	374		
1605a5/30	Timete Dominum (excerpt)	374		
1605a4/13	Alma redemptoris mater		41156, 2036	
1605a3/1	Quem terra pontus		2036	
1605a3/2	O gloriosa Domina		2036	
1605a3/3	Memento salutis auctor		2036	
1605a3/4	Ave maris stella		2036	
1607/25	Viri Galilei		349	
1607/26	Alleluia—Ascendit Deus		349	
1607/27	Dominus in Sina		349	
1607/28	Ascendit Deus		349	
1607/29	Psallite Domino		349	

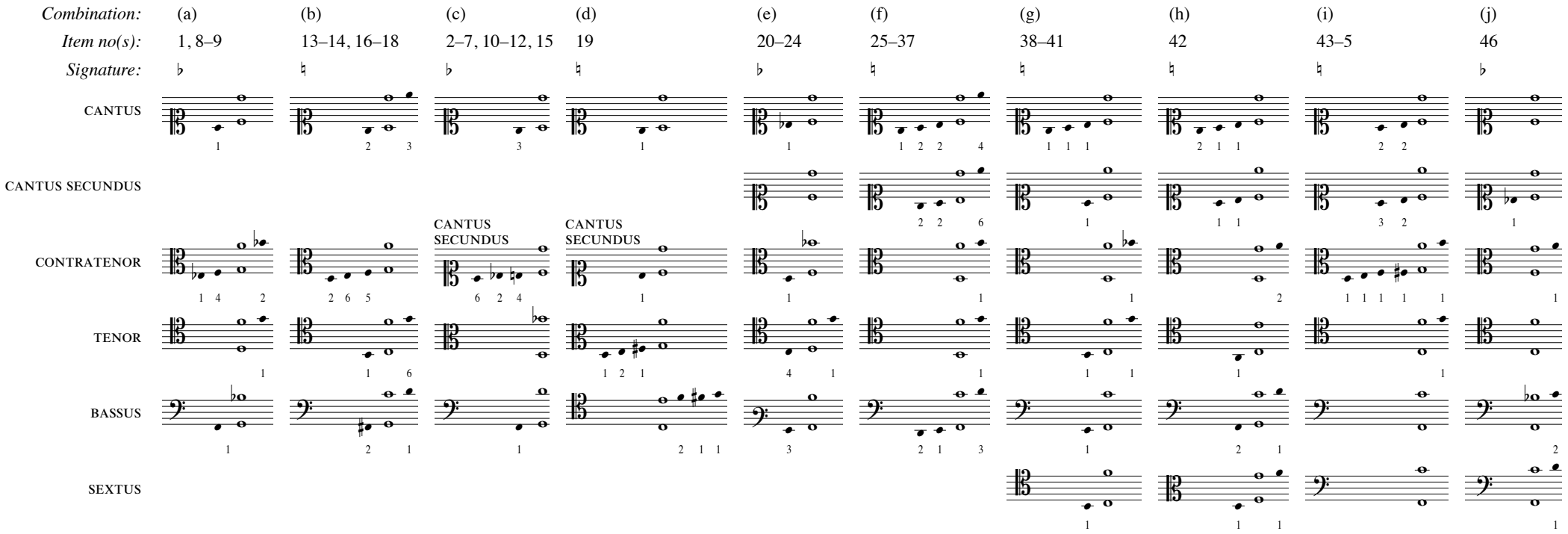
Ex. 3. Clef combinations and vocal ranges in the mass ordinaries



Ex. 4. Clef combinations and vocal ranges in *Gradualia I* (1605)



Ex. 5. Clef combinations and vocal ranges in *Gradualia II* (1607)



The Disposition and Vocal Ranges of Byrd's Partbooks

The voice-parts of Byrd's five Latin liturgical publications are schematised in exx. 3–5. The mass ordinaries (ex. 3a–c), issued as three separate sets of partbooks in the period 1592–95, are shown in the order they are known to have been published (Clulow 1966). The first volume of mass and office propers, *Gradualia I* of 1605 (ex. 4), was structured by the composer in three layers respectively consisting of items for five, four and three voices. The ordering is unusual, since in printed collections the items requiring the greatest number of voices were usually placed at the end. Exceptionally for a set of Renaissance partbooks (and perhaps because Byrd at first envisaged issuing the contents as three separate publications, like the mass ordinaries), each layer has its own numbering sequence; hence items must be identified by date, layer and number (e.g. 1605a5/1, 1605a3/2). The second volume of propers, *Gradualia II* of 1607 (ex. 5), is in contrast conventionally ordered in layers respectively for four, five and six voices, and all items are numbered in a single sequence.

Characteristically for an English composer (Wulstan 1966, 97), Byrd was far from consistent in his usage of voice nomenclature. The uppermost voice is named 'cantus' in the masses a4 and a3, 'superius' in the mass a5 and the 1605 *Gradualia*, and 'cantus' once again in the 1607 *Gradualia*. The next voice down is named 'altus' in the mass a4, 'medius' in certain items of 1605, and 'contratenor' in the mass a5 and 1607. Nor, when judged according to the principles of *voce piena* scoring, do any of Byrd's voice-names necessarily connote a register in a specific relationship with that of the tenor. In the mass a3, the tenor's upper neighbour, which is clearly of the same type as the 'altus' and 'contratenor' of the masses a4 and a5, is instead designated 'cantus'. Depending on its relationship with the other voices, the so-called 'medius' of 1605 is clearly sometimes an alto and sometimes a second soprano: in a continental publication it would surely have been designated 'quintus' (just as the sixth of the 1607 partbooks—which contains second alto, second tenor and second bass parts—is correctly designated 'sextus'). Not even the name 'tenor' guarantees tenor function within the ensemble:

in 1605a5/1–25 (ex. 4a) the range of the designated tenor is clearly that of a baritone, the actual tenor part being assigned to the 'contratenor' partbook.

Notwithstanding these inconsistencies of nomenclature, it is not difficult to categorise the vast majority of Byrd's scorings as either *voce piena* or *voci pari*. Accordingly, in exx. 4 and 5, for each layer of the two *Gradualia* sets the *voce piena* scorings are shown first followed by the *voci pari* scorings. The five- and six-part *voce piena* scorings may incorporate a second soprano part (ex. 4 b–c; ex. 5 e–j), a second alto part (ex. 4 d; ex. 5 h), a second tenor part as in the mass a5 (ex. 5 g) or a second bass part (ex. 5 i–j); alternatively they may incorporate an additional baritone part (ex. 4 a) or a bass part that happens to lie high enough to be notated as a baritone (ex. 5 e). The *voci pari* scorings may substitute a second soprano for the alto part (ex. 4 j), for the tenor part (ex. 5 c), or for the bass part (ex. 4 m; ex. 5 d), or, in the most extreme case, substitute second and third sopranos for the alto and bass parts (ex. 4 l).

In no case can there be any doubt as to whether the *voce piena* items of the *Gradualia* are in tenor-C4 notation (ex. 4 d, f–i; ex. 5 a–b, e–j) or tenor-C3 notation (ex. 4 a–c). Of the 1605 *voci pari* scorings, only two can be construed as variants of either tenor-C4 or tenor-C3 notation. Read as tenor-C4, the scoring shown in ex. 4 k comprises soprano, mezzo-soprano, alto and tenor; read as tenor-C3 and transposed down a fourth, it comprises mezzo-soprano, alto, tenor and baritone/bass. Likewise the three-part scoring shown in ex. 4 o may comprise either mezzo-soprano, alto and tenor, or—a fourth lower—alto, tenor and baritone/bass. While it is not inconceivable that Byrd intended these items to serve a dual purpose, the likelihood seems greater that they are in tenor-C3 notation and incorporate the baritone, this voice-type being employed elsewhere in the *Gradualia* whereas the mezzo-soprano is not. For the same reason, the 1607 *voci pari* scoring shown in ex. 5 d may confidently be deemed to comprise two sopranos, alto and tenor; the only other such scoring from 1607, shown in ex. 5 c, clearly comprises two sopranos, alto and bass. Indeed, on the relevant pages of the 'contratenor' partbook to which the second soprano parts of both these *voci pari* items were assigned, Byrd took the exceptional step of changing the running header from 'contratenor' to 'cantus

secundus'. The whole of the 1607 collection thus turns out to be in tenor-C4 notation, a circumstance for which there can be no better explanation than that the composer had decided to move with the times.

The two 1607 *voci pari* scorings nonetheless pose questions with crucial implications for performance practice. Since the 1607 set contained a designated 'cantus secundus' partbook, why did Byrd not simply assign the second soprano parts to that partbook, thereby allowing the lower parts to be allocated to their correct partbooks? And why, when one running header was changed, were the running headers of the lower parts left as 'tenor' and 'bassus'? These questions are all the more baffling when liturgical function is taken into account, since the propers for the third mass of Christmas (1607/1–5) comprise an Introit in entirely regular tenor-C4 notation (1607/1, ex. 5 a) and a Gradual, Alleluia, Offertory and Communion in one of the *voci pari* combinations (1607/2–5, ex. 5 c). Did Byrd therefore expect a second soprano to stand agape during the Introit and then take over the contratenor partbook for the remainder of the mass? And in consequence, was the tenor to stand agape during the remainder of the mass, having handed his partbook to the contratenor singer after the Introit? Or were Byrd's singers versatile enough to hold on to their respective partbooks and shift register as and when such clef changes occurred?

It will be only in the light of broader conclusions about performing pitch that the two options of exchanging partbooks or shifting register can be meaningfully assessed. Yet evidence in favour of shifting register may well be provided by a multi-sectioned three-voice item in the *Gradualia* (1605a3/4; ex. 4 p). Here the middle voice occupies the C3 clef for the first four of the seven *partes*, abruptly switches to the C1 clef for the fifth *pars*, and returns to the C3 clef for the last two *partes*. Nominally the voice is a tenor, the running header to that effect being retained, and there are no typographical indications that the fifth *pars* is technically a 'superius secundus'. Admittedly, the extremely wide range resulting from this clef change—wider even than that resulting from the inconsistent cleffing of the Christmas mass propers—might be taken as an argument against any transposition of tenor-C3 notation. But if Byrd's ensemble were versatile enough to sing tenor-C3 notation without transposing it down a fourth, then it is surprising that

the twenty different clef combinations found in the *Gradualia* do not include any 'great compasse' combinations deploying the F4 and G2 clefs simultaneously. When transposed by the usual intervals, furthermore, the ranges of the tenor-C3 items behave just as would be expected, as we shall soon see.

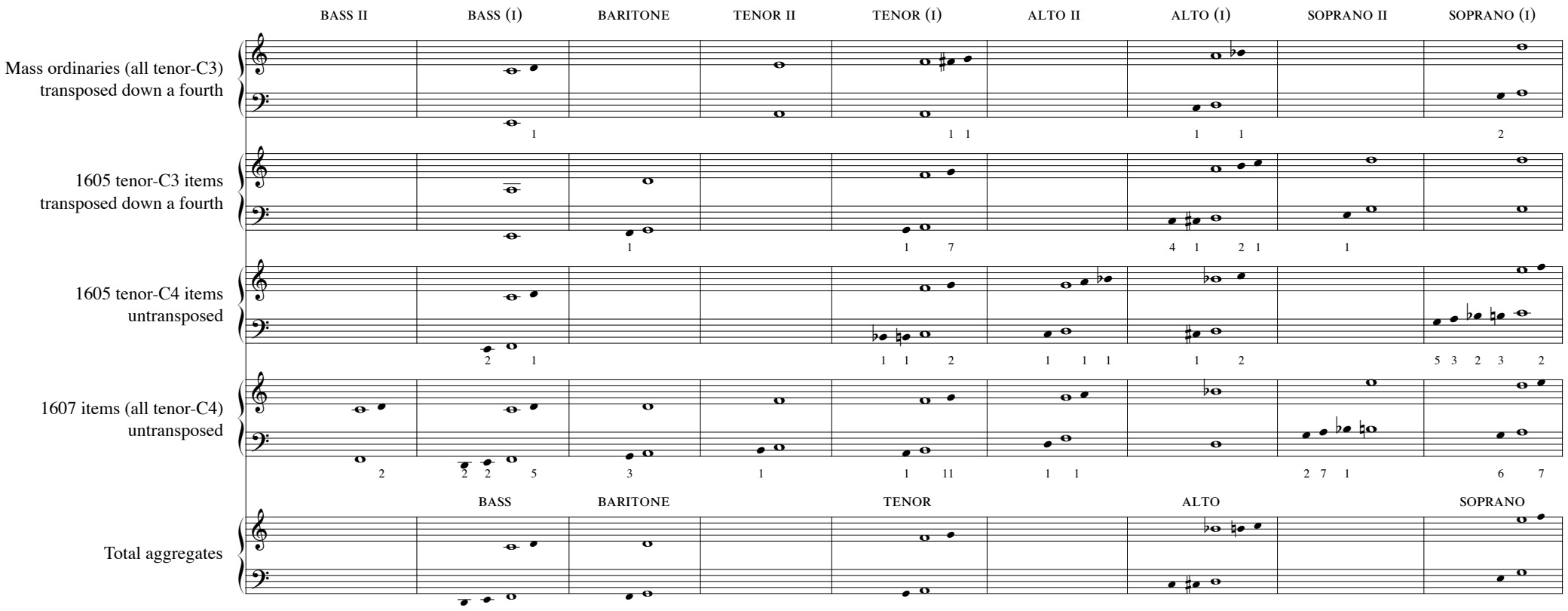
While Byrd was clearly happy to work mostly within the basic framework of continental clef combinations, it is equally clear that his imagination could not be restricted by the limits of the five-line staff. Whereas the likes of a Palestrina could compose entire mass ordinaries—the six-voice *Missa Papae Marcelli*, for example (edn in Haberl 1881)—without once overstepping the staff limits of his chosen clef combination, in Byrd's polyphony ledger lines abound. Not all of his extreme notes form part of a voice's regular operating range, however, some being used occasionally and some uniquely. In exx. 3–7, therefore, an attempt has been made to differentiate between a voice's basic range, which is shown with void noteheads, and extensions to that range, which are shown with black noteheads. Differentiating between a basic range and its extensions is necessarily arbitrary: by the method followed here, a given note is included in the basic range (a) when it occurs more than twice within an individual composition or (b) when it occurs more than twice within any one composition belonging to a group of compositionts with a common signature and clef combination (single mass movements being reckoned as individual compositions, and whole masses as groups). Hence for an individual composition the total instances of an extension will never exceed two, whereas for a group of compositions the total instances will never exceed twice the number of compositions in that group. Since the duration of a given extension is not into account, a reiterated note is reckoned as a single instance of an extension; thus in a passage such as *e′ f′ g′ g′ f′* the *f′* would be reckoned twice but the *g′* only once.

The three mass ordinaries have ranges similar enough to imply they were all meant to be sung at the same pitch level (ex. 3). Apart from shunning *c′*, the 'superius' of the mass a5 observes the same range as the 'cantus' of the mass a4, with a highest notated limit of *g″*. The alto parts fall almost entirely within the range of a twelfth notated *g–d″*, this being exceeded only

in the mass a4 by two notes respectively a tone lower and a semitone higher. The tenor and second tenor parts all observe a lowest notated limit of *d*, and a basic upper notated limit of *a′* or *b′*-flat that is uniquely extended to *b′*-natural and *c″* in the Credo of the mass a4, an 'extremity for the ditty's sake', as Morley puts it (1597, 166), befitting the words 'et ascendit in caelum'. The bass has a notated lower limit of *B*-flat in the masses a4 and a3, and *A*, a mere semitone lower, in the mass a4; its highest upper extension (to *g′*) occurs also in the Credo of the mass a4, and in conjunction with the tenor's extension to *c″*. The use of the C4 clef for the masses a4 and a3, furthermore, cannot be taken as a signal to transpose down a fifth: both masses already have flat signatures (the two flats of the mass a4 being as many as sixteenth-century usage could accommodate), and the 'cantus' and 'altus' parts of the mass a4 extend a tone lower than the corresponding parts of the mass a5.

To be sure, the variety of clef combinations in the *Gradualia* is bewildering, and especially so in the 1607 volume where tenor-C4 and tenor-C3 notations are mixed. Nevertheless, with the exception of the Christmas items mentioned above, each cycle of mass propers confines itself to one of the *voce piena* combinations shown in ex. 4 a, b and f, and ex. 5 b, c, e, f and g. Hence when these items were performed liturgically the singers of their alto, tenor and bass parts could have sung also the mass ordinaries to Byrd's setting a3 or have been joined by the singer(s) of their soprano parts to sing his setting a4. Though the second tenor needed for the setting a5 is incorporated only in the six-part propers for the feast of St Peter and St Paul (1607/38–41, ex. 5 g), the second tenor part of the mass a5 has a range only a tone higher than that of the baritone part of the propers 1605a5/1–25 (compare exx. 3 c and 4 a), meaning that Byrd probably envisaged both parts for the same singer(s). The mass a5 could not have been combined with the other five-voice propers, however, without some redeployment of the vocal resources, those propers having instead two soprano parts (exx. 4 b and 5 e–f). The remaining scorings from both collections—be they *voce piena*, *voci pari*, three-part, or vocal-plus-instrumental—are all associated with miscellaneous standalone items such as antiphons and office hymns, and did not need to be compatible in the way the mass ordinaries and propers did. Written perhaps for

Ex. 6. Aggregate vocal ranges of the mass ordinaries and the *voce piena* items of the *Gradualia*.



specific occasions and specific resources, these items very likely capitalised on 'the talents and vocal ranges of particular singers in [Byrd's] community' (McCarthy 2013, 136).

Assuming that items in tenor-C3 notation should be transposed down a fourth (and the ranges of 1605a5/27 and 1605a4/11 suggest the same treatment despite the lack of a flat signature, see ex. 4 c and m), we find that the ranges of the three mass ordinaries are by and large closely corroborated by the ranges of the *voce piena* items in the *Gradualia* (ex. 6). The bass parts all have a basic upper sounding limit of *c′* which is extendable to *d′*; the tenor parts observe an absolute upper sounding limit of *g′*; the sounding range of the alto parts, basically *d*–*b′*-flat, is extendable by as much as a tone at each end. The soprano parts have a lower sounding limit of *g′* that is transgressed only once (in 1605a5/27, and not for any reason that can be gleaned from the verbal text); though the usual upper sounding limit of *d″* is stretched to *e″* in the 1605 tenor-C4 items and in the basic range of the 1607 second soprano parts, nothing about the ranges of the other voices suggests that the items concerned were meant for performance at a lower pitch level. Similarly, the only two instances of *D*, occurring in the bass parts of 1605/27–28, are accompanied by regular ranges in the upper voices. The only two instances of *f″* both occur in the problematical 1605a4/10 (ex. 4 h), an early work in which Byrd seems still not to have fully shaken off the sonorities of the pre-Reformation triplex voice, and which has been described as 'the oldest and crudest piece … ever published or anthologised by the composer' (Kerman 1981, 62).

Byrd's Latin Liturgical Works and Quire Pitch

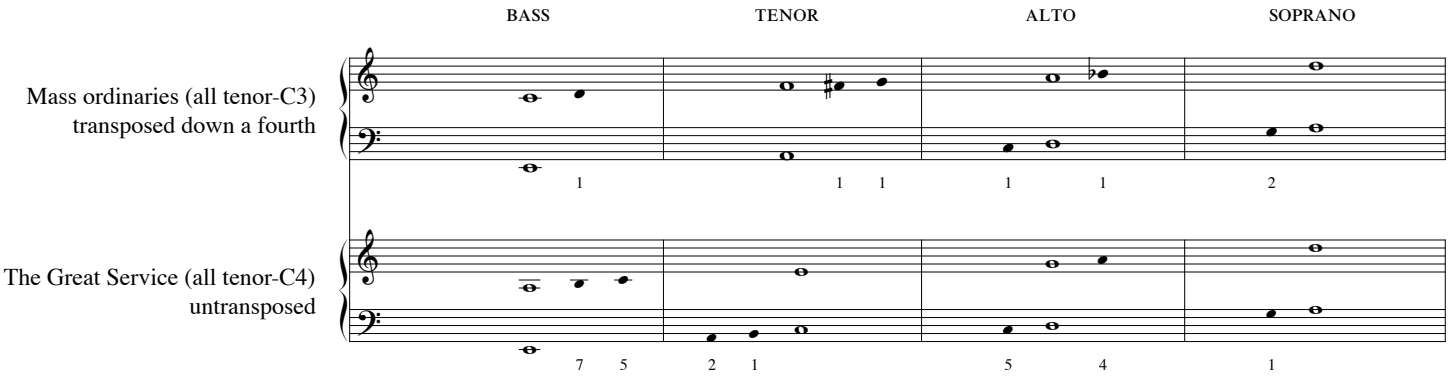
As a Gentleman in Ordinary of the Chapel Royal, Byrd spent much of his career as a singer, organ accompanist and composer of vernacular church music in the royal household chapel of the English monarch. The vast majority of the vernacular repertory is scored *a voce piena* in tenor-C4 notation, typically with a second 'contratenor' or alto part, but sometimes with further duplications of the four basic voice-types. From MS organ books of early to mid seventeenth-century date, the repertory is known to have been performed usually with some sort of accompaniment, and from the evidence of contemporary organ pipes from Durham Cathedral

and Magdalen College Oxford the accompanying instruments are known to have sounded roughly two thirds of a tone higher than concert pitch, i.e. between A+1 and A+2 (Johnstone 2003). One of these transpositions therefore needs to be applied in order to bring the repertory close to its original sounding pitch, A+1 being slightly closer to, albeit slightly lower than, the pitch level represented by the Durham and Oxford pipes.

The performing conditions of the Chapel Royal, with an organist constantly on duty and a choir sometimes comprising more than forty voices (le Huray 1967, 65, 119), were of course worlds apart from the clandestine domestic celebrations of the mass at which Byrd's Latin liturgical works must first have been performed. A case for the applicability of known church pitch to those works would thus hardly be tenable unless it could be demonstrated that Byrd, whether he was writing liturgical music in Latin or in English, had precisely similar voices in mind. Yet a comparison of the aggregate vocal ranges of the three masses with those of Byrd's most substantial vernacular liturgical work, The Great Service, shows this must indeed have been the case. In ex. 7, the service's ranges have been schematised according to the method described above, void noteheads showing the basic ranges and black noteheads extensions. No fewer than thirty-eight different vocal combinations are used in the service, the most complex consisting of two basses, two tenors, four altos and two sopranos; to qualify for inclusion in the basic range, a note must be sung at least three times in at least one of the service's seven movements, not just by voices of the same type, but within a single voice part. In Byrd's three other extant vernacular services, comprising a total of eleven movements, the ranges of The Great Service are exceeded but once, by a solitary tenor *G* in the so-called Third Service. (For untransposed edns of all Byrd's services see Buck et al 1922; though a portion of one of the original alto parts of The Great Service is no longer extant, its range can be reliably gleaned from contemporary organ accompaniments.)

In comparing the sounding ranges of the three masses (i.e. with their tenor-C3 notation transposed down a fourth, as shown in ex. 7) with the ranges of The Great Service, we may note first that the overall compass (*E–d″*) is in both cases identical, as too are the ranges of the

Ex. 7. Aggregate vocal ranges of the mass ordinaries and The Great Service.



respective soprano parts. Each voice-type observes the same absolute lower limit in the masses as it does in the service. The extended range of the service's bass parts (and extensions to those parts are not particularly exceptional) corresponds to the basic range of the masses' bass parts, while the basic upper limit of the masses' tenor parts is a mere semitone higher than that of the service's tenor parts. Upper extensions to the masses' bass and tenor parts are exceptional, all three of them serving, as we have seen, to symbolise the text of the Credo a4. In terms of absolute upper limit, the alto parts of the masses exceed those of the service for a single note, and by a single semitone. Therefore, apart from the difference of a semitone between the respective basic tenor ranges, the differences in range between the masses and the service may be said to consist of single instances of just four notes.

Applying the transposition A+1 to the total aggregate vocal ranges shown in ex. 6 reveals the results that will be obtained from performing Byrd's *voce piena* Latin liturgical music at a pragmatic yet close approximation to the pitch standard of contemporary English vernacular liturgical music. The bass and baritone parts will be contained within the two octaves from *E*-flat to *e′*-flat, the tenor parts within the two octaves from *A*-flat to *a′*-flat; for present-day singers these are indisputably optimal ranges. The same cannot be said, however, of the two upper voice types: with a basic range of *a*-flat to *f″*, the soprano parts call decidedly for mezzo-soprano voices, while the alto parts, requiring the two octaves from *d*-flat to *d″*-flat, are as a whole too high for a man's chest voice and too low for either a man's head voice or a regular female voice. Yet since, to the best of our knowledge, these are the vocal ranges Byrd wrote for, it would appear that the singers of his 'altus' or 'contratenor' parts were most probably men capable of artistically blending chest and head production. Clearly, such singers had to be vocally adaptable, and dealing with the clef change in 1605a3/4 would have stretched their adaptability no more than a tone higher than elsewhere, in just two extensions to today's *e″*-flat. If, as was suggested above, the baritone parts of 1605a5/1–25 were taken by the singer who also took the second tenor part of the mass a5, then the resulting aggregate range would have been equivalent to today's *A*-flat–*f′*, plus a single lower extension to *G*-flat.

Yet here the need for vocal adaptability ends: whatever designations may appear on the title pages and running headers of Byrd's partbooks, there is no reason to suppose that the *voci pari* items were meant to be tackled by voices different from those indicated by the clef combination. Thus 1605a4/17 (ex. 4 l), though nominally for 'superius', 'medius', 'tenor' and 'bassus', must be assumed to be for three sopranos and tenor. The same conclusion inevitably applies to the problematical 1607/2–5. Although the 'cantus secundus' parts of those items would have taken Byrd's adaptable alto singer no higher than 1605a3/4 did, they would have done so to a greater extent. The user of the 'tenor' partbook, moreover, would have been taken a minor third higher than in any of the actual tenor parts in the masses or *Gradualia*, while in 1607/19 the user of the 'bassus' partbook would have been taken a perfect fourth higher than in any of the actual bass parts. It thus appears that the 1607 Christmas propers do indeed call for the cumbersome redeployment of vocal resources between movements as described above, an impracticality that must be put down to a miscalculation on Byrd's part.

Unless or until some reason for disregarding it should emerge, the previously unsuspected correspondence of range between Byrd's masses and his Great Service can mean only one thing: that transposition to A+1 is as justifiable for Byrd's Latin liturgical music as for his vernacular. To be sure, for many if not most present-day performers the historical evidence will inevitably have to take second place to the imperative of choosing a pitch that suits the available voices. But whenever the contrary possibility exists of choosing voices that suit the historic pitch standard, the works in tenor-C4 notation may be sung a semitone higher than notated, and those in tenor-C3 notation (taking into account the implicit downward transposition by a fourth) a major third lower than notated. With these two rules of thumb, curious interpreters may explore the colour and sonority of the masses and *Gradualia* as closely as is now practicable to a pitch level on which Byrd himself made music.

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