

## THE HORIZONTAL SPACING OF MUSICAL SYMBOLS: A BRIEF HISTORICAL OVERVIEW

MICHAEL TALBOT  
University of Liverpool

**Izvleček:** V obdobju, ki zajema približno zadnjih 350 let, se je horizontalno razporejanje notnih znakov in pavz spremenilo. Način, pri katerem prevladuje načelo enakomerne razporeditve simbolov (najbolj ekonomičen način z ozirom na prostor), je zamenjal drugi, kjer je odločilno natančno vertikalno podpisovanje glasbeno sovpadajočih simbolov, v manjši meri pa prenos časovnega trajanja na horizontalo. Referat preiskuje razlog za spremembo in nekatere od njenih učinkov.

**Ključne besede:** notacija, glasbeni čas, pojmovanje glasbe

**Abstract:** Over the last 350 years or so the horizontal spacing of notes and rests has moved from a situation where the principle of equidistance between symbols (the most economical of space) is dominant to one in which the precise vertical alignment of musically coincident symbols and, to a smaller extent, the translation of temporal duration into horizontal distance is observed. The paper examines the reason for the change and some of its effects.

**Keywords:** notation, musical time, perception/conception of music

Like words on a page, the musical notes of a staff or a system proceed from left to right, continuing below on a new line when the right-hand margin is reached – and so it has always been, from the very beginning of staff notation. However, the notation of music differs from that of words in that it has to convey mathematically precise quantities. The pitch of individual notes is given its exact value by heighting, with the aid of staff lines and leger lines. The duration of individual notes is expressed primarily via a wide choice of symbols, which are differentiated through the presence or absence of a stem, the filling in or leaving void of the note-head, the presence or absence of one or more flags or beams, the presence or absence of figures (such as “3” for a triplet group) indicating a pattern of division, and so on. However, there is – at least, potentially – a subsidiary, even if less exact, means of conveying duration, which is by varying horizontal spacing. The mechanism is obvious: the horizontal space between one note and the next is in approximate proportion to the duration of the first note. Only by applying this principle is it possible, in a score, to ensure that any two notes struck together are in perfect (or near-perfect) vertical alignment. Even when we play from a single line on a single staff, the relationship of duration and horizontal space is maintained, albeit less strictly and sometimes only in token fashion.

Nowadays, we take for granted that this vertical alignment and differentiated horizontal spacing will exist: we see it in all modern printed music, and the programs for music notation on computers build it into their default settings. When we learn to notate music in manuscript, even if there is little explicit mention of the two cardinal rules for inter-note spacing (that notes struck together are aligned vertically and that the space left after a note reflects its value), we imbibe and reproduce it.<sup>1</sup>

However, the modern rules for inter-note spacing are not essential in the way in which those for the form of symbol used are. A score with random, chaotic spacing between notes would still be an intelligible and possible, however inconvenient, vehicle for performance. And there are two respects in which the principle of *differentiated* horizontal spacing is inferior to a universally practised earlier system, the subject of this paper, based on *equidistant* spacing.

In the first instance, differentiated spacing is wasteful of paper (or, going back in time, of parchment). Example 1 shows this clearly. Example 1a adopts differentiated spacing, while Example 1b practises equidistant spacing, with much gain in compactness. If paper or parchment is a precious commodity, the less space consumed, the better. To put it brutally: blank portions of staff are a luxury that costs money.

### Example 1

Differentiated and equidistant spacing compared

#### (a) Differentiated spacing



#### (b) Equidistant spacing



In the second instance, the result of differentiated spacing is less attractive to look at than that of equidistant spacing. Our modern attitude to standard musical notation (I am not speaking of innovative notations that employ graphics) is pragmatic, not aesthetic. However, a mentality that rejoices in decorated capitals and marginal illustrations is likely to be more receptive to the aesthetic aspect of a score, and so we find it in the

<sup>1</sup> At least, we do if we are competent musical scribes. The author has much experience of a stubborn minority of composition and harmony students who fail to implement the two rules.

pre-modern and even the early modern period. Where we care about *durations*, and regard the beginnings and endings of notes as fundamentally different (as they indeed are acoustically, given the phenomena of attack and decay), Medieval and Renaissance minds were more exercised by *proportions*. Whereas a duration is dynamic by nature, a proportion is static. If what matters most about notes and rests is their value *per se*, then it may seem logical to space them as evenly as one does when writing a numerical series such as 1, 3, 5, 7, 11, 7, 5, 3, 1. The interest of many Medieval composers in symmetrical, sometimes palindromic,<sup>2</sup> structures is very much in keeping with the idea that the passage of the reader's eye from left to right, moving steadily down the page, is not mainly, or only, a process charting the music's movement through time: it is also a conventional way of taking in a visual design in which, as in an architect's plan, there is certainly a "left" and a "right" (corresponding to "before" and "after") – but the left-to-right relationship is not regarded as *wholly* different in kind from the right-to-left relationship. In that perspective, it makes sense to locate a note or rest horizontally at its mid-sounding-point (or "mid-non-sounding –point" in the case of the latter!) rather than at the point of attack.<sup>3</sup> This contrasts with the practice of modern notation, where it is specifically and solely the point of attack that governs the position of a note. Of course, once the space on either side of *one* individual symbol is equalized, one cannot but equalize the spaces between *all* symbols, irrespective of the different durations that they convey. The fact that in earlier notational practice stems ascend or descend from the *centre* of the note-head – a feature that in the case of music printed from movable type persists until late in the eighteenth century – seems to symbolize the Janus-like, free-standing character of the musical note. Conversely, placing the stem *to one side* of the note-head and beaming together consecutive short notes – both of these being practices that originated in handwritten music and were only later, following the introduction of engraving, adopted by printed music – produce a more dynamic visual effect that reflects and reinforces both the non-symmetrical character of the single note (as an acoustic phenomenon) and an awareness of how short notes combine to make up larger units.

Another difference is that in the older conception, musical time is something constructed "from the bottom up" by the notes and rests themselves. In the newer conception, it is more a prefabricated, empty grid into which the notes and rests have to be fitted. (Here, one could draw a parallel with the evolution of harmony. Before the eighteenth century harmony is conceived intervallically, the chord being merely the objective product of combinations of intervals. In modern harmony, the chord has an "ideal" structure to which the possibly divergent "real" structure has to be related, and it is no longer an absurdity to conceive of, for example, a dominant seventh chord lacking its root.) This concept of an invisible grid, already implied at an only slightly higher structural level by the presence of regular barring, encourages a more exact approach to horizontal placement.

The transition from equidistant to differentiated spacing did not take place quickly, consistently or uniformly, and it would require prolonged investigation and detailed study to describe its progress accurately. What is certain is that in 1650 it was not far advanced

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<sup>2</sup> As in Guillaume de Machaut's *Ma fin est mon commencement*.

<sup>3</sup> As, of course, happens today for the whole-bar (semibreve) rest.

but by 1800 had been largely completed. The relatively late date that I give for its universal adoption may come as a surprise. It certainly qualifies the rather too vague, and I think in part misleading, information given by Emanuel Winternitz in one of the rare passages in musicography to deal with the matter. Winternitz writes:

[...] Since the establishment of the modern score towards the end of the sixteenth century, score writing has come to employ in addition a more or less approximate representation of time lengths in terms of space lengths. Whenever corresponding bars in the different staves have notes of unequal time values, an arrangement is inevitable in which, say, the span covered by a half-note is twice the length of two quarter-notes and four times that of four eighth-notes.<sup>4</sup>

The remarkable fact is that that the adoption of notation in score as a primary medium of musical notation (scores had already been used as aids to composition and for didactic purposes for a very long time!) and the use of the barline, eventually taken over also for the notation of individual parts, did not immediately make the principle of equidistance obsolete, even though they undermined it and contributed in the long run to its supersession. There is nothing “inevitable” about the association of a score containing barlines with differentiated spacing: it coexisted, albeit uneasily, with equidistant spacing for literally centuries. Moreover, Winternitz is far too mechanical about his proportions: in practice, the space between two minims may easily be either less or more than that between two crotchets, even if he is not incorrect in proposing this ratio as a benchmark.

One may view the evolution of horizontal spacing in the period 1600–1900 as a kind of tussle between competing priorities. Favouring equidistant spacing were visual elegance and economy of paper use. Favouring differentiated spacing were the interests of the player and student of polyphonic music who needed, especially when sight-reading, to be able to assimilate and co-ordinate durations accurately – often without the time to “count” all note-values systematically. It is no accident that the first musical autographs in Winternitz’s anthology to exhibit an almost perfectly executed differentiated spacing are keyboard works, by Froberger (Plates 11–13). As Plate 12 shows, even when barlines are infrequent, it is possible to maintain perfect temporal alignment between all parts and staves. Predictably, Winternitz’s specimens of keyboard music by J. S. Bach (Plates 26–29) exhibit the same modern-looking spacing. To illustrate the more conservative approach, we can take the manuscript score of Vivaldi’s “Manchester” Sonatas for violin and bass, contemporary with the Bach pieces, where equidistant spacing remains the dominant principle.<sup>5</sup> In the *Corrente* of the second sonata it is noticeable how each stave adheres to its own spacing logic independently of what the other is doing: in the many instances where each part ends the bar with three quavers, these are never given an exact vertical alignment.

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<sup>4</sup> Emanuel Winternitz, *Musical Autographs from Monteverdi to Hindemith*, 2nd edn, 2 vols, New York, Dover Publications, 1965, vol. 1, p. 7.

<sup>5</sup> Published in facsimile as Antonio Vivaldi, *Le 12 sonate “di Manchester”*, with an introduction by Michael Talbot, Florence, S.P.E.S., 2004. This manuscript is copied in the hand of Vivaldi’s father Giovanni Battista Vivaldi, with autograph corrections and additions by the composer.

Interestingly, published music – especially that printed from type rather than engraved – seems to have been more conservative in this respect than handwritten music. Here, we can see the combined effect of a wish to pack as many bars as possible into a system for the sake of economy and a fondness for the pleasing regularities of equidistant spacing. This can be illustrated from page 8 of a late edition in score by John Johnson (1740)<sup>6</sup> of Corelli's trio sonatas Op. 2 (Figure 1). It is noteworthy that in the illustrated third movement of the second sonata, in 3/2 metre, the dotted semibreves, undotted semibreves and minims are predominantly spaced equidistantly within their respective staves, even though no saving of space results therefrom. In fact, the horizontal alignment of shorter note-values was widely treated in the eighteenth century as a higher priority than that of longer note values. In particular, there was a reluctance to place a white note (i.e., all note-values from a minim upwards) close to the preceding note or barline.

This preference for leaving considerable space before (as well as after) a white note persisted into the nineteenth century in the case of semibreves in common time, particularly when serving as pedal-notes in the bass. This is illustrated by *Prière du soir*, fifth of the 25 *Préludes* of C. V. Alkan, as published in Berlin by A. M. Schlesinger c. 1847, which places semibreves centrally within the common-time bar even when the staff they occupy is shared with other parts in shorter note-values. Well might a modern performer be misled into imagining that these centrally positioned semibreves were syncopated notes sounding on the second or third beat! And we are not free of the “centring” phenomenon even today, since breve and semibreve rests (the latter also used as whole-bar rests in most metres) retain the privilege of sitting in the middle of the bar, unlike minim and shorter rests. This persistence of this anomaly – a proud relic of a principle that once governed all notes and all rests – can perhaps be explained by the fact that such a rest is so much more visible if placed centrally. Because it represents silence, it cannot itself become misperformed through incorrect alignment, and because it occupies an entire bar, it cannot cause any adjacent note to be misperformed.

The persistence of the principle of equidistance today is also vestigially apparent in the case of separate parts extracted from a score. Here, unlike in the score itself, there are no other notes with which to make vertical alignment, and so the differentiation of horizontal spacing according to note-value can be relaxed – although rarely to the extent that, say, no more space is left after a minim than after a crotchet. The result is often a compromise lying about half-way between the perfect proportionality identified by Winternitz and perfect equidistance.

One curious by-product of the move, in the late eighteenth and nineteenth centuries, to a perfect vertical alignment of coincident sounds was that, for a time, the dot of addition was sometimes treated as an independent symbol in its own right, being placed exactly at the point where the added duration commenced. This is illustrated by Alkan's vocal quartet on the sacred Hebrew text *Etz chajjim hi*, as published in Paris by S. Naumbourg

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<sup>6</sup> Numbered 431 in William C. Smith and Charles Humphries, *A Bibliography of the Musical Works Published by the Firm of John Walsh during the years 1721–1766*, London, The Bibliographical Society, 1968.

Figure 1

Page 8 of John Johnson's edition of Corelli's *Sonata a tre*, Op. 2 (c. 1740)

Source: IMSLP (International Music Score Library Project)

The image displays a page of musical notation for a three-part sonata. It consists of six systems of music, each with a treble and bass staff joined by a brace. The first system is marked *Adagio* and includes a large number '8' at the beginning. The second system has a '98' in the bass staff. The third system has a '7 98' in the bass staff. The fourth system has a '56 6 98 7 6 9 5 9 5 4 3 56 6 9 8 9' in the bass staff. The fifth system is marked *piano* and has a '3 98 98 4 6 5 3 6 6 \*' in the bass staff. The sixth system is marked *Allegro* and includes the text 'Opera III.' at the bottom. The notation includes various notes, rests, and ornaments, with some notes marked with asterisks. The key signature is one sharp (F#) and the time signature is 3/8.

in 1847.<sup>7</sup> The – to modern eyes – ludicrous gap between the note-head and the following dot did not, however, win favour, and it has become normal for well over 100 years to standardize the space between note-head and dot and keep it no wider than demanded by clarity.

The change over time in the principles and practice of horizontal spacing in music notation is of little importance to editorial and performance practice. No duration is altered, after all, by a change in spacing. But it can be regarded legitimately as a symptom and concomitant of certain changes in the general perception of music that have occurred in the modern era.

For a start, it asserts the primacy of the score over the separate parts. Until score notation became dominant in the performance, as opposed to the mere study, of music – a process fully accomplished only in the nineteenth century – the beneficial consequences that would flow from an insistence on perfect (or as perfect as feasible) vertical alignment could be ignored in favour of aesthetic and economic factors. Inevitably, the principles that at the time appeared appropriate for the primary material, the parts, were liable to be reproduced without major modification in the derived material, the score. And the eventual domination of the score over the parts leads in turn to a host of other interesting questions, such as the triumph of “simultaneous” composition over “successive” composition and the ever-closer integration of texture, as represented by *durchbrochene Arbeit* and leading eventually to its ultimate reduction, *Klangfarbenmelodie*.

Differentiated horizontal spacing also marches hand in hand with the use of regularly spaced barlines. As we have seen, the presence of such barlines offers no guarantee that equidistant spacing will be abandoned, but it at least provides an argument by analogy for the adoption of vertical alignment between coincident notes or rests, through which the differentiation arises naturally.

We may also legitimately ask whether the high degree of rhythmic complexity in much post-1800, and especially post-1900, music would ever have come about without the extra degree of discipline introduced by exact vertical alignment. In particular, this notational exactitude is supportive of a feature to which, in another place, I gave the name of “diminuted metre”<sup>8</sup>. In diminished metre the *effective* beat-note is shorter than (typically, half the length of) the *ostensible* beat-note. So, in 4/4 metre it is the quaver, not the crotchet, that functions as the beat-note, as ascertained from the harmonic motion and phrase structure. One inevitable consequence of diminished metre is that more musical events tend to happen between two barlines, and without exact vertical alignment, the music would be that much harder to assimilate and perform, and perhaps even to conceptualize on the composer’s part.

Is the victory of differentiated spacing as complete as it is ever likely to be, or are future changes foreseeable? To judge from the students whose handwritten compositions and harmony exercises I have marked over several decades, the retention of the central

<sup>7</sup> In the spelling “Etz Hayyim” this text in praise of the Torah (“Tree of Life”) is familiar from Milhaud’s *Service sacré*.

<sup>8</sup> See Michael Talbot, Vivaldi’s “Late Style”: Final Fruition or Terminal Decline?, *Vivaldi, “Motezuma” and the Opera Seria: Essays on a Newly Discovered Work and its Background*, ed. Michael Talbot, *Speculum musicae* 13, Turnhout, Brepols, 2008, pp. 147–168, at p. 158.

position by whole-bar rests is counter-intuitive and, in the opinion of some of them, irrational. Music notation, like language, often evolves in a quasi-Darwinian way. If a mistake (the equivalent of a miscopying of genetic material) is committed often enough but no adverse effects are encountered, a “tipping point” may be reached where it suddenly becomes the new orthodoxy. So it has been, for example, with dotted rests, which, although disdained by a few conservative musical scribes even today, have a pedigree reaching back far into the eighteenth century.<sup>9</sup> To some extent, the music notation programs for computers are retarding the process of change by building traditional practice into the default settings, so it may be a very long time before the centrally placed whole-bar rest loses its authority. It could also happen that one day some means is found of eliminating the visually ugly and notationally cumbersome “sprawl” (in the horizontal dimension) that unavoidably results from the insertion of accidentals, the “diagonal” relationship of note-heads a second apart or the need to separate any two stems pointing in the same direction. If this is ever achieved, the vertical alignment of coincident sounds will be able to move even closer to total perfection.

#### HORIZONTALNO RAZPOREJANJE GLASBENIH SIMBOLOV: KRATEK ZGODOVINSKI PREGLED

##### Povzetek

Danes se zdi samoumevno, da so v partituri hkrati nastopajoči toni podpisani, in da se horizontalni razpored notacijskih znakov ozira na njihovo trajanje (prostor med dvema polovinkama je večji kot med dvema osminkama). Vendar se je ta način zapisovanja, ki se je začel pojavljati sredi 17. stol., dokončno uveljavil šele v 19. stol. V partiturah 17. in 18. stol. je bilo običajno, da je bila daljša vrednost v danem glasu napisana sredi horizontalnega prostora, ki naj bi predstavljal njeno trajanje (celinka v enem glasu je bila tako zapisana med 2. in 3. četrtniko v drugem); poleg tega so bile v posameznih glasovih note zapisane čimbolj skupaj, ne oziraje se na to, ali so vertikalno nad ali pod njimi zapisani toni zveneli hkrati z njimi ali ne (gl. primera 1a in 1b na str. 34).

Proces uveljavljanja partiturnega podpisovanja hkrati nastopajočih tonov in razlikovalnega razporejanja not z ozirom na njihovo trajanje je bil kompleksen; prav zaradi tega tudi ni povsem pojasnjen. Podpisovanje se je uveljavilo zaradi lažjega branja partitur, razlikovalno razporejanje, za katero je potrebno več pisnega prostora, pa med drugim tudi zato, ker varčevanje s papirjem ni bilo več tako nujno. Vendar je v prehodu od enega do drugega načina zapisovanja mogoče videti tudi premik v pojmovanju glasbe oz. kompozicijske strukture. Starejši način, kjer so daljše vrednosti sredi pisnega prostora (in ne na mestu, ko ustrezni ton zazveni), odraža pojmovanje, po katerem je glasbeni čas celota, ki se po takšnem ali drugačnem proporciju deli v manjše dele; nasprotno pa strogo

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<sup>9</sup> I have discovered examples in Vivaldi's autograph manuscripts. Ironically, the original guidelines of the New Critical Edition of Vivaldi's works supervised by the Istituto Italiano Antonio Vivaldi forbade the use of dotted rests, even in compound metre.

podpisovanje implicira glasbeni čas kot vnaprej postavljeno mrežasto shemo, ki naj bi jo skladatelj izpolni. Podobno se v partiturnem podpisovanju odraža zamisel, da je partitura po smislu pred glasovi (ki so le njeni sestavni deli). Takšno pojmovanje glasbenega stavka pa je v zgodovini privedlo do novih glasbenokompozicijskih zasnov, kot je bila npr. melodika zvočnih barv (»Klangfarbenmelodie«).