TEXTURAL DEPTH, STRUCTURAL DEPTH, EXPRESSIVE DEPTH:

LADDERS FROM LINE TO SONORITY

IN ARVO PÄRT AND HENRYK MIKOŁAJ GÓRECKI

AND

BURNING THE DEEP RED SEA

(AN ORIGINAL COMPOSITION FOR CHAMBER ENSEMBLE)

by

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University of Pittsburgh, 2005

Submitted to the Graduate Faculty of

Arts and Sciences in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

2007

UNIVERSITY OF PITTSBURGH

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Textural Depth, Structural Depth, Expressive Depth:

Ladders from Line to Sonority

in Arvo Pärt and Henryk Mikołaj Górecki

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University of Pittsburgh, 2007

The intense emotional response that Arvo Pärt's *Cantus* and the canon from Henryk Mikołaj Górecki's Symphony No. 3, *The Symphony of Sorrowful Songs* generate in many listeners raises analytical questions. A preliminary hypothesis is that the intense and durable emotional response evoked by the works was a result of their complexity. A detailed analysis of these two canons demonstrates such complexity. This complexity is clear, coherent, and hierarchical, and in each case is the result of a very simple compositional procedure. In both pieces complexity is constituted by an intricate web of processes that is described in this paper as structural depth. The kind of structural depth found in these pieces is analogous yet significantly different from the kind of structural depth that Schenkerian analysis uncovers. Intelligibility of processes, onset asynchrony of prominent events, and independence of processes are proposed as important criteria for the identification of this type of structural depth. The systematic establishment of criteria and methodology for the identification and analysis of structural depth in this dissertation leaves the door open for its application in the analysis of other pieces. In addition, this paper makes extensively use of metaphors such as that of a stepladder to facilitate the conceptual understanding of the similarities, differences, and interaction among the different processes. This analysis also identifies particular potentials of pandiatonicism that these canons takes advantage of such as the use of triadic sonorities in a modal environment, the role played by ascending fifth root motion, and the subtle and gradual transformation of harmonic patterns.

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PREFACE

I would like to thank every person that helped me to get through this long and at times overwhelming process. To Eric Moe for his experienced guidance, unconditional support, infinite patience, and for serving me as a model of inspiration as a composer as well as a person. To Mathew Rosenblum for welcoming me and my ideas with open arms, far exciding the most positive and friendly attitude I could have ever expected to find. I also owe him feeding my interests in the study of meaning in music. To Amy Williams for her good advice and her being always willing to hear about the gradual unfolding of my process. To Fil Hearn for kindly agreeing to be part of my committee part of my committee and showing me that there are some people outside the academic field of music that could appreciate what music theory can bring to the listeners' experience. I also should mention my friends who through informal talks helped me to identify what part of my ideas could have a potential for this project. Finally, I want to thank my loving family, my mother Esperanza, and my siblings Andres y Victoria for their unconditional love. Although, the distance has separated us for years, I could not have gotten to the end without their being always there for me.

1.0 INTRODUCTION

On December 4, 1976, the British composer Benjamin Britten died. This event marked the end of a pivotal year for the history of contemporary classical music. In that year, four of the most important composers usually associated with the minimalist movement wrote some of their most iconic works. Steve Reich, Philip Glass, Arvo Pärt, and Henryk Mikołaj Górecki, consolidated their aesthetic approach in compositions that, although created independently, share a similar freshness and vitality.[1] Those pieces share an aesthetic of relative simplicity, primarily manifested in their extensive use of repetition, but also significantly manifested in their emphasis on diatonic harmony.[2]

Although the death of Benjamin Britten and the composition of these pieces are coincidental, there are two elements that link these events beyond their chronology. In the first place, Britten, although a multi-faceted composer, manifested, in both his music and his pronouncements about music, a clear interest in both accessibility and simplicity. As many minimalist compositions, most of Britten's works are primarily triadic in their harmonic language, and emphasize the use of simple formal schemes where repetition is privileged. Secondly, perhaps in acknowledgement of this, one of the pieces that immediately followed "the burst of minimalist creative activity" in the year 1976, was dedicated to his memory:

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[1] In the year 1976 Steve Reich composed *Music for Eighteen Musicians*, his second piece for a large ensemble, the first being *Drumming* (1971). That same year Philip Glass, in collaboration with Robert Wilson, produced the opera *Einstein on the Beach*, regarded by many critics as one of his best works. The year 1976 also saw the birth of Pärt's tintinnabuli technique through the appearance of pieces such as *Für Alina* and *In Spe*. Finally, in that same year, Henryk Mikołaj Górecki composed what would become not only his best known piece, but arguably the most commercially successful piece of contemporary music to date with over a million copies sold worldwide, his Symphony No. 3, *The Symphony of Sorrowful Songs*.

[2] This return to the diatonic world was prepared by the pandiatonicism of Neo-Classic pieces such as Stravinsky's *Serenade on A* (1925) or Copland's *Appalachian Spring* (1944). It is important to point out, however, that most of the early so-called 'minimalist music' does not completely break with the avant-garde aesthetic, since their rigorous focus on process per se establishes a connection with the serial procedures of previous music.

Cantus in Memory of Benjamin Britten, written by Arvo Pärt in the year 1977, together with other pieces that Pärt composed that year such as *Arbos*, *Summa*, and *Fratres*, belong to the same group of tintinnabuli pieces he began creating in 1976.[3]

This paper analyzes Pärt's *Cantus in Memory of Benjamin Britten*, and the first movement of Górecki's Symphony No. 3, *The Symphony of Sorrowful Songs.* These two pieces not only share a general connection to minimalism but also some of the specific features of their compositional procedures.[4] Both *Cantus* and the opening section of Gorecki's symphony are canons of large proportions. Cantus' is a five-voice mensuration canon[5] that with the use of tintinabuli technique results in a nine-voice texture. Górecki's canon is an eight-voice stacked canon[6] that with octave doubling adds up to ten instrumental layers. These two canons are written for string orchestra and encompass almost the complete pitch range available on these instruments. The canonic procedure that these pieces rely on is not an exception but rather a trademark of early minimalism. Important early minimalist pieces such as Terry Riley's *In C* (1964), and Steve Reich's *Come Out* (1966) and *Piano Phase* (1967) are almost completely generated

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[3] It is important to point out that although dedicated to Benjamin Britten, *Cantus* does not include any actual quotation from or direct reference to Britten's music.

[4] The link is especially intriguing since there is no evidence of the composers knowing each other's work at the time of their composition.

[5] In a mensuration canon, also known as prolation canon, each voice introduces an augmented version of the theme. This creates a rhythmic stratification where different speeds occur simultaneously. Due mostly to the technical challenges of its writing, there are very few examples of this type of canon. Among these are Johannes Ciconia's chanson "Le Ray Au Soleyl" (late 14th century), Johannes Ockeghem's four-voice Missa "Prolationum" (ca. 1475), Josquin Desprez's three-voice "Agnus Dei" from the Missa "l'homme armé" (late 15th century), and Bach's four voice canon, last in a set of fourteen canons appended to the Goldberg Variations (first published in 1741). More recently, between the years of 1965 and 1992, the American composer Conlon Nancarrow experimented with mensuration canons with complex rhythmic rations and textures up to twelve voices. Some examples of these more complex types of mensuration canon are his piano studies No. 37 and No. 40. It is important to notice that only Nancarrow's examples exceed *Cantus* number of voices.

[6] 'Stacked canon' is a less standard term first proposed by Alan Gosman in his article 'Stacked Canon and Renaissance Compositional Procedure' (1997). The term describes a canon of more than two voices that strictly follows a fixed interval of imitation other than unison or octave (i.e. stacked fifths, stacked fourths, etc.) Only eight examples of diatonic stacked canon have been identified to date, Gorecki's being the most recent one: Johannes Ockeghem's three-voice "Prennez sur moi vostre exemple" (ca. 1475), Mathieu Gascongne's twelve-voice "Ista is speciosa" (ca. 1510), Mathurin Foresetier's Missa "L'homme arme" (ca. 1510), Jean Mouton's four-voice chanson "En Venant de Lyon," Verdel's four-voice motet "dignare me laudare te" (published in 1534), Adrian Willaert's chanson "Si je ne voy m'amie" (published in 1553), and finally Palestrina's "Benedictus qui venire" from Missa "Ad Fugum" (1567). Notice that the only stacked canon that exceeds Gorecki's number of voices is Gascongne's twelve-voice canon.

from canonic writing.[7] Their particular use of imitation, especially in the works by Reich, has come to be known as 'phasing'. In 'phasing' the temporal interval of imitation is continuously being adjusted. This adjustment occurs either by gradual increments (i.e., modifying very slightly the speed of one of the performers), as is the case of the two pieces by Reich already mentioned, or by sudden changes in the interval of imitation, as in Reich's *Clapping Music* (1972). There are some important differences, however, between the canonic procedure in the two pieces examined in this paper and Reich's 'phasing' procedure, the most obvious being their use of register. While Reich's early phasing pieces imitate at the unison, constraining their voices to a narrow middle register, Pärt's and Górecki's canons use imitation at a larger interval that results in a wider registral range; with more active participation of register, these pieces feature a clear registral progression that eventually leads to a prominent climax. The emphasis of Reich's early 'phasing' pieces, on the other hand, is on the way virtual melodic patterns are created by the superposition of displaced identical objects, and, more importantly, on the rhythmic process itself. However, as will be discussed in the conclusion, the processes of Pärt's and Górecki's canons involve a more linear progression of tension, and their apprehension is significantly more accessible than in Reich's early pieces. This is not to say that one kind of music is better than the other, but that the type of listening experience that their canonic procedures entails is remarkably different.

Some brief remarks about some of the antecedents of these pieces may help the reader to better understand the role of Pärt's and Górecki's canons in a larger historical picture. The second movement of Stravinky's Sonata for Two Pianos (1943-44) is a theme and variations where the theme is a two-part canon by inversion with an additional third voice restricted to the notes of the tonic triad. As in Pärt's and Górecki's pieces, registral expansion in Stravinsky's piece plays a key role. In addition, and also like the two pieces examined in this paper, both the rhythmic-melodic features of the canonic lines as well as the contrapuntal relationship that generates the pandiatonic harmonies strongly evoke early music. The most

[7] Riley's *In C* can be seen as a variation of the concept of mensuration canon, since although part of the time the different performers play the same figures simultaneously and literal augmentation does not occur, the time every performer stays on each figure usually varies.

striking similarity, however, is the way the third voice in Stravinsky's canon, the voice completely restricted to the tonic triad, resembles a tintinnabuli voice.[8] Górecki's *Three Pieces in Old Style* (1963) and Pärt's *Solfeggio* (1964), on the other hand, although they do not rely on canonic writing per se,[9] anticipate Górecki's and Pärt's simplification of their harmonic and formal language. During the composition of these pieces, both composers were still predominantly writing in an atonal language. These two pieces, although they constitute a rare exception in the composers' output at the time, suggest a strikingly parallel thirteen year period of quiet but definitive aesthetic transformation for both composers. Finally, the first variation of Brian Eno's *Three variations in the Canon in D major* (1975),[10] superposes lines from Pachelbel's Canon in D major, changing their speed accordingly to the relative differences in natural decay of every register of the different string instruments. The overall slow tempo, the use of strings, the predominance of descending stepwise motion, and especially the rhythmic stratification establish a remarkable resemblance to Pärt's *Cantus* (1977). The exact role of Pärt's and Górecki's canons in the minimalist movement deserves a close inspection from an historical standpoint. The present study, however, will set the discussion of the historical context aside in order to examine in detail the richness of the inner musical structures.

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[8] Arvo Pärt's tintinnabuli technique requires at least one voice to be limited to the notes of the tonic triad. This voice is usually referred to as the tintinnabuli voice (T). The tintinnabuli technique will be discussed in more detail in the chapter on Pärt's *Cantus*.

[9] Pärt's *Solfeggio* could be seen as an uninterrupted imitation of a C major scale that assigns each new note to a different voice and register.

[10] The consideration of the pop musician Brian Eno in this discussion suggests the connection of Pärt and Górecki's with a more generalized phenomenon that crossed stylistic boundaries. However, although mostly known as musician related to popular music, Brian Eno has always had strong connections with the world of contemporary classic music. Worth mentioning is his participation in Cornelius Cardew's Scratch Orchestra in 1971 and his creation of a label to release music of lesser-known composers such as John Cage, John Adams, and Michael Nyman, among others. Brian Eno's *Three variations in the Canon in D major* were released in Eno's fourth solo album called *Discreet Music* (Dec, 1975).

1.1 EMOTIONAL RESPONSE AND MULTIPLICITY OF PROCESSES

The intense emotional response that these two pieces generate in many listeners raises analytical questions. A preliminary hypothesis is that the intense and durable emotional response evoked by the works is a result of their complexity. This complexity is clear, coherent, and hierarchical, and in each case is the result of a very simple compositional procedure. In both pieces complexity is constituted by an intricate web of processes that is described in this paper as structural depth. This analysis will show that this kind of structural depth found in these pieces is analogous yet significantly different from the kind of structural depth that Schenkerian analysis uncovers.

The numerous processes triggered by Pärt's and Górecki's canons will be discussed by beginning with the most autonomous and prominent and moving to the least autonomous and most subtle. Whereas, at the conscious level of listening, most listeners tend to overlook the more subtle processes (for instance the evolution of the relationship between outer voices), the apparent apprehension of the more subtle process by the subconscious level of listening influences the global perception of the piece.[11] One of the main reasons to suspect that the more subtle processes are both apprehended and influential is that, when purposely focusing on them (for instance when the listener is guided by specific external instructions), they seem to be highly intelligible, out of proportion to their subtlety.

1.2 THE USE OF METAPHORS

One of the main tasks set in the present analysis is to make conscious the intricate discourse that seems to normally be only subconsciously apprehended. A major tool that these analyses will use for this

[11] The notion of the listening experience simultaneously occurring at a conscious and a subconscious level is commonplace in the academic literature that deals with music cognition and music perception. In general terms, whereas the conscious dimension of listening is usually linked to cognitive processes, the subconscious dimension is associated with perceptual ones.

purpose is the association of musical structures to visual metaphors.[12] Each process will be described in terms of a stepladder or an element of a stepladder. The relationship between musical processes and visual metaphors will fall into one of two categories. On the one hand are the more traditional musical-spatial analogies such as the association of ascending in pitch with ascending in vertical space (usually known as 'pitch verticality'). On the other hand are less common metaphors such as the association of slowing down with getting closer to an object.[13] In general terms, the first type of metaphor will account for musical effects that could be described as more direct and psychologically 'one-dimensional' whereas the second type will account for musical effects that are more subtle and psychologically deeper.[14] It is important to notice that most of the processes dealing directly with harmony belong to the second category, since their association with visual metaphors requires a higher degree of abstraction than the melodic or rhythmic processes do. This general distinction between direct rhythmic-melodic processes and subtle harmonic processes is emphasized in this analysis by devoting a separate chapter to each. The result is a two-fold analysis that echoes the gradual evolution of a canon, first introducing the rhythmic-

[12] It is important to consider that the use of metaphors in music analysis might be suggested by the nature of music itself. It has been argued by some aestheticians, such as the philosopher Roger Scruton (1983), that metaphors are essential to the experience of music as opposed to just an alternative mode of listening. Further support for this assertion can be found in current work by cognitive scientists whose empirical studies suggest that metaphors are also essential to human understanding as a whole. For a review of the empirical evidence supporting metaphor as a basic cognitive process see Raymond W. Gibbs, Jr., *The Poetics of Mind: Figurative Thought, Language, and Understanding* (Cambridge: Cambridge University Press, 1994).

[13] While some metaphors used in this paper seem to be more natural than others, all of them meet a minimum standard of correspondence. This practice coincides with theories by linguists such as George Lakoff and Mark Turner (1980) who believe that in order for metaphors to be effective, a minimum of correspondence between the two domains is required. It is also important to notice that musical-spatial analogies that are usually regarded as mostly cultural in origin, such as the verticality of pitch (considered for a long time a consequence of music notation), are starting to be considered as having a strong universal or biological component. In the particular case of the verticality of pitch, Cox (1999) relates pitch to space via the experience of vocal production (higher notes needing more effort and larger quantities of air to be produced) and the general metaphorical mapping 'greater is higher'.

[14] Aestheticians such as Cook (1998), Davies (1994), and Scruton (1997) have considered musical-spatial analogies to be an important source of musical expression, arguing that musical structures evoke emotion through isomorphism with expressive human motion. In addition to these ideas, I would argue that the potential psychological depth that a musical-spatial analogy can trigger might by enhanced by the complexity of this isomorphism. For instance, the metaphor that associates a rise in pitch with getting closer to an object might create a more complex emotional impact than the more direct metaphor of pitch verticality.

melodic components and then following with the consolidation of a series of harmonic patterns through the gradual accumulation of melodic layers.[15]

1.3 PANDIATONICISM

The harmony in the two pieces analyzed in this paper can be described as pandiatonic.[16] Although the number of pieces that use pandiatonic harmony is large (especially since the appearance of the minimalist movement in the musical scene in the mid-60's), the discussion of pandiatonic harmony in the academic literature has been somewhat neglected. This limited coverage may be partially determined by the fact that most pandiatonic pieces emphasize melodic structures over harmonic ones, considering pandiatonic harmony a mere byproduct of the interaction of the lines. However, pieces like Pärt's and Górecki's canons show how the initial subordination of harmony to melody does not necessarily prevent clear harmonic processes to be generated and to eventually become central for a piece. The emphasis that the present analysis places on the harmonic processes will provide one of the first in-depth discussions on the way pandiatonic harmony can be structured and become a central aspect of the musical discourse. As opposed to what might be expected from a modern approach to the diatonic collection in composition, in both pieces the triad is the basic structural unit. The familiarity that most listeners have with triadic structures will be demonstrated as the fundamental element that enables the harmonic patterns to evolve in a gradual and subtle way, which evokes an almost visual plasticity difficult to find in more traditional triadic-diatonic contexts.

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[15] The expression 'A Ladder from Line to Sonority', included in the title, describes this process of melodic layers gradually consolidating harmonic patterns.

[16] This term was first introduced by Nicolas Slonimsky in 1938 to describe the free addition of notes to the triad (i.e. 6ths, 9ths, etc.). Eventually, the term came to describe a general free and predominantly polyphonic use of a diatonic collection, which for some authors, such as Vincent Persichetti (1961), also included a tendency to avoid tertian sonorities. Pandiatonicism is sometimes also referred to as 'white-key style.'

2.0 GÓRECKI'S CANON: LINE

2.1 RHYME AND TENSION

One of the first aspects that becomes apparent when the theme is first presented is its strong rhyme structure. The reappearance of the theme's beginning in m. 5, after a clear rhythmic arrival, reinforces the articulation of the phrase structure at the same time that introduces a regular cyclic element.

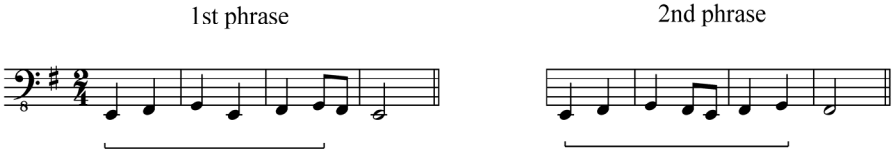

Figure 1: Rhyme structure of the first two phrases

Although two phrases with similar beginnings are usually described as being parallel, in the current description the term rhyme is preferred. This term is used here to describe a broader type of parallelism which may include similar endings, as well as beginnings, and/or motivic variations such as transposition.[17]

[17] Although other types of motivic variations such as inversion, retrogradation, or augmentation, are also present in this melody, they are not considered under the category of rhyme in this analysis because, when occurring on an inner voice, they contribute little to a general rhyme effect.

The end of the theme also presents two four-bar phrases which are very similar to each other. This time, however, the rhyme is not focused on the beginnings of the phrases but on their ends.

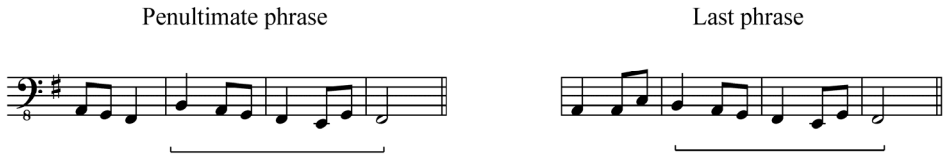

Figure 2: Rhyme structure of the last two phrases

The other eight measures of the theme, which constitute its middle section, are also tightly connected in motivic terms to the other phrases. However, its melodic design partially interrupts the four-bar phrase logic by tying together four measures of melodic ascent and four measures of melodic descent into a single long phrase.

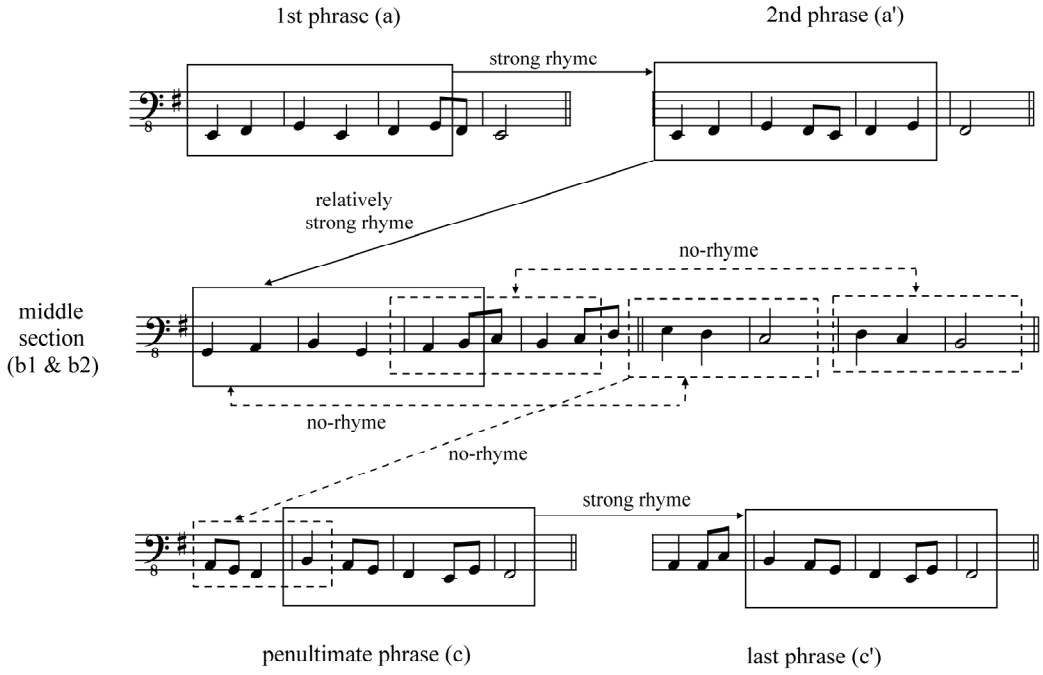

Figure 3: Theme's rhyme structure

The strong rhyme of the beginnings of the first two phrases and the endings of the two last phrases can be seen as gradually fading out to and gradually fading in from an area of no-rhyme, or singleness/uniqueness: the beginning of that long middle section loosely rhymes with the beginnings of the two first phrases by being a transposition of them. The ending of that middle section, in turn, is related to the beginning of the penultimate phrase by means of augmentation. These two weaker rhymes, at the beginning and ending of the middle section, work as a transition towards its interior, where, if its two four-bar sections are compared, no substantial rhyme[18] can be found.

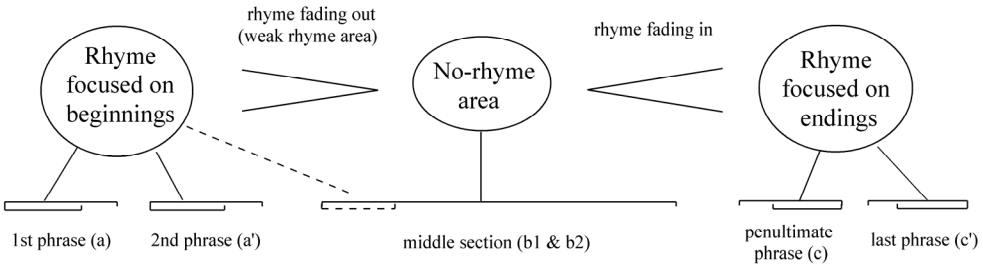

Figure 4: Fluctuation of the intensity of the rhyme

The degree of tension is usually inversely proportional to the intensity of melodic rhyme. The gradual dissolution of the rhyme's regular pattern represents a considerable increment of tension at the level of melodic design. This move towards irregularity in design and the subsequent return to regularity complete a symmetric arch of tension.

[18] Although m. 13 can be seen as an inversion of m. 9, its capacity of generating rhyme is very weak when compared to a literal repetition or a transposition. This is especially true in this type of melody where ascending and descending melodic motion are in clear confrontation. Although the eight measures of this middle section work as a single long phrase, the rhyme structure is examined at the level of four-bar sections because that is the temporal grid established by the surrounding strong rhyme schemes.

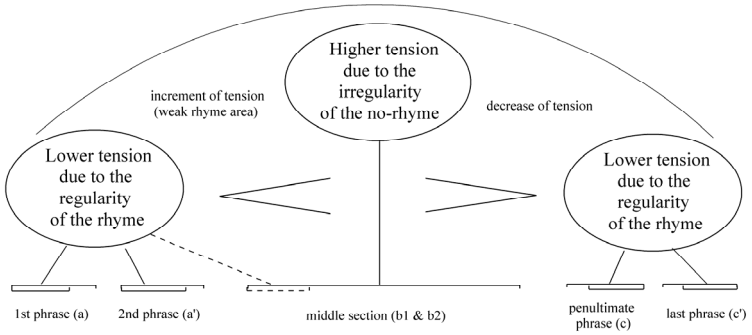

Figure 5: Arch of tension generated by the intensity of the rhyme

2.2 REGISTER AND RHYME

The theme spans an octave which is completed through a gradual process. The melodic apex is reached in m. 13, exactly half way through the theme's total length. This melodic apex is followed by a gradual registral descent which completes a symmetric melodic arch.

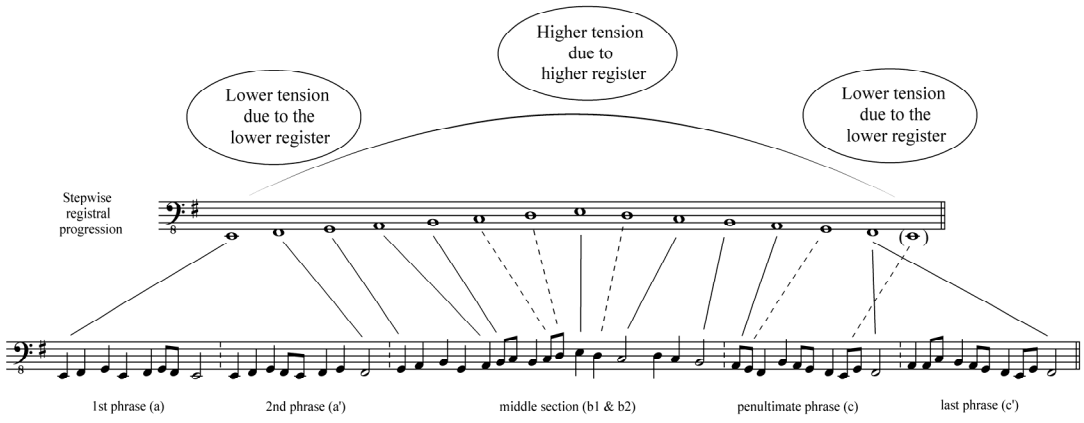

Figure 6: Arch of tension generated by the melodic arch[19]

[19] Figure 6 gives priority to the emphasized pitches (metrically, agogically, or syntactically emphasized). The dashed lines identify the non-emphasized pitches of the registral progression.

The tension generated by this melodic arch perfectly matches the arch of tension of the rhyme scheme previously described. This coincidence reinforces the dramatic tension that a pronounced melodic apex, like the one in this melody, usually creates. [20] It is also important to notice that the melodic arch is completed only when the melody starts over, enabling its final 'f#' to descend to 'e'. This dependency on restating the theme in order to complete the melodic arch, and to complete the harmonic movement by returning to the tonic note, is one of the elements that provides this canon with its uninterrupted continuity and makes its cyclic structure appear as a natural consequence.

2.3 TENSION IN THE BASIC CONTRAPUNTAL UNIT

One measure after the second contrabasses start the restatement of the entire theme, the first contrabasses introduce the theme diatonically transposed up a 5th. The level of dissonance of this two-voice counterpoint gradually increases toward the middle section of the theme, creating a similar arch of tension to the one proposed by the rhyme structure and the registral progression. Figure 7 identifies the dissonant intervals whose metrical accent and/or contiguity with other dissonant intervals makes them more prominent. It seems important to point out that the accumulation of dissonant intervals towards the middle of the two-voice counterpoint is not only prominent because of the type of intervals and their contiguity. The harshness of these dissonant intervals is increased by their parallel motion and this harsh dissonant parallelism is in turn highlighted by the type of simultaneous rhythmic pattern this is involved with.[21]

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[20] The acceleration and deceleration of the speed that the emphasized pitches of the registral progression are introduced, intensifies the arch of tension proposed by both register and rhyme.

[21] Whereas the melody itself and most of the two-voice counterpoint can be regarded as being close to the western traditional polyphonic practice, it is in this area of highlighted harsh dissonance where a subtle departure from tradition can be first experienced. However, it may be possible that the extremely low register of the entire two-voice section could itself be perceived as a non-traditional element as well. In addition, it should be taken into

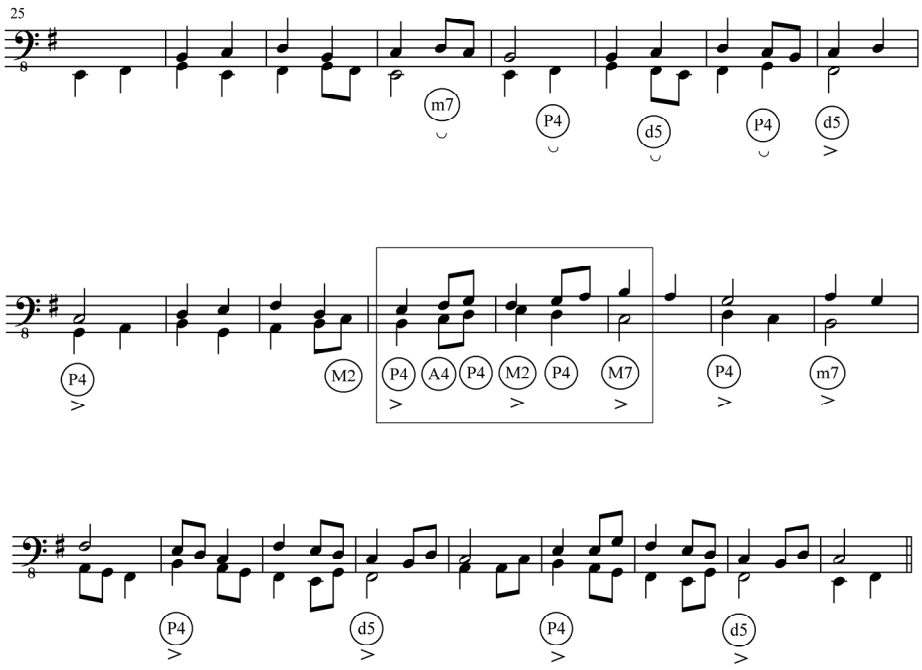

Figure 7: Level of dissonance in the initial two-voice counterpoint[22]

Although the canon eventually builds up to an eight-voice texture, the general contrapuntal characteristics of the piece, regardless of the number of voices, are highly determined by this initial two-voice counterpoint. On the one hand, this specific relationship will remain through most of the canon as its lower foundation. On the other hand, a transposed version of this counterpoint will be always the most clearly exposed layer of the texture throughout. In addition, this basic two-voice counterpoint will be replicated not only by the two lower voices and the two top voices but by every other pair of adjacent voices throughout the texture. For this reason the more voices involved in the texture the more the basic counterpoint's most distinctive characteristics will tend to be emphasized by their vertical accumulation.

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account that, because of the extreme low register, the distinction between consonant and dissonant intervals is not as sharp as it could be.

[22] It seems important to point out that the specific quality of the intervals will sometimes change when the voices are diatonically transposed to the new modal levels. Some of the most relevant of these transformations are the shift from perfect to diminished fifth and from major second to minor second.

2.4 THE REGISTRAL-TEXTURAL LADDER

The theme of the canon is introduced at a new pitch level by every new voice. The relationship between one entry and the next is always an ascending diatonic fifth. Although the process of introducing new real voices ends when the transposition reaches the original pitch level ('e') played by the first violins, the registral ascent is continued by a new layer that doubles both first and second violins an octave higher. The result in terms of register is an impressive six-octave ascent, from the initial 'e^{1}' in the double basses to the 'e^{7}' in the first violins in m. 212. This ascent is followed by a descent that, although interrupted in m. 317, eventually returns to the lower 'e' transpositional level of the second double basses at the end of the movement.

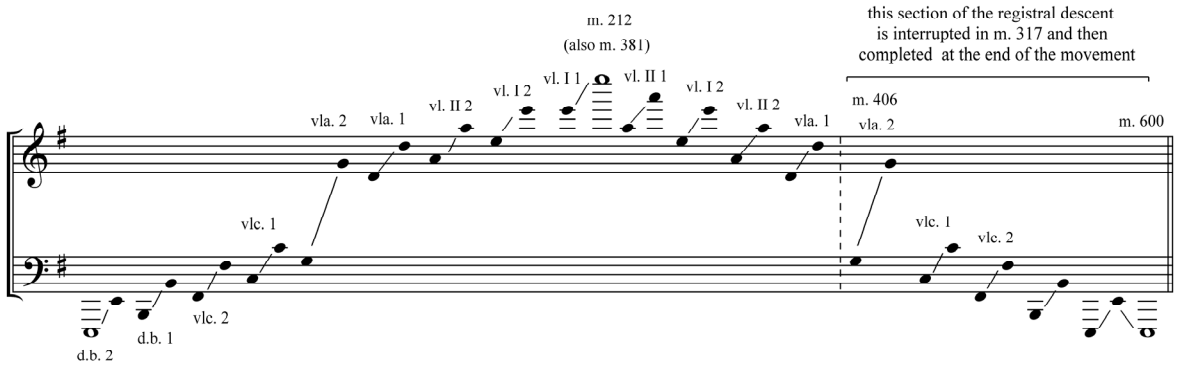


Figure 8: Canon's overall registral progression

The registral arch delineated by introducing the new voices always at a higher pitch level and by removing them by reversing the order in which they were first introduced, clearly echoes the registral structure of the theme. This resemblance is not only confined to the general symmetric arch contour but also includes the intervallic relationship as well as the specific pitch classes.

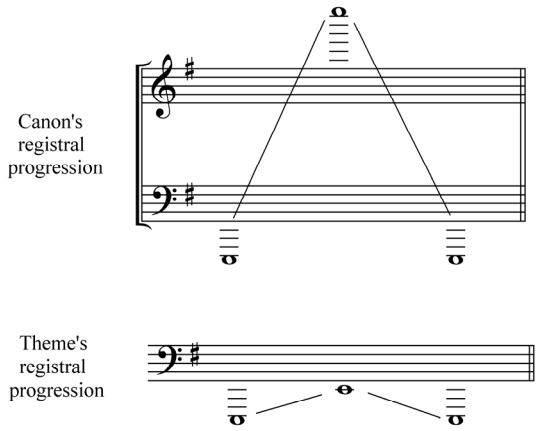


Figure 9: Registral progression at two levels of structure

The arch contour, the micro and macro levels mirroring each other, and even the gradual accumulation of layers are all elements that can be found in a multitude of different musical contexts. However, the extremely straightforward way in which these elements are presented in this canon is not so generic and deserves being considered as one of its distinctive features. It could be argued that the degree of clarity and exposure of the arch, with its clearly defined melodic apex, the organic relationship between micro and macro levels, and the accumulation of layers are the main causes of the expressive climactic effect that this canon achieves. However, it could also be argued that a registral and textural ladder, especially when so obvious, and taking so long to complete, needs to be complemented by other strong processes in order to keep the listener's interest throughout and to guarantee the climactic effect. The three elements of the theme described at the beginning of this chapter, melodic rhyme, contour, and contrapuntal dissonance, are all aspects that serve as important complementary processes for the canon's registral-textural ladder.

2.5 REGISTRAL PROGRESSION, REGISTRAL EXPANSION

While the entrance of each new voice introduces a new register, therefore establishing a registral progression, the span between the outer voices, if considered in general terms, is also increased. This increment in span can be described as a registral expansion.[23]

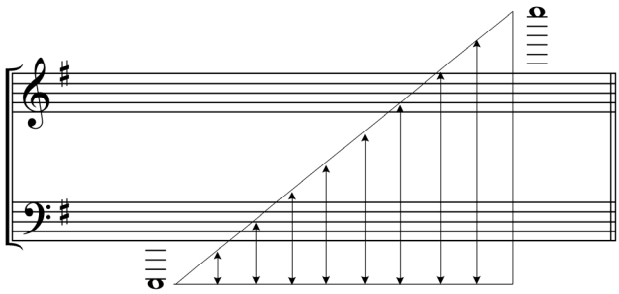


Figure 10: Overal registral expansion (span increase) in the first part of the canon

The double-headed arrows in figure 10 are simplified representations of the registral expansion that takes place every time a new voice is introduced in the canon. This process of registral expansion, however, is more complex if the contour of the outer voices is considered in more detail. As described before, the theme's contour is a symmetric melodic arch. Every new voice introduces this melodic arch displaced by one measure and, for this reason, the outer voices' counterpoint is constantly changing. While at the initial stages of the canon, the highest notes of the outer voices' arches occur close in time to each other (see figure 11), they gradually move further apart in time from each other. In contrast, the highest note of the upper arch and the lowest note of the lower arch get gradually closer. This process

[23] It seems important to notice that although, in general terms, any registral expansion includes at least one registral progression not all registral progressions generate a registral expansion, since the outer voices' registral progressions might be related by parallel or oblique motion.

transforms the outer voices' counterpoint from parallel to contrary motion, establishing a progression towards a more defined registral expansion.

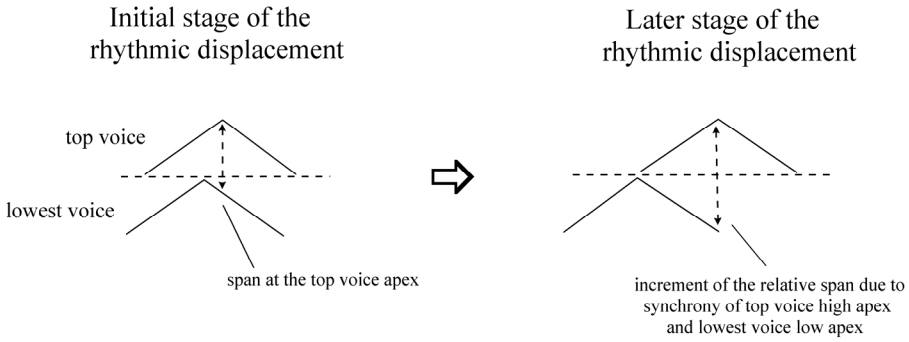


Figure 11: Process towards registral expansion (span increase) at the level of local registral progressions[24]

This gradual process towards registral expansion at the local level can be understood as a reinforcement of the overall registral expansion first described.

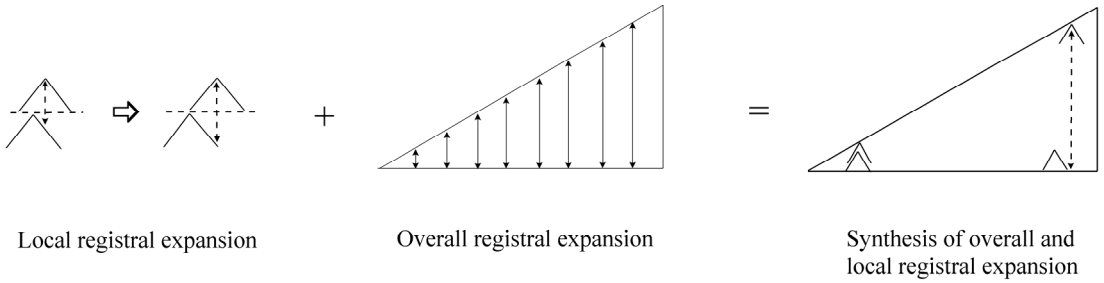


Figure 12: Relationship between overall and local registral expansions

[24] For the sake of conceptual clarity, this abstract scheme does not show that the top voice in the later stages of the rhythmic displacement are introduced at a considerably higher pitch level than the one in the initial stage. The term relative span refers to the measurement of span in terms of the outer voices' relative highness and lowness.

In a more detailed level, however, the process of transformation of the outer voices' counterpoint embodies certain irregularities, especially at the level of the synchrony of the arrivals to the highest and lowest points. Figure 13 samples three different stages of this contrapuntal relationship. In the initial two-voice counterpoint, the temporal interval of imitation is close and the registral expansion that they produce at the micro level is not very pronounced. In the second example, the top part has been rhythmically displaced by four measures and the highest pitch of the top voice and the first arrival at the low register coincide in parallel octaves. In the third example, both the highest note in the top voice and the lowest layer's low register coincide as well. However, the first arrival at the low register occurs five beats before the top voice's melodic apex is reached.

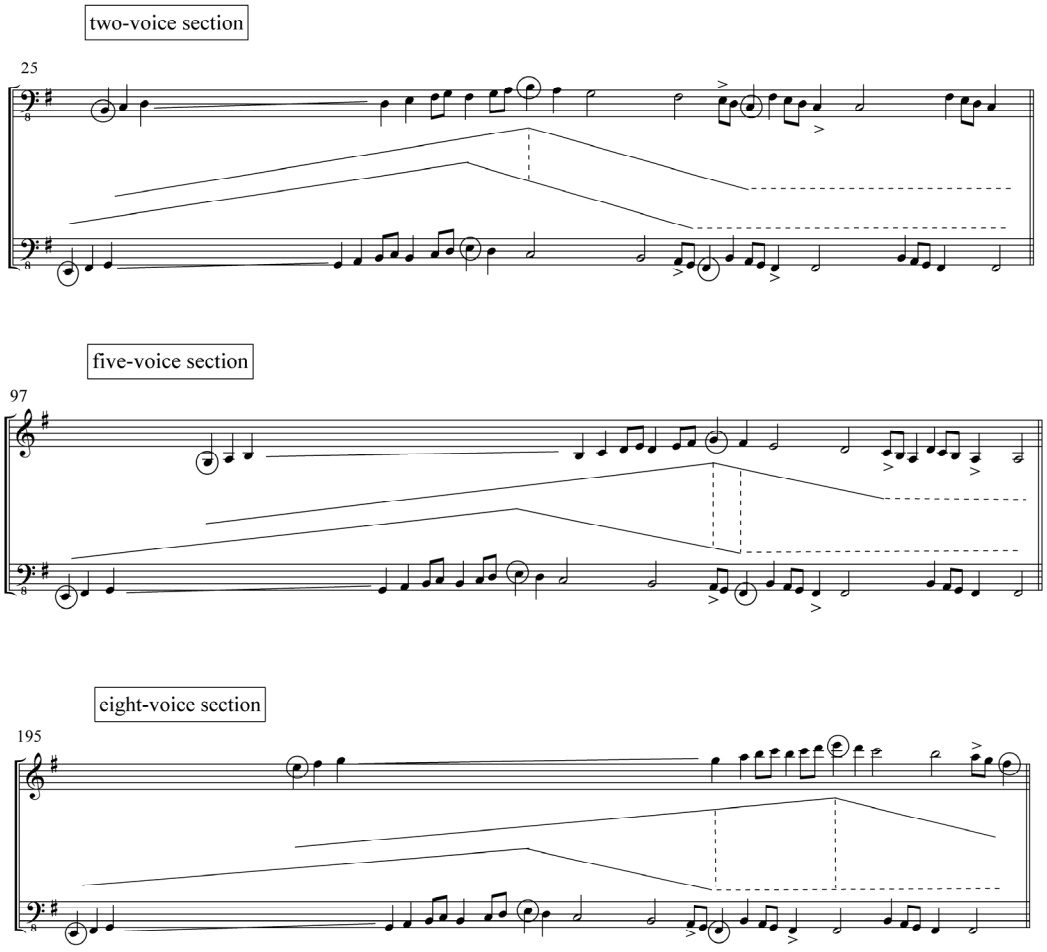


Figure 13: Three different stages of the outer voices contours

Although, both the second and third examples expand to their largest possible span at that given moment of the piece, the degree of synchronization of the arrivals in the second example focuses the tension into a single point, whereas the third diffuses the tension between two different points in time. The simultaneity of arrivals may suggest that the melodic apex of the second example is more climactic than the one in the third example. However, it is the span itself and not the specific way it is reached that becomes the most salient feature of the registral expansion in this piece. Therefore, the third example, which has the largest span, is still the most climactic one.

Although the synchrony of arrivals in the second example is not enough to undermine the climactic effect reached by the third example, it is still very important for the piece. The peaks of tension, like the one the second example generates, partially interrupt an otherwise completely straightforward process. These 'irregularities' in the process play with the listener's expectation, creating a sense of anticipation, and adding an interesting geography to the piece. When the melodic apex of the canon finally occurs in m. 212, its climactic effect is guaranteed by the psychological complexity that complementary processes such as the one just described provide.

2.6 A LADDER OF DISSONANCE

Earlier on this chapter, a progression towards dissonance was described at the level of two-adjacent-voice counterpoint. In that discussion it was pointed out that the most distinctive dissonant counterpoint is first presented in mm. 36 and 37, just before the melodic apex of the top voice is reached. This moment of rhythmically active, parallel dissonance is so distinctive that it can be clearly perceived even when it happens between inner voices, in textures as thick as eight voices at the climax of the canon.

The consequence of this prominence is a clear ladder of dissonance which climbs through the texture, interconnecting all the voices of the canon from the bottom to the top.

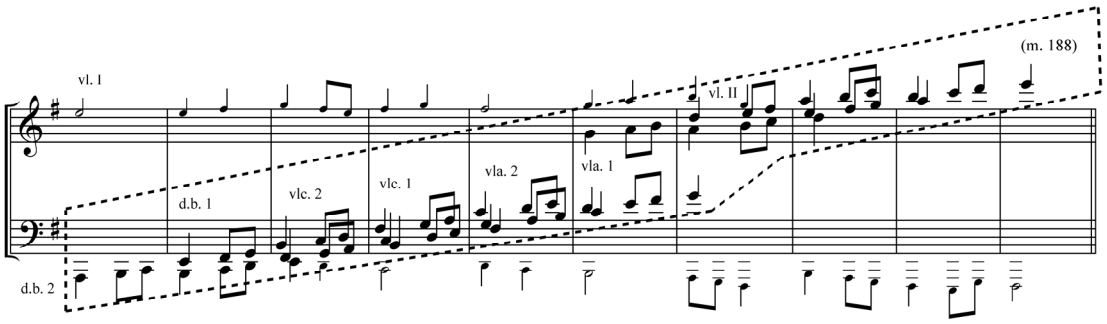


Figure 14: Ladder of dissonance

It seems important to notice that this ladder of dissonance is not uniform throughout in terms of its degree of exposure. Its prominence gradually increases the closer it gets to the top layer, where the polyphonic texture is more transparent. This gradual approach to the spotlight works as a virtual crescendo, a prolonged anacrusis which intensifies the sense of arrival at the melodic apex of the top layer. In addition, the ladder summarizes the structure of the voices' entrances and their pitch levels. This summary not only echoes the overarching canonic structure reminding the listener of the textural depth of the piece, but also makes him/her aware of the magnitude of the span that the piece reaches at every peak.

2.7 REGISTRAL LADDERS, LADDERS OF DISSONANCE

Although the ladders of dissonance and the registral ladders are both melodic ascents, they differentiate from each other in the time they take to complete their ascent. The more rapid ascent of the ladder of dissonance works as an echo of the comparatively slow registral ascents. Because of the closeness in length, this echoic relationship is more evident between the ladders of dissonance and the

theme's registral ascents than between the ladders of dissonance and the overall canon's registral ascent. In addition, and because of that same closeness in length, the relationship between the ladder of dissonance and theme's registral ascent is more sensitive to the gradual lengthening of the ladder of dissonance throughout the canon. Figure 15 shows how the ladder of dissonance goes from being just a sixth of the length of the theme's ascent, at the beginning of the canon, to being three fourths of it when the canon's climax is finally reached.

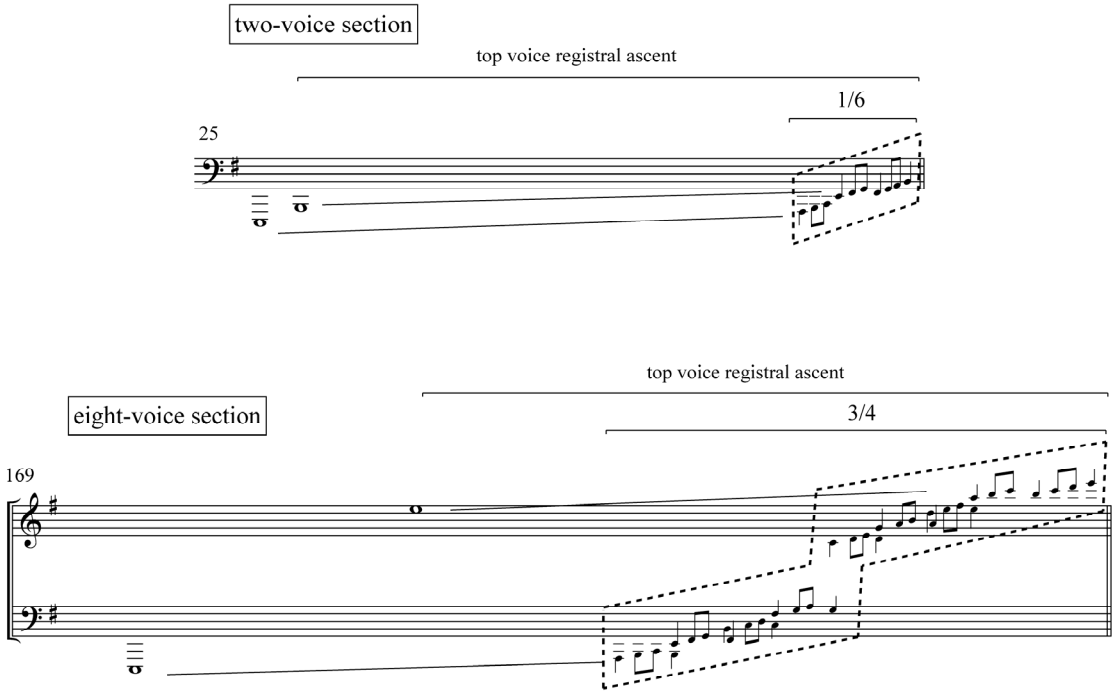


Figure 15: Two stages of the relationship between the ladder of dissonance and the theme's registral ladder

This change in proportions between the two ascents gradually brings the echoic relationship to the foreground. This increment in the prominence of the relationship results in a clearer confrontation and therefore a stronger level of tension towards the canon's melodic climax. The relationship between the ladders of dissonance and the theme's registral ascents has at least two other elements that contributes to

the dramatic effect of their confrontation. On the one hand, and as opposed to what occurs in a conventional imitation, both imitated and imitator arrive to their final note at the same time, creating the illusion that one moves faster than the other. On the other hand, the causes and types of the prominence of the ascents are different in each case. Whereas the theme's registral ascent is prominent mainly because it is the top layer in the texture, the prominence of the ladder of dissonance comes from its rhythmic and harmonic features. In addition, because of the way they relate to the texture, the prominence of the registral ascent is even throughout, whereas the importance of the ladder of dissonance increases the closer it gets to the top layer. The result is a complex stretto effect. Each of the theme's registral ladders is echoed by an ascent which, moving in a faster pace and increasing in prominence, defies the natural subordination of imitator to imitated.

As opposed to what occurs between the ladders of dissonance and the theme's registral ladders (where, because of the closeness of length, one can be perceived as imitating the other), the canon's registral ladder is summarized by the ladder of dissonance. Every ladder of dissonance is an abbreviated form of the registral progression that the canon has reached up to that point.[25] Figure 16 show how, if the large picture is considered, these periodic summaries work as brief dynamic accents, that give additional momentum to a much larger process.

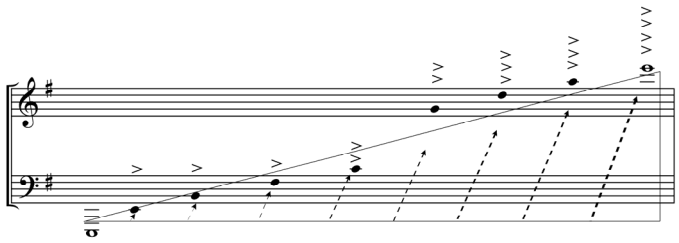


Figure 16: Relationship between the ladders of dissonance and the canon's registral ladder

[25] The ladders of dissonance go from being roughly 1/13 the length of the canon's registral expansion in the two-voice section to being 1/21 the length of the canon's registral expansion when the canon's climax is reached. It is important to point out that not only are these differences in length too big to encourage an imitative effect, but it decrement throughout the canon is not as substantial as the decrement of the difference between the ladder of dissonance and the theme's registral ladder's length.

2.8 LADDERS GOING FROM RHYME TO NO-RHYME

At the beginning of this analysis the rhyme scheme of the theme was discussed. The theme was described as gradually moving from a clear, regular four-bar rhyme focussed on phrase beginnings to an area of no-rhyme in the middle section and then coming back to a strong rhyme focussed on phrase endings. When the canon starts introducing the different voices displaced by one measure, the rhyme schemes get mixed with each other in a rather complex way. Figure 17 points out some of the consequences of the superposition of the rhyme schemes. The first thing that should be noted is that the top voice is by far the most prominent layer in this canon. For this reason, the rhyme scheme that leads the perception of the canon is the one presented by the top voice and all the other voices tend to be perceived as either reinforcing or contradicting that scheme. When the eight-voice polyphony is cut in vertical slices determined by the phrases of the top voice, a contradiction of the initial rhyme and a reinforcement of the final one are found.

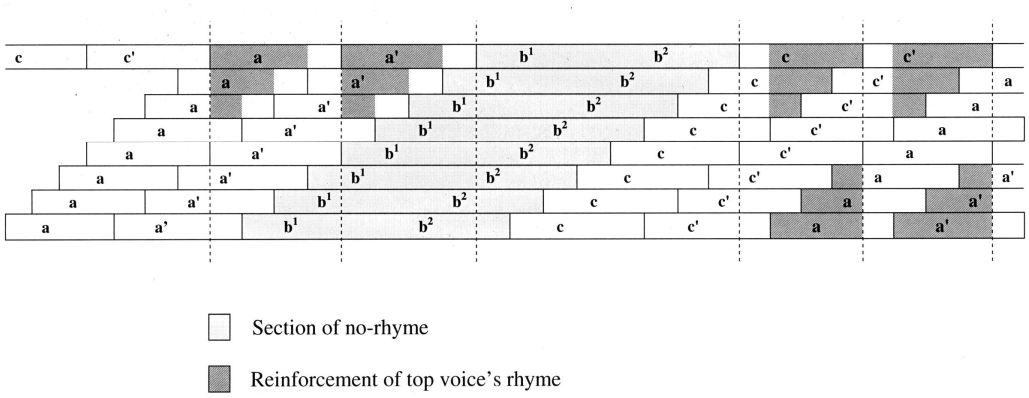


Figure 17: Superposition of rhyme schemes

Because of the prominence of the top voice, and the density of the polyphonic mass, there is a tendency to perceive the canon in terms of a main melody accompanied by an underlying thick and complex layer. This layer of 'accompaniment' gets its identity as much from its polyphony as from its

harmony. Its harmony, in turn, is determined more by the lower components than by the higher ones. For this reason, is the presence of rhyme with the lowest layers beneath the endings of the two last phrases of the top voice and the absence of rhyme with the lowest layers beneath the beginnings of the two first phrases that respectively determine the contradiction and the reinforcement of the main rhyme scheme.[26]

When the different stages of the first two phrases (a and a') of the top voice are compared throughout the canon, a gradual increment of the contradiction of its rhyme can be observed. Figure 18 shows how, while in the three-voice section the top voice rhyme is still strongly reinforced, in the five-voice section the rhyme is already in a strong conflict. The conflict reaches its peak in the eight-voice section, and the tension generated by it strongly contributes to the climactic effect of the section. This gradual increase of the contradiction in the large scale can be described as a ladder that goes from rhyme, with few voices in a low register, to no-rhyme, with numerous voices and the inclusion of the high register.

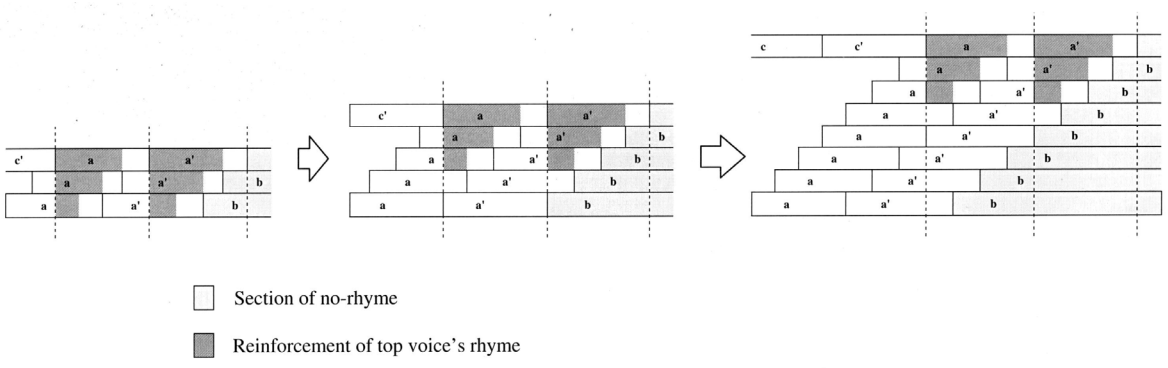


Figure 18: Three different stages of the rhyme in the first two phrases of the top voice

A gradual contradiction of the top voice rhyme can also be found when the different stages of the last two phrases (c and c') are compared. However, this contradiction reaches its peak in the five-voice

[26] A more detailed account of these relationships will be provided in the final part of the next chapter.

section, after which point the lower layer rhyme component is introduced and gradually increased until the climax of the canon is reached in the eight-voice section.

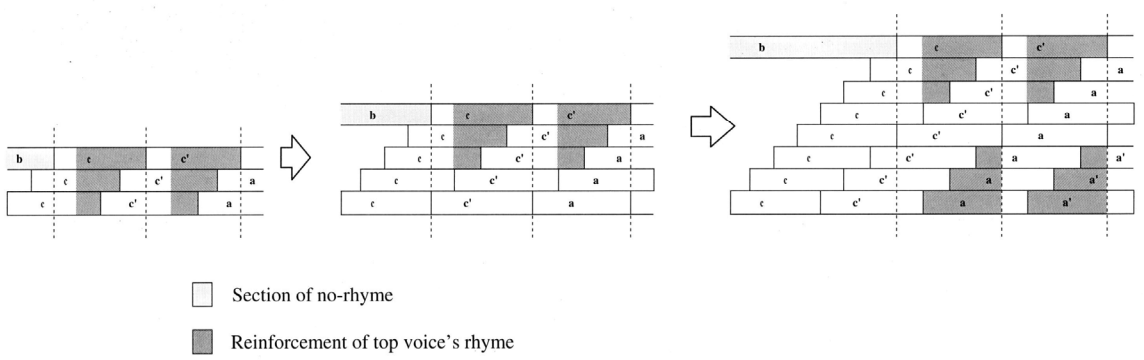


Figure 19: Three different stages of the rhyme in the last two phrases of the top voice

The way in which the rhyme scheme of the top voice in the eight-voice section is first contradicted and then reinforced generates a clear dynamic of tension and resolution. This tension-resolution scheme, at the level of melodic rhyme, coincides with the schemes of tension generated by both register and the ladder of dissonance. The conjunction of these schemes consolidates the idea of tension rising towards the melodic apex and the consequent resolution of that tension through an increasingly more regular and relaxed descent from that apex.

However, as shown by figures 18 and 19, the contradiction of the rhyme of the two first phrases and the reinforcement of the rhyme of two last phrases is not equally present throughout the canon. In fact, in places like the three and four-voice sections the scheme is almost reversed. Because of this, the conjunction of the schemes of the tension generated by rhyme, contour, and dissonance is not a constant throughout the canon, but the culmination of a gradual process of alignment. In this way, the arrival at the melodic apex of the canon is not just the arrival of the highest pitch and the largest span in the canon, but also the point where the cooperation between the main melodic structures is the closest.

It is also important to notice that, although the schemes in figures 17 and 18 show a sharp distinction between areas of rhyme and no rhyme, this is just an abstraction to facilitate conceptual clarity.

As mentioned at the beginning of this chapter, the transition between melodic rhyme and melodic no-rhyme in the theme is rather gradual. When the voices accumulate throughout the canon, this gradual transition at the level of individual melodies translates into a more gradual ladder effect between rhyme and no-rhyme. Even more interesting when examining the sonorities, is that the gradual transition of melodic rhyme runs parallel to an even more gradual and complex transition of harmonic rhyme. The next chapter describes the harmonic structures related to this other type of rhyme. The harmonic dimension of this canon, as is usually the case with highly polyphonic pieces, is subtle. However, its relationship with the other structures is a crucial factor in creating the dramatic intensity of the more exposed melodic and polyphonic dimensions.

It seems necessary to point out one more time that all the melodic and contrapuntal aspects mentioned in this chapter (rhyme, register, and dissonance) are strongly related to each other and that the success of the music comes as much from the way they reinforce each other as from their differences, usually related to their rhythmic dimension. These differences are the ones that make their interaction interesting, and keep the attention of the listener focused on an otherwise plain surface.

3.0 GÓRECKI'S CANON: A LADDER FROM LINE TO SONORITY

3.1 THE TRANSPOSITION OF SONORITIES

As mentioned before, this canon introduces every new voice a diatonic fifth higher than the preceding voice, and exactly one measure after that preceding voice has started the repetition of its theme. This type of imitative relationship not only determines the way adjacent voices are related to each other but it also determines that most of the contrapuntal combinations will be transposed up through the texture. The ladder of dissonance described in the previous chapter, for instance, is one example of how a given contrapuntal combination can be successively transposed by ascending fifths at a rhythmical distance of one measure (see fig. 14). This successive transposition traces a diagonal through the texture[27] that interconnects the different voices of the canon. This same diagonal relationship can also be found if contrapuntal blocks of more than two voices are considered. In this canon, most of the voices of any vertical slice of the texture can be found a measure later transposed a diatonic fifth up and played one layer up in the texture. For instance, in mm. 63-64 (figure 20), the two quarter-notes of the second contrabasses are played a measure later by the first contrabasses up a diatonic fifth.

[27] The specific image of a diagonal line crossing through the texture is mainly an abstract byproduct of the visual representation of time as a horizontal dimension and pitch as a vertical dimension.

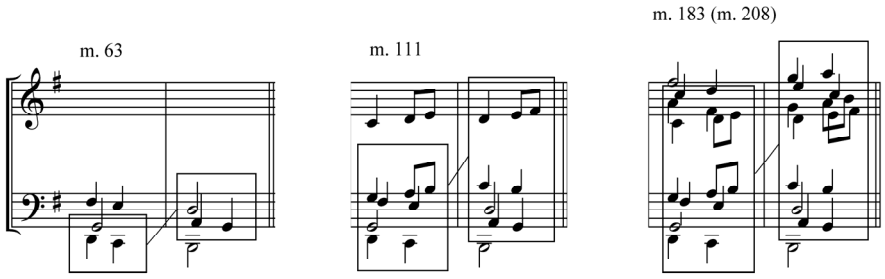


Figure 20: Three different examples of the transposition of sonorities

Although these diagonal relationships are very clear when represented visually, they only become fully perceptible to the ear when they have highly distinctive features, such as rhythmically active parallel dissonance. In most of the other instances, these diagonal relationships remain hidden under the prominent and uninterrupted horizontal continuity of the top voice's theme. For this reason, the effect of the scheme of transposition is, in most cases, limited to the generation of a subtle underlying harmonic structure which gives the more evident melodic process additional coherence and depth.

3.2 HARMONIC STRUCTURE OF ASCENDING FIFTHS

The sonorities shown in the third excerpt of fig. 20 are relatively complex constructions that, although smoothly connected to each other by stepwise motion, do not seem to project clearly defined roots. Sonorities like these are characteristic of the second part of the theme's middle section, right before the arrival at the melodic apex, and are directly connected to the ladder of dissonance. The other sonorities in the canon, however, tend to be much simpler (major and minor triads in different inversions), and their roots more clearly defined. Every time the sonorities are limited to these basic triads, with no added notes, a clearer harmonic structure of ascending fifths tends to be established between the roots of the strong beats of each measure.

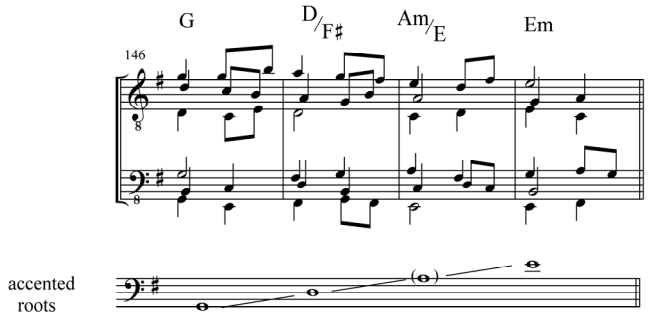


Figure 21: Clearer harmonic structures of asc. 5ths[28]

However, if the sonority includes any added notes the harmonic structure of ascending fifths becomes more complex, and potentially it can lose its clarity and continuity. The boxes in figure 22 point out a scheme of transposition governed by the succession of ascending fifths A, E, B, and F#. The perception of this harmonic structure is, however, disrupted by the pitches 'g' and 'd' introduced beneath the Bm and F#^{o} sonorities by the lower layers. The resulting sonorities tend to be perceived as being rooted on 'g' and 'd' respectively, and the continuity of the ascending fifths is interrupted.

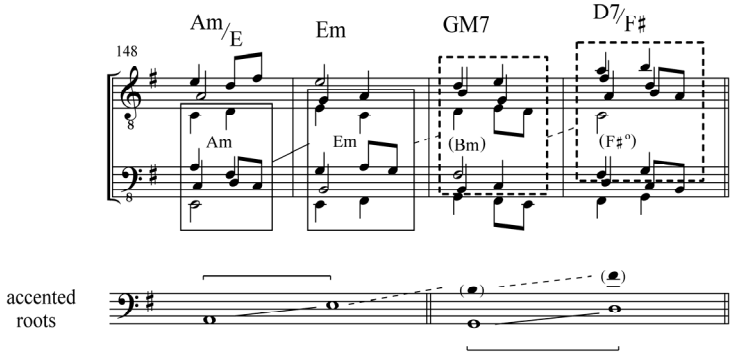


Figure 22: Disruption of the continuity of the structure of asc. 5ths

[28] In a more traditional harmonic context the A minor chord in second inversion in figure 21 would work as contrapuntal embellishment of the E minor chord. In the context of this piece, however, there are several reasons this second inversion does not affect significantly the perception of A as the root of A minor chord. First, the structure of ascending fifths tends to prevail despite the chordal harmonic ambiguities since it is not established solely by the chords but predetermined by the fixed scheme of imitation. Second, the note 'a' is agogically and registrally accented. Finally the bass note is so low and relatively close to the note immediately above that its influence in the harmonic perception of the chord is rather limited. The type of notation used here to describe the chords is borrowed from sheet music notation, a shortcut for the description of chords in popular music.

In a way similar to the melodic rhyme, the harmonic structure of ascending fifths also loses its clarity and continuity towards the middle section of the theme. This process is evident from the first moment that the number of voices allows triads to be fully expressed. Figure 23 shows how an uninterrupted cycle of fifths is established from the final phrases of the three voice section in m. 70 until shortly after the entrance of the new voice in m. 77. From that point on, the structure of ascending fifths is disrupted twice and then fades away when the top voice reaches the third phrase of the theme. The structure of ascending fifths is again audible when the top voice presents the two final phrases. This process is repeated each time the theme is restated.

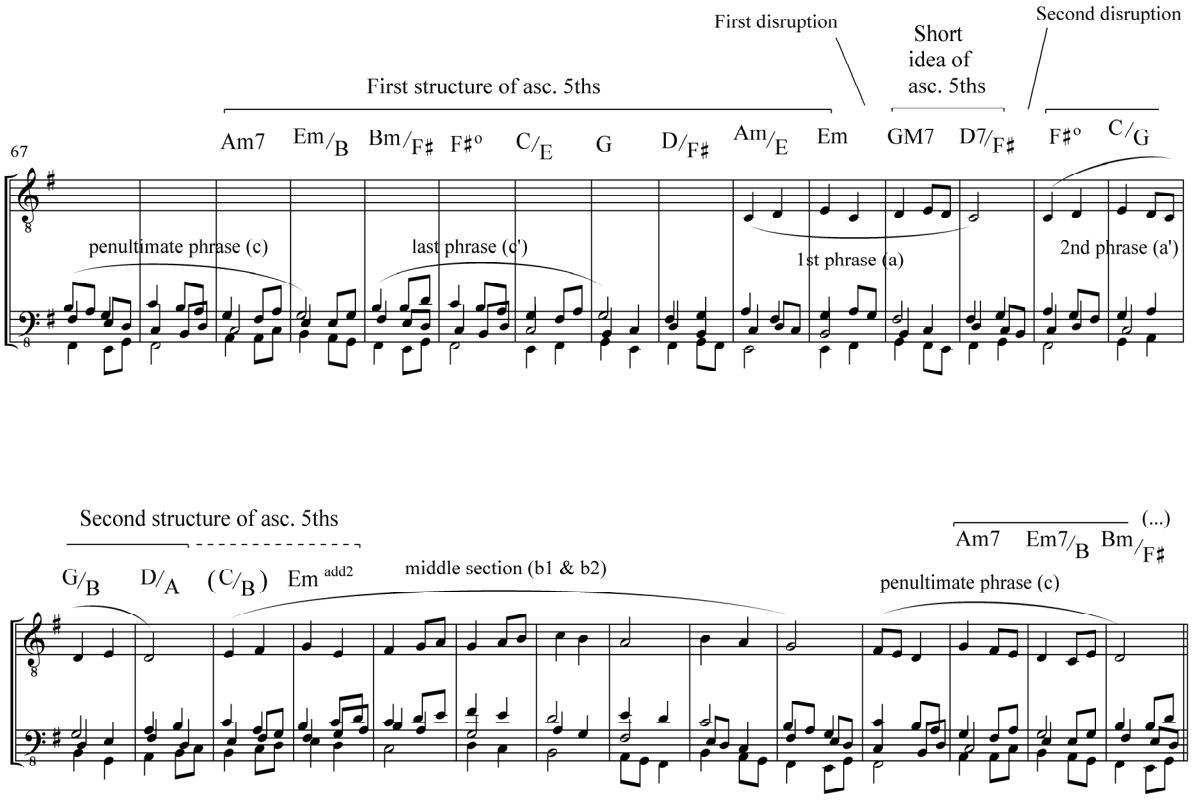


Figure 23: First clear statement of the structure of asc. 5ths and its two disruptions

The similarities between the melodic rhyme and the harmonic structure of ascending fifths are not limited to their disappearance in the middle section of the theme. They also share an affinity in the way they get transformed throughout the unfolding of the canon. Since the entrance of every new voice introduces the theme displaced one measure, the second phrase of the top layer gradually gets to be more and more involved with the area where the structure of ascending fifths is less clear. In the climax of the canon, this displacement of the top voice in relationship with the structure of fifths places its melodic apex right before the harmonic clarity returns. As is the case with the melodic rhyme in the eight-voice section of the canon, the tension generated by the gradual loss of harmonic clarity perfectly converges, in the climax of the canon, with the ascent to the melodic apex of the top voice. This tense anacrusis is resolved both in terms of rhyme and harmonic clarity after the top voice reaches the canon's peak and starts its descent.

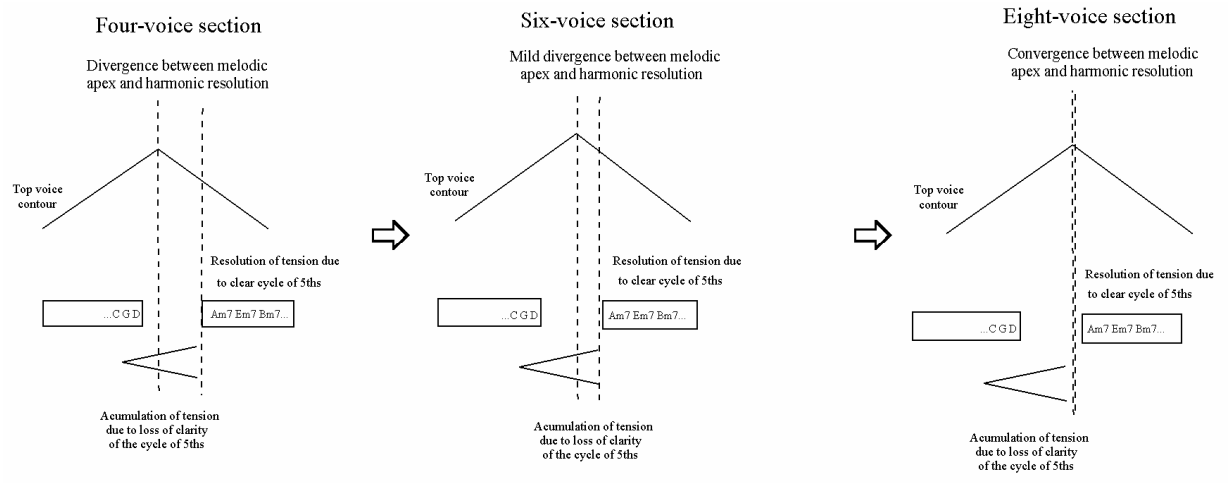


Figure 24: Process towards the convergence of the melodic apex and the peak of harmonic tension due to the lack of clarity of the harmonic structure

3.3 GRADUAL TRANSFORMATION WITHIN THE HARMONIC STRUCTURE OF ASCENDING FIFTHS

(A transition from an emphasis on the harmonic dimension to an emphasis on the polyphonic dimension)

The two disruptions of the continuity within the cycle of fifths can be understood as caused by the transition between two different types of ascending fifths structures. Figure 25 illustrates the gradual diagonal introduction of the second structure of fifths in the eight-voice section of the canon.[29]

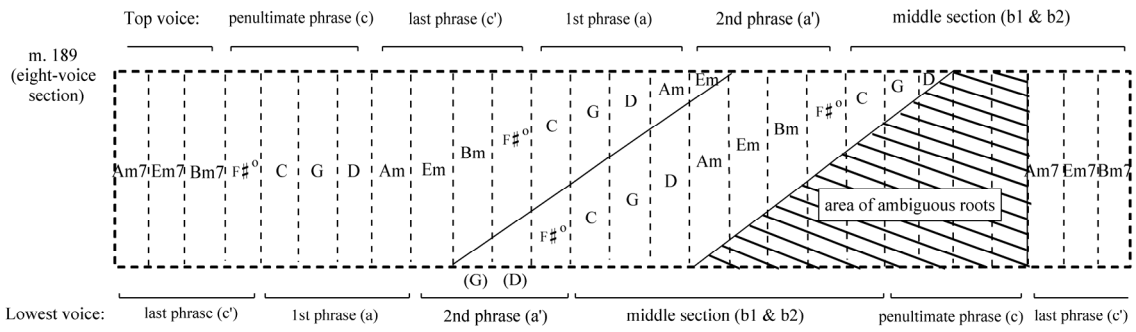


Figure 25: Gradual transition between the two main structures of asc. 5ths

These two main structures are not only different in terms of their specific chords, but also in the type of relationship their individual chords establish with the sonorities placed on the weak beats. Whereas in the first structure, strong and weak beats are related by descending fifths, in the second structure they are related by descending thirds.

[29] The G and D chords in parentheses (at the bottom of figure 25), although apparently foreign to the second structure of ascending fifths, can be regarded as an early stage of the transition between the two long chains of fifths. The notes of the theme that present the roots of these two chords, when moving up through the texture, become the third of the chords. For instance, whereas the 'd' of first double basses in m. 199 works as the root of the D chord, it becomes the third of a F#^{o} triad when found transposed a fifth up to 'a' in the second cellos one measure later.

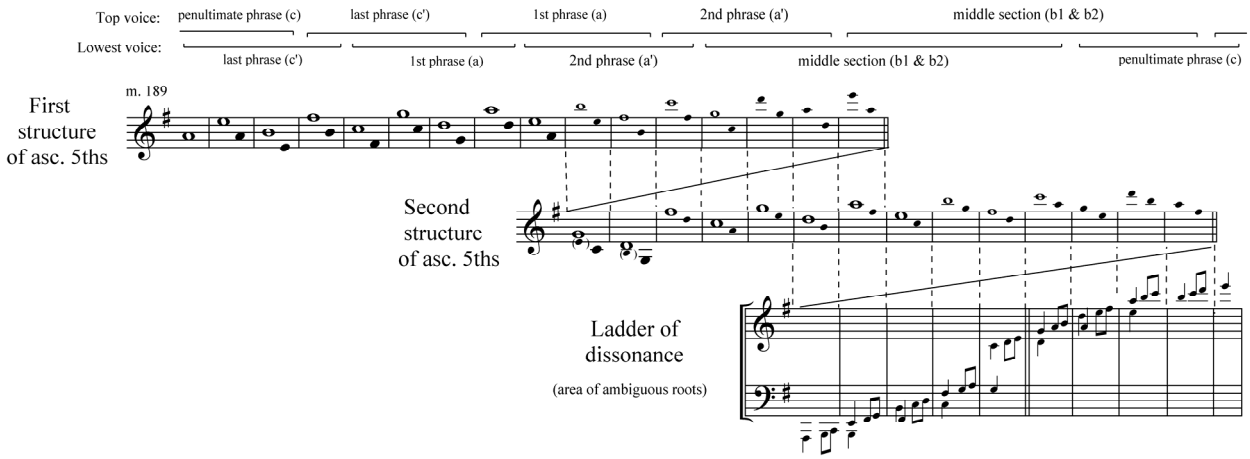


Figure 26: Harmonic relationship between strong and weak beats within the structure of asc. 5ths in the eight-voice section

This change is not just an intervallic variation but it determines the extent to which the chords placed on the weak beats are harmonically projected. The harmonic relationships by descending thirds, especially in this particular case that partially fills in the intervallic gap between the strong beat roots, tend to operate more as a contrapuntal device of connection than as the generator of an autonomous harmony. The harmonic relationships by descending fifths, on the other hand, because of they are usually harmonically emphatic, [30] tend to promote the harmonic autonomy of the sonorities placed on the weak beats. It is also important to consider that although, in the particular case of these descending fifths, they also establish a stepwise connection with the root of the next strong beat, the permanent change of melodic direction they are involved in generates an accent that activates their harmonic dimension.

One of the consequences of the different degrees of the harmonic projection of the weak beats is the predominance of a quarter-note harmonic rhythm in the first structure and of a half-note rhythm in the second structure. The initial quarter note harmonic rhythm is reinforced by several factors. On the one

[30] The term 'usually' alludes here to both the intrinsic properties of the intervallic relationship as well as to the long tradition that, through especially Western musical practice, has consolidated the way this intervallic relationship has normally been used and perceived.

hand, the almost complete absence of accented non-chord tones allows the root of the second beat chords to be clearly projected. On the other hand, most of the eighth-note figures of the last two phrases of the theme, especially those involving a leap, put a strong rhythmic and melodic emphasis on the second beat of each measure. This emphasis becomes especially strong when the figures are superposed. Not only do the eight-notes of the second beats become more prominent because of the different voices playing the same rhythmic pattern simultaneously, but also, and perhaps the most striking feature of this section, the superposition generates multiple parallel contrapuntal motions. These parallelisms are prominent because the sonorities involved are resonant triads with perfect intervals in their lower register and imperfect intervals in their higher register, and because part of the parallelism involves simultaneous leaps. The parallelism of these chords moving in eighth-notes pervades the voice-leading with prominent parallel fifths, octaves, and tenths which make the relevance of the second beats unmistakable.[31]

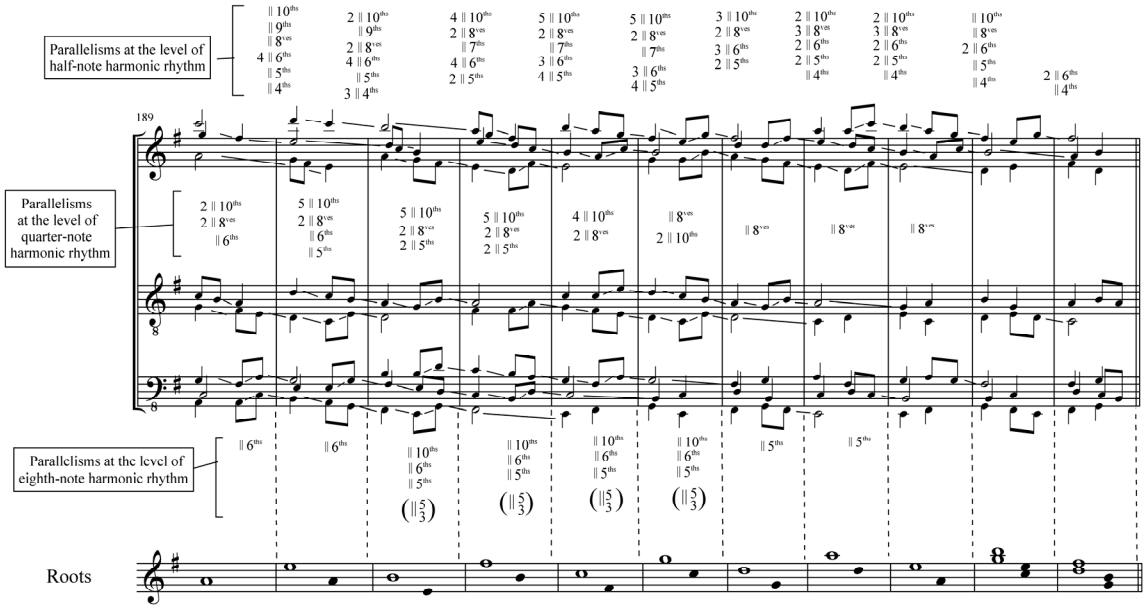


Figure 27: Reinforcement of the quarter-note harmonic rhythm by the eighth-note figures of the last two phrases of the theme

[31] It could be argued that, because of the chordal blocks moving in parallel motion, the actual harmonic rhythm of that section is one quarter-note followed by two eighth-notes. However, the brief duration and weak position of that chord placed in the last eighth-note of each measure, added to the fact that a leap of a third tends to be heard as a prolongation by arpeggiation of the accented sonority, restrain the effect of these chords to the melodic-contrapuntal dimension.

It seems important to notice that every time a new voice is added to the canon the area where the two main cycles of ascending fifths diagonally overlap increases in length. Figure 26 shows the longest overlapping of these two structures in the canon, which is reached when the last of the voices is finally introduced. The lengthening of the overlap throughout the first part of the canon makes the transition denser and more organic because the melodic, rhythmic, and harmonic features of the two structures are cross-faded at some length.[32] However, this more organic transition is not totally gradual since the specific harmonic characteristics of the lowest layer(s), which has a strong influence on the harmonic perception of the other layers, adds some conspicuous irregularity to the process. When a gradual transition between the quarter note and half note harmonic rhythms might be expected, for instance, a temporary augmentation of the harmonic rhythm to a whole note occurs instead. The D7 and F#^{o} chords, shown in figure 28, tend to be perceived as a harmonic unit not only because they share all pitches, but also because they have the same bass. Both the combination of the augmentation and the tension derived from the tritone generate a dramatic effect every time this particular F#^{o} chord appears throughout the canon.[33]

[32] Whereas the visual representation of the transition between the two harmonic structures shows a sharp diagonal separating them, the actual aural effect of the overlapping is to generate a rather homogenous blend, where the two layers are difficult to distinguish from one another. The effect of this process is similar to the superposition of semi-transparent layers of color in watercolor painting. The gradual decrease of the number of voices creating the first structure and the increase of voices creating the second is like a cross-fade, where one section connects to the other by overlapping the dynamic fade in and fade out. However, the fact that most of the notes of the top sonorities can easily be perceived as traditional added notes to the bottom sonorities prevents the process from being completely gradual.

[33] This harmonic tension is especially increased after the second violas introduce the half note 'g' to the chord in m. 104. In terms of the diagonal scheme of transposition this 'g' is the result of the overlapping of the two main structures of ascending fifths, which superposes the C and F#^{o} chords. However, in practical terms, whereas the 'c' and 'e' pitches of the C chord perfectly blends with the F#^{o} chord, the 'g' sticks out as an autonomous element because of its strong conflict with the F#^{o} chord.

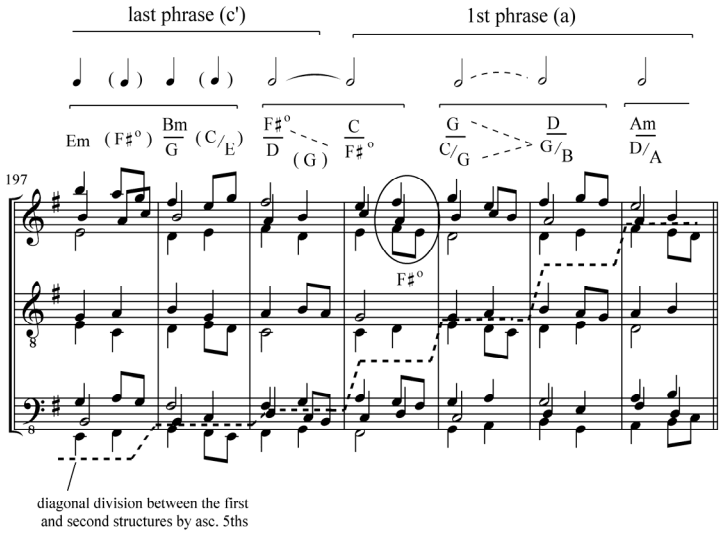


Figure 28: Augmentation of the harmonic rhythm in the eight-voice section[34]

This tonal tension is resolved by the two measures that immediately follow the D7 and F#^{o} chords. However, this resolution is contrapuntally complex, since multiple non-chord tones are superposed at different levels of rhythmic structure and the overlapping of the two structures of ascending fifths generates a very rich superposition of triads. Figure 29 simplifies the texture by eliminating the non-chord tones at the level of the eighth-note structure and some of the figuration at the level of the quarter-note structure.

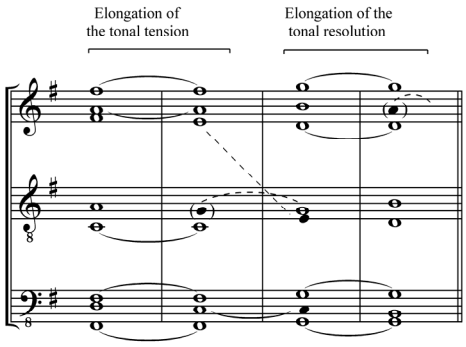


Figure 29: Most relevant pitches for the scheme of tonal tension-resolution in mm. 199-203

[34] The chords in parentheses in figure 28 belong to the first structure of ascending fifths which gets absorbed by the second structure when they overlap.

The slowing down of the harmonic rhythm, the increase of number and complexity of non-chord tones, the introduction of descending third relationships between strong and weak beats, and the subsequent introduction of the ladder of dissonance shortly after, makes the second structure of ascending fifths diffuse in harmonic terms. Compared to the first structure of ascending fifths, the second clearly emphasizes the polyphonic over the harmonic dimension. This shift of focus works as a natural transition towards the strongly polyphonic accumulation of tension in the ascent to the melodic apex.

3.4 HARMONIC RHYME

One of the most salient harmonic patterns in the transition between the two main structures of ascending fifths is the recurrent sequence of the G and D chords. This harmonic pattern is determined by the melodic rhyme scheme of the theme and is already present in the first two-voice section of the canon.

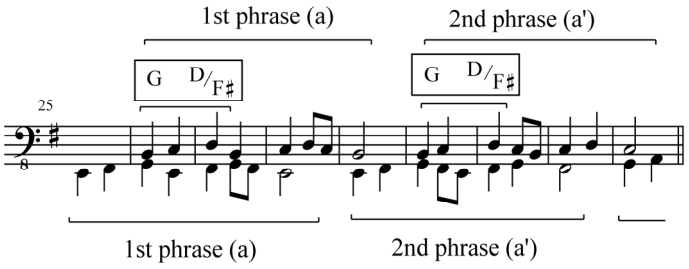


Figure 30: G-D pattern in the two-voice section

Later in the canon, a third appearance of the G-D idea is consolidated with the introduction of the fourth voice in m.76.

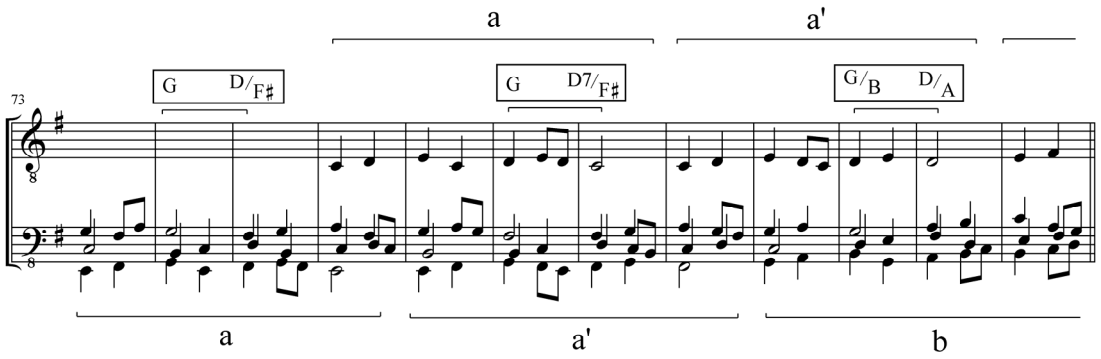


Figure 31: G-D pattern in the transition between the three and the four-voice sections

The successive accumulation of layers not only consolidates the G-D idea, but also partially extends the rhyme logic to some of the adjacent measures. These extended areas of the rhyme exhibit a less clear pattern which ambiguously shows elements of both four-bar and eight-bar harmonic patterns. At the four-bar level, the C chord built above the first 'e' of the lowest voice, is very close in its harmonic effect to the Em chord that occurs four measures latter, because they share the same bass note. At the eight-bar level, the same pattern of roots C and E, as well as the Am chord that precedes the Em chord are repeated.

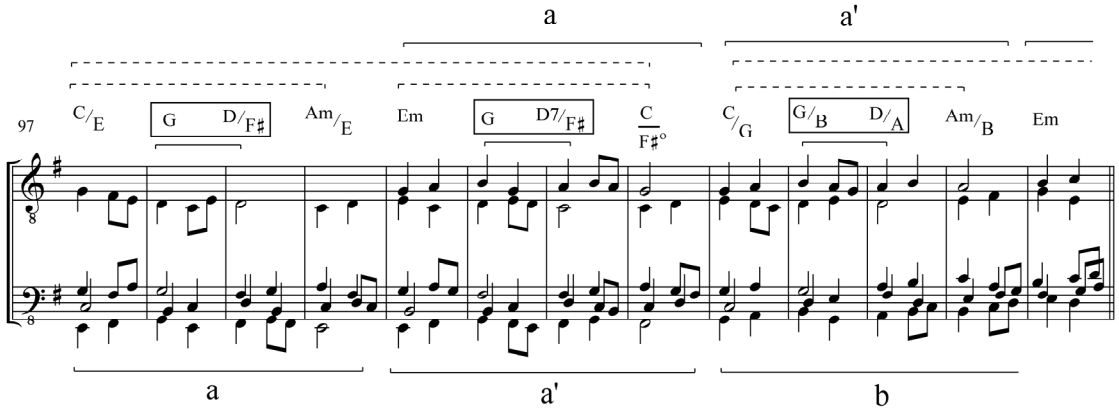


Figure 32: Partial extension of the harmonic rhyme in the transition between four and five-voice sections

By the time the last voice of the canon is introduced, elements of the four-bar harmonic rhyme have been extended even further. The succession G-D-Am-Em is generated by the weak beat sonorities of four additional measures. These sonorities, although placed on weak beats, are particularly relevant because the degree of dissonance on the strong beats of those measures prevents the strong beats from clearly projecting harmonic roots. However, the already described diagonal schemes of transposition of sonorities gradually diminish the number of voices involved in the G-D-Am-Em sequence until it completely fades away. In addition, it is important to remember that the middle section of the theme, where this subtle extension of the harmonic rhyme takes place, tends to be perceived in more polyphonic than harmonic terms. For this reason, this extension of the harmonic rhyme works as a rather distant echo of the initial pattern.

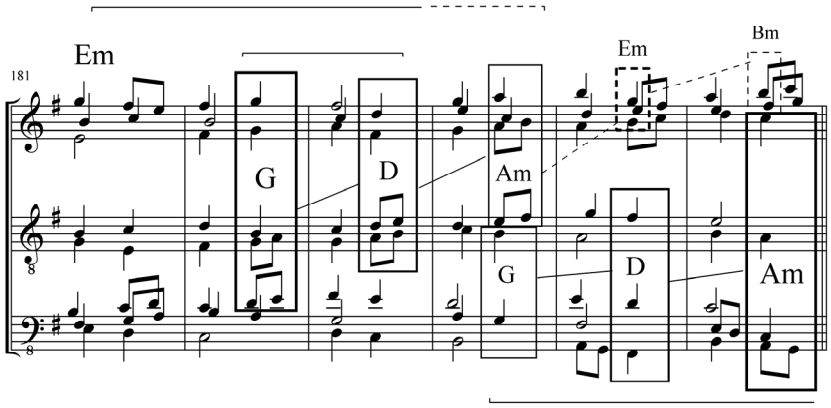


Figure 33: Four-bar extension and fading away of the harmonic rhyme

It is also important to notice that the chords that are not repeated every four measures (C and Em; F#^{o} and Am) do not completely contradict the four-bar harmonic rhyme. These chords, related by diatonic thirds, share two pitches and for that reason can easily be perceived as substitutions for each other. These relationships by diatonic thirds and their subsequent harmonic affinity are natural consequences of breaking down a diatonic cycle of fifths into two groups of four chords each.

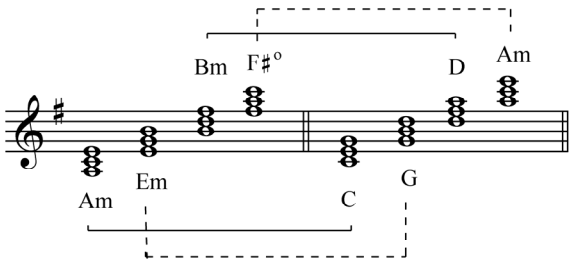
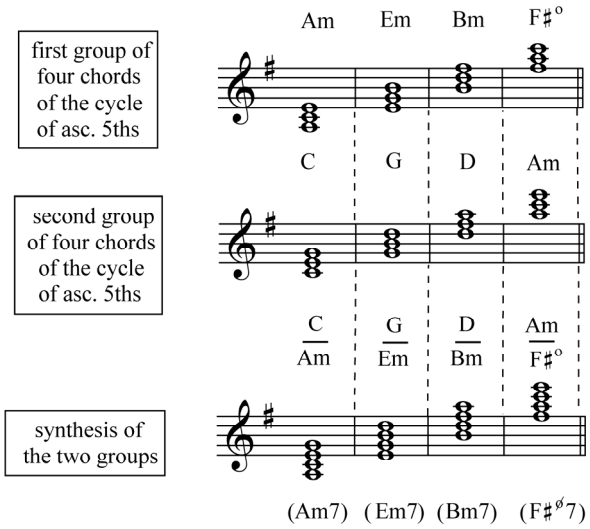


Figure 34: Harmonic affinities derived from a four-chord grouping of a cycle of asc. 5ths

This same type of harmonic affinity can be found between the four first measures of the cycle of fifths and the first four measures that introduce the G-D idea (the roots of these two groups of four measures are the same used in figure 34). In addition to this basic affinity derived from the cycle of fifths, the chords in the first group of four have sevenths that add another layer of harmonic affinity, since these seventh chords can be perceived as synthesizing both groups of four chords. Figures 35a and 35b illustrate how the sequence C-G-D-Am, where the G-D is first introduced, is prepared by its inclusion in the previous sequence Am7-Em7-Bm7-F#°.[35]



[35] Most of the weak beats in this excerpt replicate the same connections that exist between the strong beats.

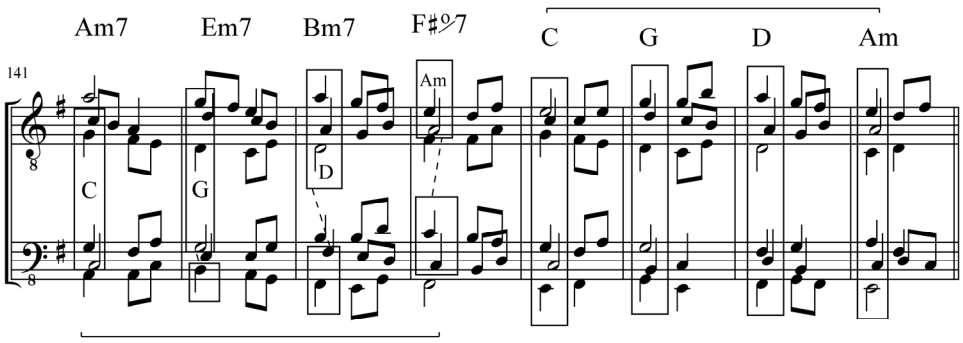


Figure 35: Fusion of the two groups of four chords into seventh chords and the harmonic 'preparation' of the C-D-G-Am sequence

Figure 36 summarizes the evolution of the harmonic rhyme throughout the first part of canon. This rhyme progresses from being almost totally confined to the G-D idea and expressed in only two phrases to including four chords and influencing most of the theme.

This evolution not only includes an increase in the length of the area influenced by the harmonic rhyme but also in the quality of that rhyme. The accumulation of rhythmically displaced layers gradually spreads the rhyme over time. The result, however, is not a uniformly spread rhyme, but a rhyme that comes into focus on the two central G-D ideas and gradually loses its clarity, as if it were getting diffused, in the measures immediately before and after the two central G-D ideas, as well as in the preceding and following four-measure groups.

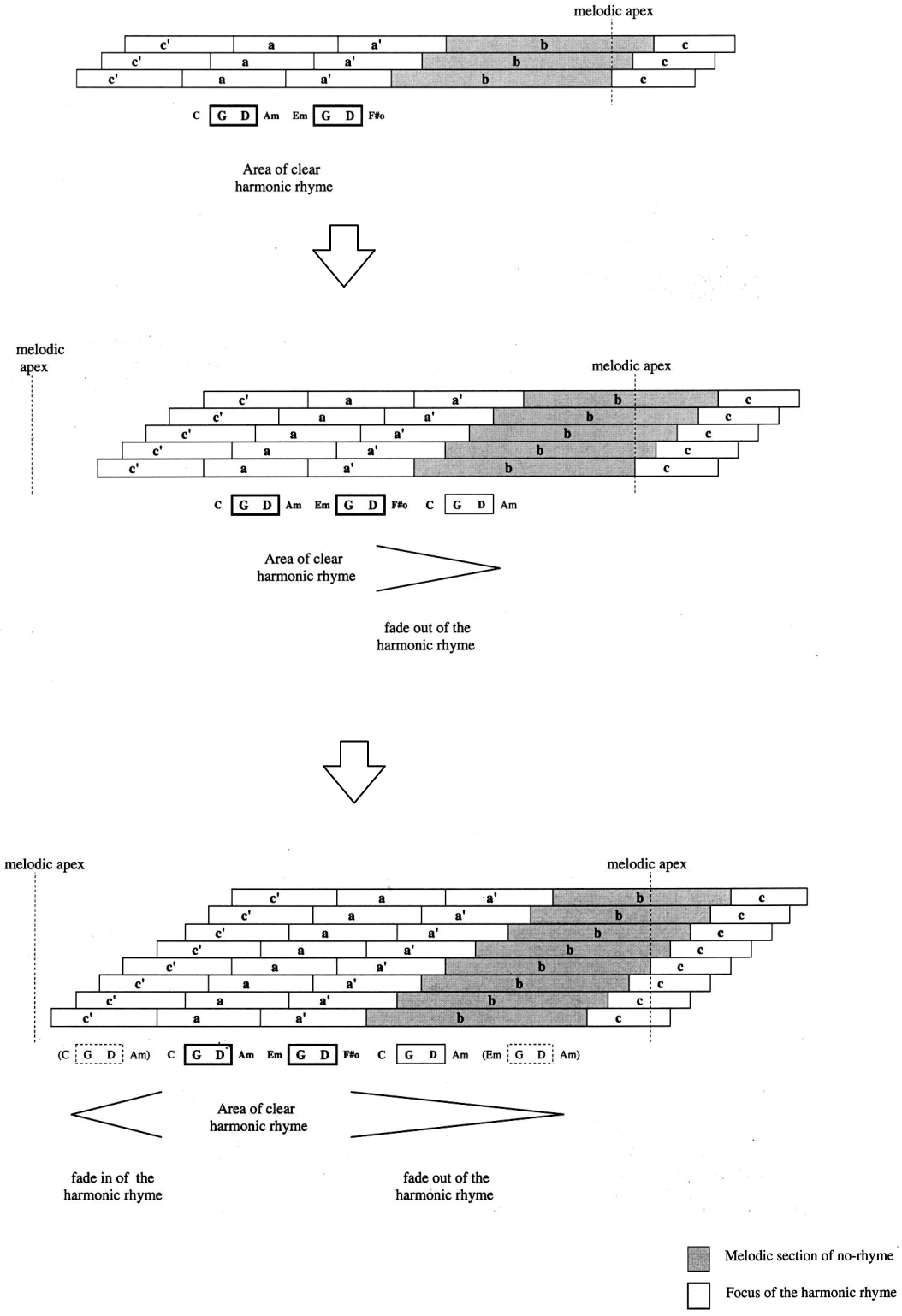


Figure 36: Evolution of the harmonic rhyme throughout the first part of the canon

The long and relatively continuous harmonic structure by ascending fifths, first described in this chapter, and the four-bar harmonic rhyme focalized on G-D, just discussed, are not mutually exclusive. They are complementary layers that generate a complex but still natural and cohesive harmonic discourse. Each one of these two harmonic layers is essential, since they are manifestations of different basic elements of the piece. Whereas the long structure by ascending fifths is mostly determined by the melodic interval of imitation of the canon, the four-chord rhyme unit is mostly generated by the specific melodic features of the theme. The integration of these two layers into a single harmonic structure produces a discourse that is at the same time cyclic and ever-changing, static and directional, and whose gradual loss of clarity towards the middle section of the theme adds enormous plasticity to the way each melodic apex is reached. On the other hand, the overall evolution of the harmonic rhyme just described, which includes processes of consolidation, expansion, and fading, intensifies both cyclic and ever-changing aspects of the theme, increasing the continuity of the accumulation of tension, and therefore the dramatic intensity and momentum of the ascent towards the climax of the canon.

3.5 A LADDER OF MODAL TRANSPOSITIONS

Each transposed new voice introduced in the canon, outlines a different modal scale. For instance, whereas the original theme moves from e^1 to e^2, outlining an E aeolian scale, the second voice moves from b^1 to b^2, outlining a B phrygian scale. Figure 37 lists the succession of modal levels throughout the canon.

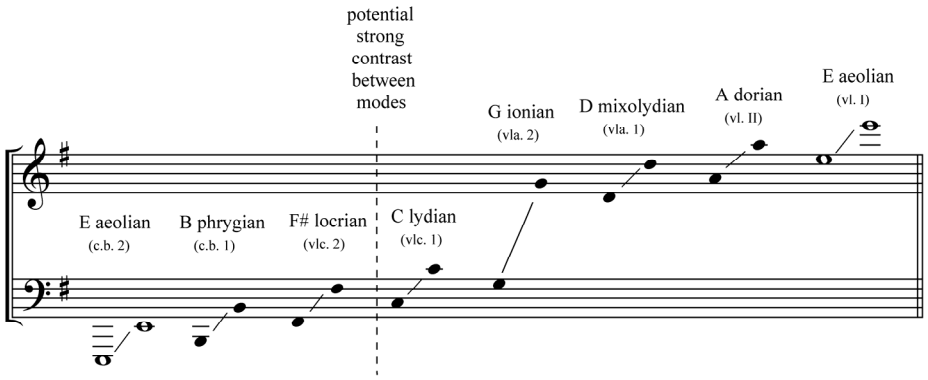


Figure 37: Modal levels of each entrance of the theme

Because the first appearance of the theme occurs at the level of E aeolian, and that very same layer remains as the lower foundation until the climax of the canon is reached, the 'e' never stops being the tonal center. This strong predominance of the E aeolian also prevents the different modes introduced by the other voices to be fully harmonically projected. For this reason, the main effect of the changes of mode is not that of a prominent change of the harmonic color but a subtle, continuous renewal of the specific pitches and intervals emphasized by the top melody. Figure 38 shows the first of these melodic renewals. In that particular case the specific pitches {e-f#-g} of the initial gesture are replaced by the pitches {b-c-d} and the specific pattern of interval M2-m2 is replaced by the pattern m2-M2 which, although recognized as the same basic melodic idea, introduces change and music interest.

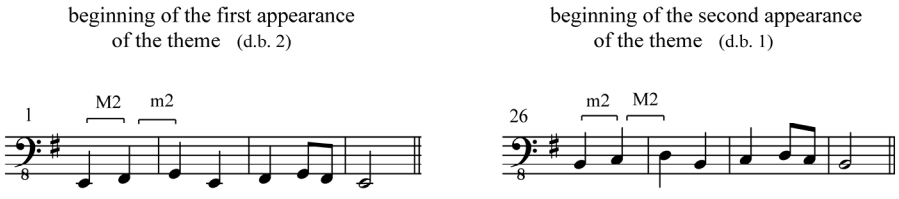


Figure 38: Shifting of the quality of the melodic intervals

This B phrygian melody does not project a pure phrygian color. Instead, it provides an emphasis on the pitch ‘b’, not as center but as scale degree five of E aeolian. Because of this, the characteristic phrygian minor second between scale degrees one and two, is perceived instead as a minor second between scale degrees five and six of E aeolian. Although this E aeolian contextualization of the ‘b’-‘c’ move is still characteristic and full of tension, it generates a slightly different harmonic color, which could be informally described as less ‘exotic’. In addition, whereas at the macro level the melodic intervals emphasized by every new modal level are subordinated to the overarching E aeolian, on a local level the effect of the same melodic intervals is also heavily influenced by the harmonic context. For instance, the already mentioned phrygian ‘move’ between ‘b’ and ‘c’ is first introduced in the contrapuntal scheme M3-m6 which neutralizes most of its dissonance potential.[36] This particular contrapuntal scheme emphasizes the consonance potential of that minor second by using imperfect consonances and a contrapuntally ‘comfortable’ combination of contrary and stepwise motion. At the local level, this emphasis on consonance promotes the projection of a consonant harmonic quality that could be described as a tonicization of III, instead of E aeolian or B phrygian. The result of this double influence is a ‘b’ that is at the same time scale degree five of E aeolian at the macro level and the third of a G triad in a local level that smoothly moves to a ‘c’ that is both the scale degree six of E aeolian and the root of a C major chord.

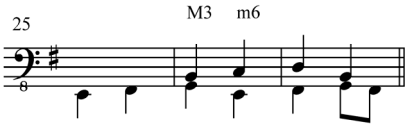


Figure 39: Harmonic intervals at the beginning of the second entrance of the theme

[36] One of the simplest ways that counterpoint could emphasize the tension of the minor second between ‘b’ and ‘c’ is having a lower voice holding the ‘b’ while the upper voice moves from that same ‘b’ to ‘c’, generating an oblique motion.

Although the simultaneity of tonal relationships at different levels of structure is a normal byproduct of tonal practice, the complexity suggested by both the layering of modal transpositions and the modal character of the harmony itself, makes the understanding of these multilevel connections particularly pertinent for the harmonic analysis of the canon. One of the main features of this canon is that the absence of leading tones of e minor promotes a modal discourse. This modal harmonic quality is reinforced by the underlying idea of ascending fifths (plagal fifths); the power of this progression to establish a clearly defined tonal center and generate strong harmonic direction is remarkably weak when compared to other harmonic structures such as the cycle of descending fifths.[37] In a succession of chords related by ascending fifths there are usually two prominent features. First, if the harmonic sequence is accompanied by a melodic sequence, the music traces a registral ascent whose kinetic quality and degree of tension are highly characteristic.[38] Second, even if the harmonic sequence is not clearly supported by a melodic sequence (as is the case in this canon), the ascending essence of the root movement and the elusiveness of tonal direction generate a type of tension that allows every chord to have a similar harmonic weight and protagonism. This softening of the harmonic subordination of the individual chords to a dominating tonal center not only allows the shifting of accents of the displacement of the top melody to unfold freely in this canon but it also allows it to emphasize the accented chords regardless of its tonal implication at the macro level. Figure 40 summarizes the different triads emphasized by the melodic displacement of the top voice.

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[37] Extended successions of chords related by ascending fifths were common in early polyphony of the sixteenth century but they gradually lost their popularity when a more directional sense of tonality was consolidated in the common practice era. In the Classical period, for instance, the use of sequence by ascending fifths was mainly restricted to symphonic climactic moments. Chains of chords related by ascending fifths are also common of certain styles of rock music, where their modal effect is fully exploited.

[38] Most melodic sequences based on a harmonic cycle of ascending fifths alternate ascending fifths with descending fifths, generating a large scale progression by ascending stepwise motion. Although, in some rare occasions a melodic sequence based on a cycle of ascending fifths may move down in register by means of an uninterrupted succession of descending fourth transpositions, the large scale stepwise progression might still ascend.

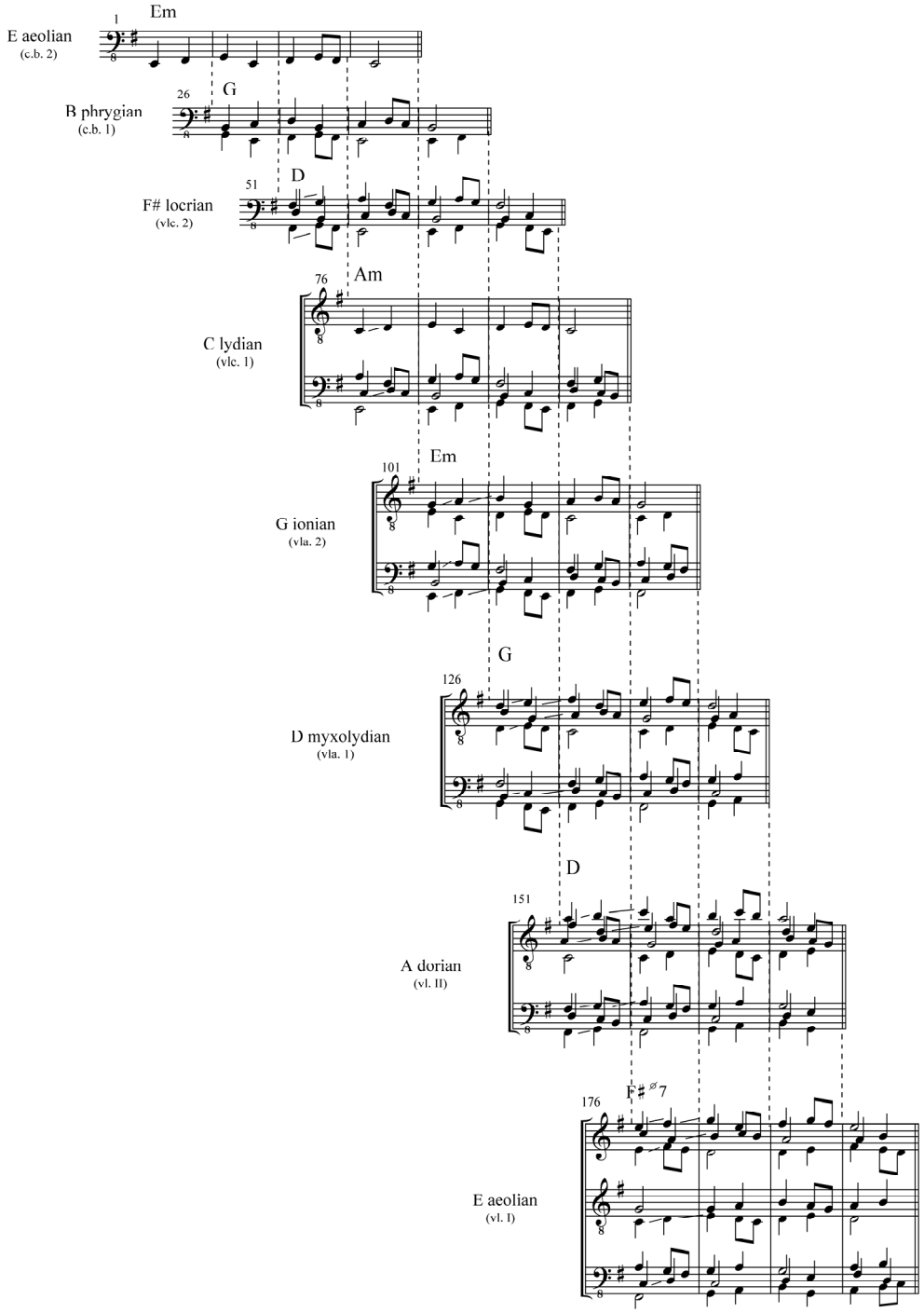

Figure 40: Shifting of harmonic emphasis throughout the canon

The relationship between the first note of the top voice theme and the root of the chord that it emphasizes gradually opens up from being the root, to being the third, the fifth, and finally the seventh of the chord. It is important to notice that this ascending progression is not a perfect mirror of the overall ascending registral progression of the canon. Whereas the registral progression traces a gradual ascent, the relationship between accented top notes and accented roots ascend at a slower and less regular pace (see figure 41). This ascent is not just an ascent in a virtual registral space (relationship between root and top note), but it has repercussions in the harmonic expression of the top part. These repercussions are, to some extent, more prominent than the modal color itself.[39]

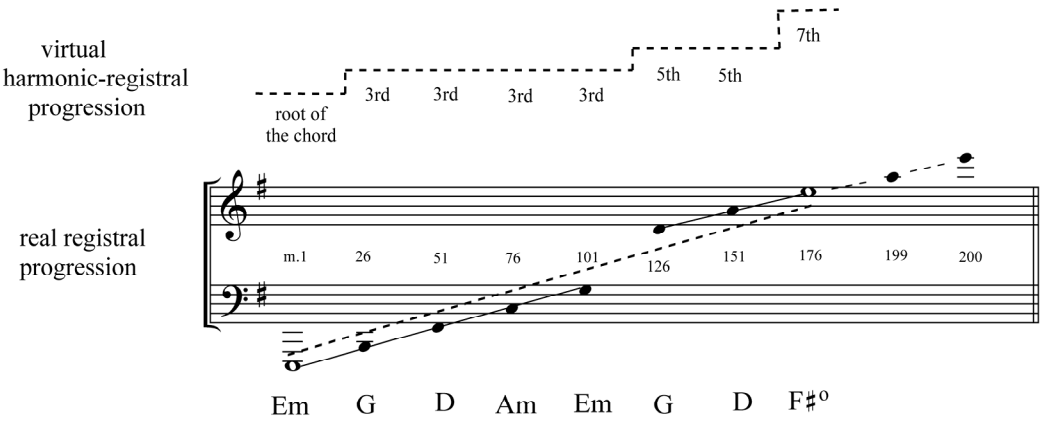

Figure 41: Comparison between virtual harmonic-registral progression and real registral progression of the first note of each of the top voice's themes

In this theme, the first accented part is particularly important in setting the harmonic mood of the rest of the melody. In the case of this melody, the harmonic dimension of the beginning of the theme is projected in a stronger way since it always occurs in the sections of the theme where both the roots of the

[39] In this canon there is a marked difference in affect between entries every time the interval between the root and the first note of the top part changes. In many of these cases these affects are emphasized by the interval between root and top part being shared by more than one chord as is the case in mm. 50, 51, and 53 (all accented chords related with the top voice by a 3rd) or in mm. 150, 151, and 152 (all accented chords related with the top voice by a 5th).

chords and the harmonic rhyme are the clearest. In addition to these two factors, the harmonic relevance of the beginnings of the theme seems to be enhanced by the way the pattern generated by them at the macro level replicates perfectly the local harmonic rhyme scheme (Em-G-D-Am, Em-G-D-F#^{o}).[40] This relationship is illustrated by fig. 40. Whereas the first four accented chords of any of the entrances follow some segment of the idea Em-G-D-Am, Em-G-D-F#^{o}, (i.e., reading the figure from left to right), the succession of the first chord of each entrance (i.e., reading the figure following a descending diagonal) also recreates the pattern Em-G-D-Am, Em-G-D-F#^{o}. This manifestation of the harmonic rhyme on a macro scale seems particularly interesting since it adds another dimension to the discourse that enhances the psychological depth of both cyclic and ever-changing aspects of the piece. This harmonic pattern is not only connected to the harmonic rhyme of the local level but it also connects to the internal structure of the theme which clearly emphasizes the notes of the triad through its registral ascent (for instance 'e', 'g', 'b' in the case of the E aeolian original).

3.6 INTERMITTENT PROMINENCE OF THE G-D IDEA AND ITS EVER-CHANGING ASPECT

As previously mentioned, the particular harmonic characteristics of this canon prevent the E minor chord from completely dominating the harmonic discourse. This rather soft subordination to a chordal center allows other sonorities to easily become prominent without any particular tonal confrontation. One of the most prominent sonorities throughout the canon is the combination of the chords G-D. There seem to be two main reasons for this prominence. First, its periodic recurrence makes this chordal combination the central component of the harmonic rhyme scheme. Second, the major mode

[40] The relationship between macro harmonic pattern generated by the beginnings of the theme and the harmonic rhyme scheme at the micro level is determined by the ratio of the rhythmic displacement between entrances.

quality of these triads, often presented without any added notes, makes these chords the most conspicuous sonorities of the canon. The prominence of these two chords is also reinforced by the interpolation of another major chord (C chord) to the pattern and highlighted by the strong contrast with the immediately preceding section, which is composed almost exclusively of minor and diminished seventh chords.

The pattern G-C-D is highly distinctive not only because it includes all the major chords available within the diatonic collection but also because it suggests a tonic-subdominant-dominant progression. Also, the succession of minor and diminished chords that precedes the G-C-D idea not only exhibits less stable chordal qualities but also less stable harmonic patterns. Its alternation of ascending and descending fifths determines that the root of every strong beat is represented in the weak beat of the next measure, and because there is no clear hierarchy between the minor chords, a disorienting sense of illusory prolongations is generated. This creates a weak sense of harmonic gravity as if the chords were wandering or floating on the air, spinning around with no direction.

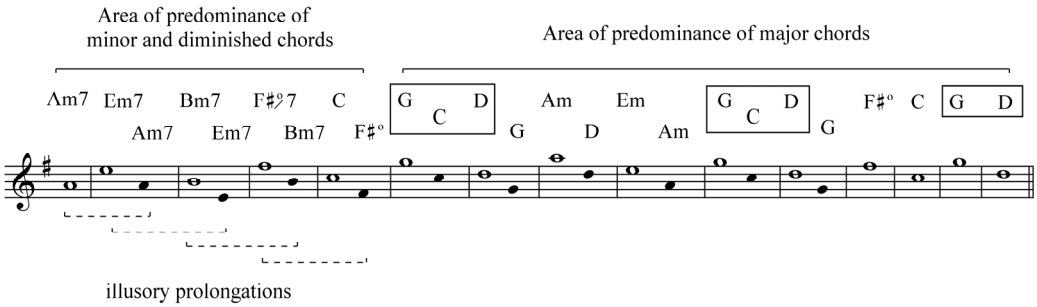

Figure 42: Main roots projected by the two structures of asc. 5ths

It is important to notice that the G-C-D pattern in this canon is mostly associated with a particular set of inversions (G in root position, and C and D in first inversion). This specific relationship between the root and the bass pattern adds psychological interest to the idea, making it even more distinctive and memorable.

In the same way that the G-C-D idea is more prominent than other harmonic combinations in the canon, some of the G-D ideas are more prominent than others. The main factor in that determines such prominence is the continuous change in the way this harmonic idea and the top voice relate to each other. The G-C-D idea is emphasized whenever it fully coincides with either the beginning or the end of the top voice phrase. Furthermore, although occurring several times during each presentation of the theme, the first occurrence of the G-C-D harmonic idea in every presentation is the most prominent, as the roots of the chords are gradually hidden behind the increase of dissonance within the theme.

There are four instances where the first occurrence of the G-C-D idea is emphasized by the phrasing (see figure 43). The first of these moments occurs when the theme is introduced for the second time, where the initial two measures of the first two phrases of this B phrygian theme coincide with the harmonic idea G-C-D. Although relatively dark in color because of the low register and presenting incomplete chords, this double emphasis on the G-C-D is clearly perceivable. The second instance where the G-C-D idea is fully supported by the top voice occurs at the end of the fourth entrance of the theme in C lydian in the first cellos in m. 98. In this case the highly distinctive eighth-note cadential figure that coincides with the G-C-D idea adds a special rhythmic accent to the C intermediate chord. The phrasing of the top voice and the G-C-D converge again in m. 146 where the harmonic gesture is emphasized by the beginning of the last phrase of the theme, whose intervals and rhythm resemble the cadential figure of m. 98, thus generating a similar emphasis of the C chord. Finally the G-C-D idea coincides with the ending of the second to last phrase of the top voice in m. 194. This last convergence is especially prominent because, with the exception of the harmonically dark first convergence in m. 26, this is the only time that the focus of melodic and harmonic rhyme coincides.

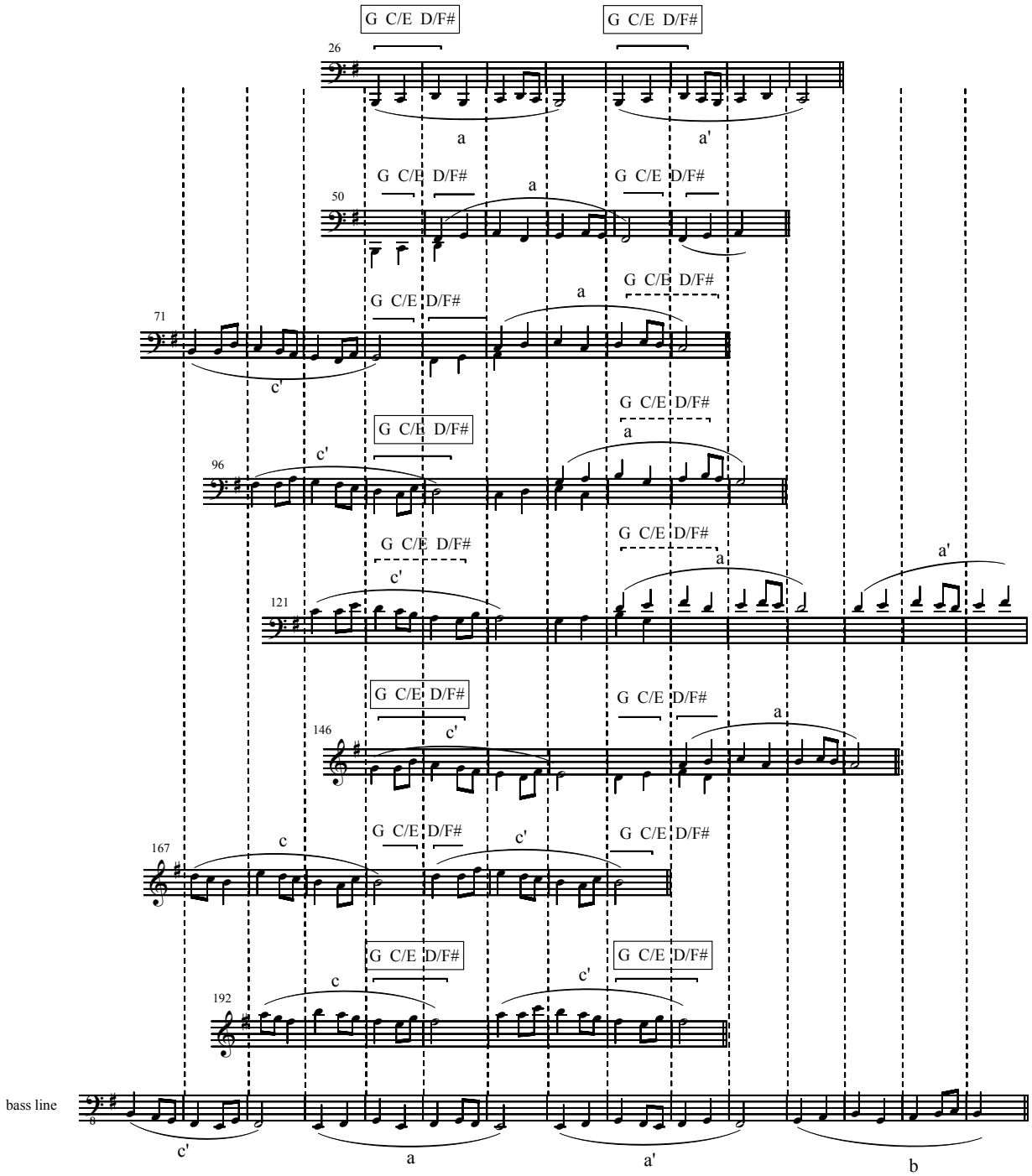

Figure 43. Relationship between the G-C-D idea and the top voice phrasing

Besides the temporal convergence of these events, their contrapuntal relationship also helps make them prominent. The parallelism between the outer voices tends to bring to the forefront both the melodic gesture and the harmonic pattern. This parallelism first uses sixths, but eventually shifts to tenths and finally octaves. The relative stability of the later intervallic relationship tends to fuse the outer voices into a single thick gesture, which adds a lot of emphasis to both the melodic gesture and the harmonic pattern. In addition, the accumulation of layers increases the prominence of the G-C-D idea, because it increases the number of simultaneous parallelisms and the number of voices that play the eighth-note figure.

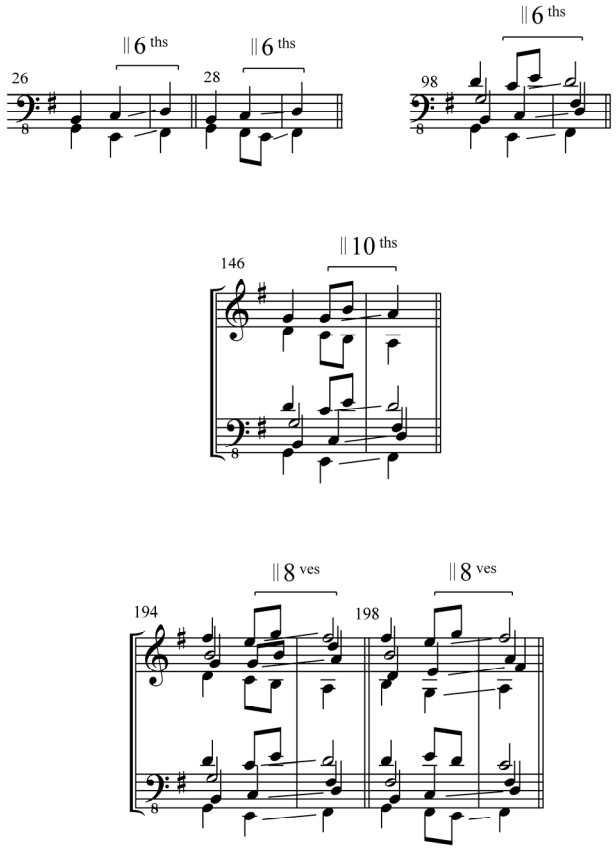

Figure 44: Evolution of the contrapuntal parallelism in the emphasized G-C-D idea

3.7 PARTIAL SUMMARY

The large scale structure generated by these four regions where the G-C-D idea is particularly prominent complements the macro-harmonic rhyme established by the roots at the beginning of each theme's entrance. These two macro structures also have an abstract similarity: the first expands intervallically by 6^{th}-10^{th}-8^{ve}, the second by root-3^{rd}-5^{th}-7^{th}. However, whereas the first structure is rather irregular because it depends on a complex process of convergence, the second structure is predictable and cyclic because it is directly determined by a regular sequence of displacement and melodic ascent of the theme. The most important difference between these two structures, however, is that whereas the cyclic ladder of emphasized chords could potentially keep repeating and the virtual registral space between root and top note keep expanding, the full convergence between the focus of harmonic rhyme and the focus of melodic rhyme reached in the climax of the canon works as the completion of a process and cannot be easily continued without repeating itself. This last characteristic makes this subtle structure one of high importance, a reinforcement of the main shape of tension of the piece delineated by a registral process (ascent followed by a descent) and a tonal process (return to the initial pitch level, E aeolian).

In these terms the different processes discussed throughout these two chapters can be classified into two groups. On the one hand, there are processes that stop when a goal is achieved (e.g., processes of convergence). On the other hand, there are processes that just stop, but that could potentially continue because they do not have an intrinsically clear goal that could be achieved (e.g., expansion between root and top voice at the beginning of each new entrance). The type of relationship that occurs when these two types of processes complement each other is that of a simple reinforcement, where the momentum of one of the processes is increased but the dramatic intensity is not necessarily enhanced. On the other hand, the coexistence and potential convergence of two processes of the first type represent a rich source of

dramatic expression since in that scenario two autonomous stories organically interact in the achievement of a common goal.

Table 1 lists most of the processes discussed in these two chapters. The items in the third column, under the heading 'goal', describe the processes as either achieving a goal or just stopping. It is important to notice that this classification is independent from the classification of processes by their degree of autonomy, under the categories 'most autonomous processes', 'less autonomous processes' and 'convergence of two processes'. This means that the degree to which a process is a by-product of another process does not determine if this process is perceived as achieving or not achieving a clear goal. The items under the 'type' column describe how regular the process is. Once again this classification is independent of the other two classifications. Whereas the coexistence of two autonomous processes or the coexistence of two processes that are perceived as achieving their goals creates the fullest enhancement of the dramatic tension, it is the coexistence of either two irregular processes or one regular and one irregular process that results in a similarly dramatic effect.

This partial summary shows the complexity of the relationships between the different processes set in motion. It is both the complexity of the relationships and the simplicity and clear structure of the processes themselves that permit the piece to create an expressive depth that does not get lost in an unintelligible multilayered superposition.

Table 1: Partial summary of the main processes in Górecki's canon

More Autonomous Processes	Description	Goal / Intelligibility	Type
Theme's melodic rhyme (see fig. 1-5)	beginnings rhyme-no rhyme-endings rhyme	achieved (arch)	Regular
Theme's registral progression (see fig. 6)	octave, arch	achieved (octave, arch)	Semi-regular
Canon's registral progression (see fig. 8)	octave, arch	achieved (octave, arch)	Regular
Rhythmic displacement between entrances	one measure	The potential goal is not achieved (complete a theme's length displacement between outer voices)	Regular
Fixed melodic interval between entrances	complete an octave by asc. diatonic 5ths	achieved (complete cycle)	Regular
Two-voice contrapuntal dissonance (see fig. 7)	consonance-dissonance-consonance	achieved (arch)	Regular
Less Autonomous Processes (by-products)	**Description**	**Goal / Intelligibility**	**Type**
Length of the ladder of dissonance (see fig. 14)	Determined by the two-voice contrapuntal dissonance, the fixed melodic interval between entrances, and the rhythmic displacement between measures	Totally subordinated to the theme's registral progression	Regular

Ladder of dissonance coming to the foreground by competing with the top voice (see fig. 15)	The length of the ladder of dissonance gradually becomes closer to the theme's length	The potential goal is not achieved (the length of the ladder of dissonance matching the theme's length). However, its coming to prominence can be perceived as a goal itself	Regular
Going from textural rhyme to no-rhyme in the beginning of the theme throughout the canon (see fig. 17-19)	Determined by melodic rhyme, and the rhythmic displacement between measures	The goal is not very clear (disruption of the initial rhyme)	Irregular
Transposition of sonorities (see fig. 20)	Determined by fixed melodic interval between entrances and the rhythmic displacement between entrances	Totally subordinated to the number of voices	Regular
Harmonic clarity of asc. 5ths (see fig. 21-23)	Determined by the two-voice contrapuntal dissonance, the fixed melodic interval between entrances, and the rhythmic displacement between entrances	achieved (arch)	Regular
Harmonic rhyme (see fig. 30-35)	Determined by the melodic rhyme and the rhythmic displacement between entrances	achieved (arch)	Regular
Macro pattern established between the first chords of each theme (see fig. 40)	Determined by the harmonic rhyme and the rhythmic displacement between entrances	No clear goal (cycle based on the basic unit of the harmonic rhyme)	Regular
Expansion of the interval between root and top voice at the beginning of each new entrance (see fig. 41)	Determined by the harmonic rhyme, the fixed melodic interval between entrances and the rhythmic displacement between entrances	No clear goal (root-3rd-5th-7th…?)	Semi-regular
Expansion of the interval of the harmonically most prominent parallelism (see fig. 44)	Determined by the harmonic rhyme, the melodic rhyme, the fixed melodic interval between entrances and the rhythmic displacement between entrances	No clear goal (6th-10th-8^{ve})	Semi-regular
Convergence of two processes	**Description**	**Goal / Intelligibility**	**Type**
Convergence between registral expansion and the canon's melodic apex (see fig. 13)	Convergence	The goal is 'clear', but the process does not stop after the goal is achieved	Semi-regular
Convergence between going from rhyme to no-rhyme in large scale and the canon's melodic apex (see fig 17-19)	Convergence	achieved (convergence)	Irregular
Convergence between harmonic clarity of asc. 5ths and the canon's melodic apex (see fig. 24)	Convergence	achieved (convergence)	Regular
Convergence between harmonic rhyme and the canon's melodic apex (see fig. 36)	Convergence	achieved (convergence)	Regular
Convergence between most prominent melodic and harmonic rhymes taking into account phrasing (see fig. 43)	Convergence	achieved (convergence)	Semi-regular
Convergence between most prominent melodic and harmonic rhymes and the canon's melodic apex	Convergence	achieved (convergence)	Semi-regular

4.0 PÄRT'S CANTUS: LINE

4.1 THE CUMULATIVE DESCENDING LINE AND THE TROCHAIC PATTERN

Cantus is almost exclusively comprised of the gradual unfolding of descending A aeolian scales. Starting with the shortest version of the scale, a single pitch, the scale is presented over and over increasing its length one note at a time.

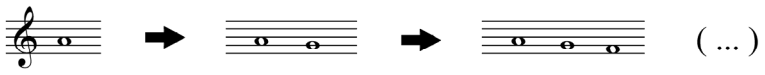

Figure 45: Basic melodic process in *Cantus*

This melodic line always follows a strict trochaic pattern (> ∪ > ∪ … a metrically accented long note followed by a metrically unaccented short note). Since a pitch is constantly being added to the descent, the relationship between the melodic and rhythmic patterns is always changing. Every second descent, the melodic gesture changes from beginning on an accented note to beginning on an unaccented note.[41] This pattern of accents in the initial A's (> > ∪ ∪) can be understood as a large-scale projection of the local-scale trochaic pattern. This projection provides an otherwise too straightforward melodic

[41] Although the first accented beginning is followed by an unaccented beginning instead of an accented one, the pattern accented-accented-unaccented-unaccented is established shortly thereafter (see fig. 46).

process with the foreground interest of periodically shifting the rhythmic inflection and the background interest of melodic groups at different levels of structure.[42]

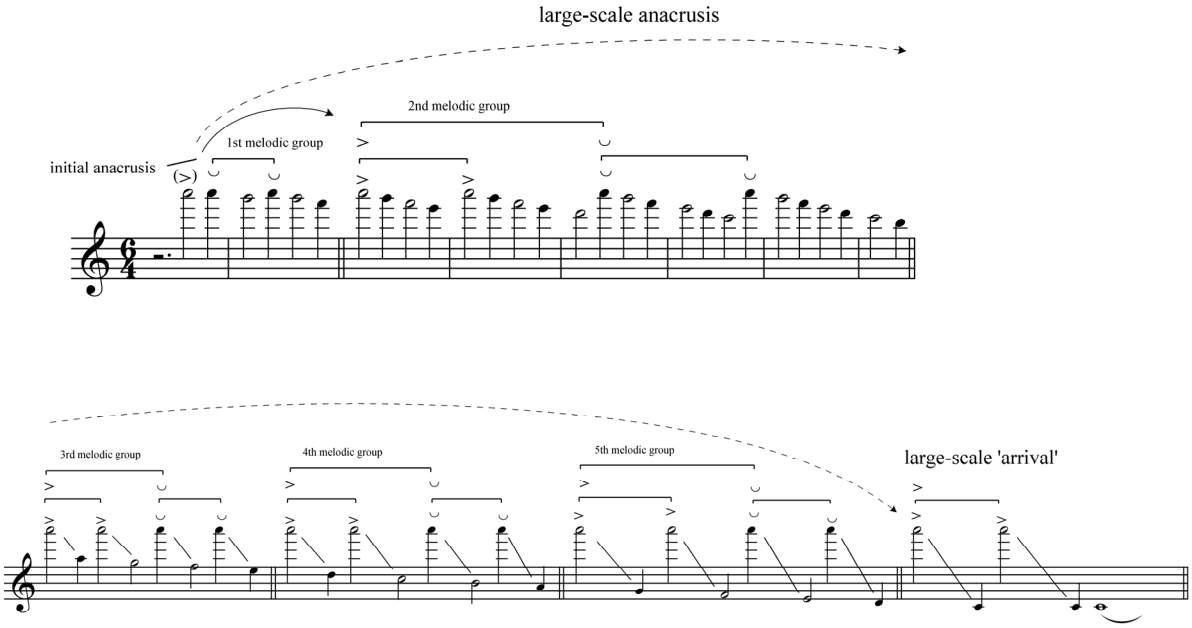

Figure 46: Melodic groups determined by the projection of the trochaic pattern to a large scale

The tendency when listening to these larger melodic structures is to hear a gesture where the first note of the scale is accented as beginning; and a gesture where the first note of the scale is unaccented as a long anacrusis. One of the most important reasons for this tendency is tonal: the accented notes of the first type of gesture move away from the tonic note {a-f-d-b…}, whereas the accented notes of the second type move towards it {g-e-c-a}.

[42] These melodic groups at different levels of structure loosely resemble the traditional hierarchical structure: sub-phrase, phrase, and group of phrases.

This canon has nine different instrumental parts, but only five autonomous voices.[43] Each of these five voices presents the descending scale in a different register, at a different speed, and completing a different span.[44]

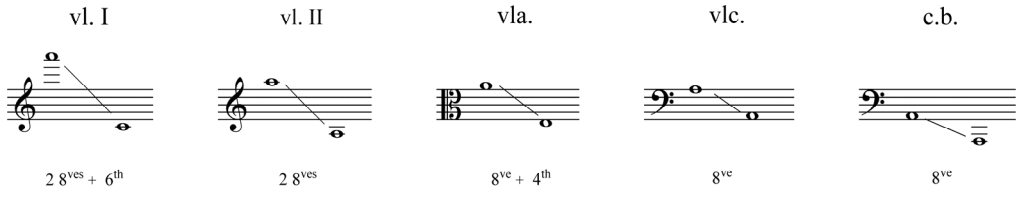

Figure 47: Range of the melodic processes for each of the main layers

In the same way that the span gets shorter in the lower layers, the number of trochaic patterns projected to a higher level of structure reduces as well. For instance, figure 48 shows how the contrabass only presents only one complete trochaic group at the large-scale level of its rhythmic-melodic structure.

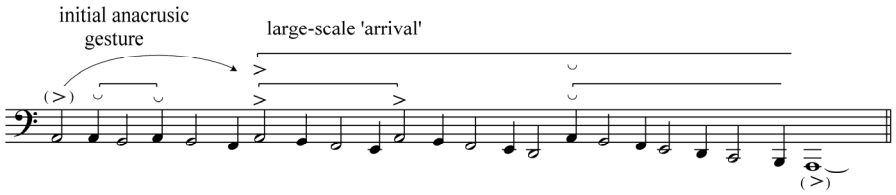

Figure 48: Rhythmic melodic groups in contrabass (notated in diminution)[45]

[43] The term 'voice' is used in this chapter to refer to any of the five main autonomous voices. The term 'layer', on the other hand, may also refer to the consolidated perception of main and secondary parts as single entities. Although the chimes are very important for the overall effect of the piece they are not part of the canonic structure.

[44] With the exception of contrabasses, every layer plays the final complete version of the scale two times. The contrabass not only differs from the other layers in not having that final repetition but it also reaches its longest span without going through all the expected steps. Instead, it goes directly from the five-note version {a-g-f-e-d} to the eight-note version of the scale {a-g-f-e-d-c-b-a}.

[45] The contrabass notes in the piece are longer than the values shown in figure 49. This version is a diminution meant to facilitate comparison between the rhythm of contrabass and first violins.

This type of rhythmic-melodic structure, where the accented tonic notes are placed at the beginning, middle, and end of the piece; and where those tonic notes placed in the middle are relatively more emphatic, generates an arch-like structure. The emphasis that the tonic notes of the middle section of the bass receive is reinforced by several other important structures of the piece. The following discussions will give special attention to this phenomenon.

4.2 MENSURATION CANON: A LADDER OF SPEEDS

The different components of this canon not only differ in span and register, but also in the speed their foreground trochaic pattern is presented. Every layer doubles the durations of the layer it imitates (see fig. 49).[46] For instance, while the rhythm of the second violins is an augmentation of the rhythm of the first violins, the rhythm of the violas is an augmentation of the rhythm of the second violins and a double augmentation of the first violins. Figure 49 illustrates the rhythmic relationships between the different layers.

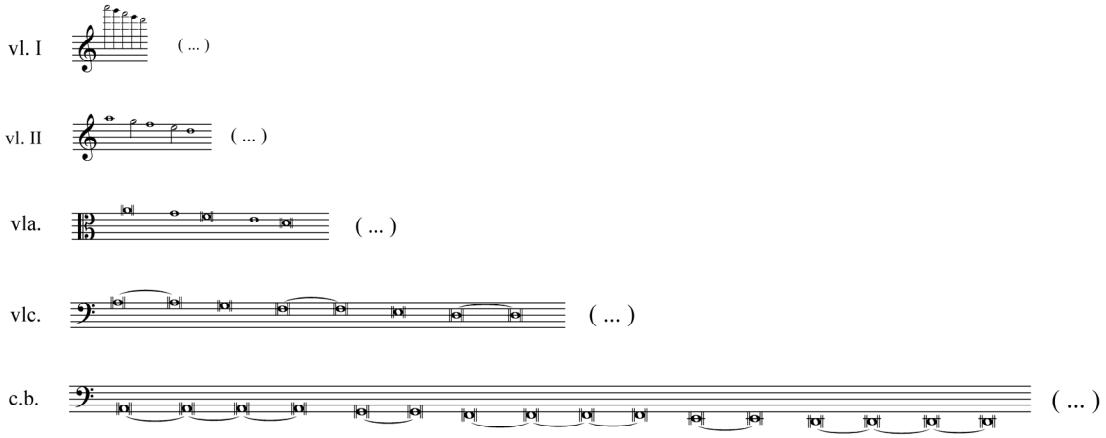

Figure 49: Rhythmic stratification in *Cantus*

[46] Although for the sake of conceptual clarity the layers in fig. 49 are lined up giving the impression they begin simultaneously, in the piece they are introduced top down.

4.3 NOTE-ONSET SYNCHRONY AND THE EIGHT-BAR PATTERN

Each occurrence of the trochaic pattern in the contrabasses proposes an eight-bar section (see fig. 50). The contrabass rhythmic figure neatly defines these sections, not only because of its agogic accent (its long notes are the longest notes of the piece) but also because it is the lowest voice. In addition, the longest notes of the bass are the only points in the piece where all five layers (and the nine instrumental parts in total) articulate their notes at the same time. In general terms, the more voices involved in an articulation and the stronger their metrical position, the stronger the accent generated. Since the piece presents five autonomous layers, the strength of the accent due to simultaneous articulation can be described by numbers from one to five. Figure 50 shows different subdivisions of the eight-bar pattern that the simultaneous articulation of accented notes suggests.[47]

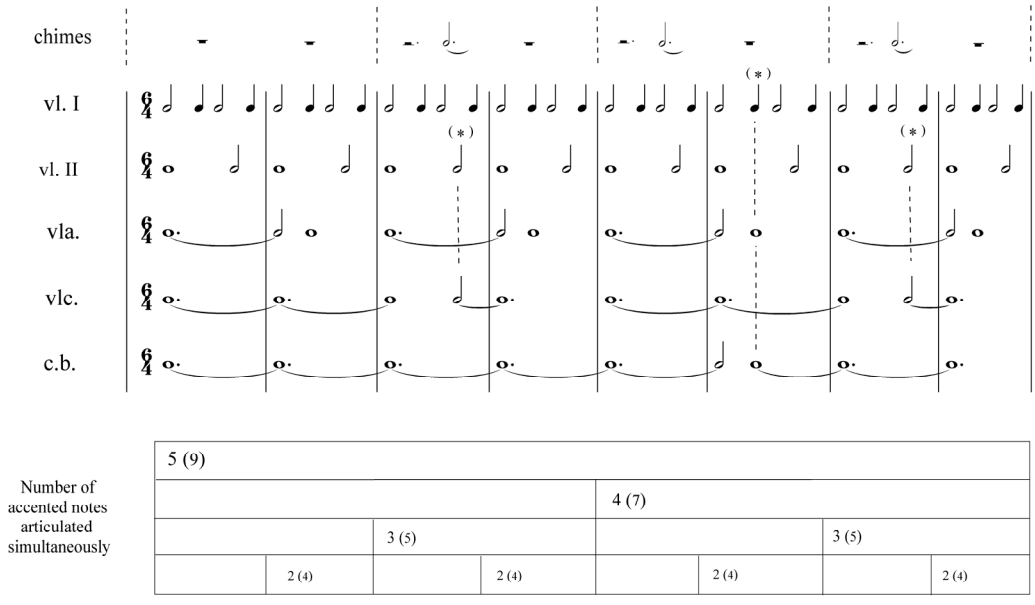

Figure 50: Sections and subsections generated by the onset synchrony of accented notes

[47] This type of simultaneous articulation is described in this analysis by the term 'onset synchrony'. The first number of each box indicates the number of autonomous layers converging. The number in parentheses indicates the total number of instrumental parts involved.

This figure shows the pattern 5-2-3-2, 4-2-3-2 as well as the way every level of structure is successively divided into subsections of equal length.[48] This arrangement is no more than a subtle grid over which the music unfolds. This grid is elaborated, complemented, hidden, and contradicted by other processes that run simultaneously to it. The asterisks in figure 50, for instance, identify three places where the regularity of the grid is contradicted by a 'syncope' generated by the onset synchrony of metrically unaccented pitches.

4.4 THE GRADUAL PROGRESSION TOWARDS PHRASE-ONSET SYNCHRONY

Whereas the length of the sections determined by the alternation of upbeat and downbeat beginnings, previously described in 4.1, is always increasing, the length of the sections determined by the trochaic pattern in contrabasses remains constant. Figure 51 shows the relationship between the 'melodic' accents on the first violins and the agogic accents of contrabasses. [49] It is important to notice that, although every single layer has these two types of accents, the structures shown in figure 51 tend to be the most prominent ones.

[48] The rhythmic pattern of the chimes is also eight-bars long and its internal structure suggests a subdivision of these eight bars into four sections of equal length. However, the connection between these two eight-bar cycles is a subtle one, since the notes of the chimes do not coincide with any of the points of note-onset synchrony of the strings. The chimes' strokes are always placed one dotted half-note after the points where four and three accented notes in the strings converge.

[49] The term 'melodic' accent is used here as a simple way to refer to the larger rhythmic pattern determined by the alternating upbeat and downbeat beginnings. The term agogic accent, on the other hand, refers to the pattern directly delineated by the trochaic figure.

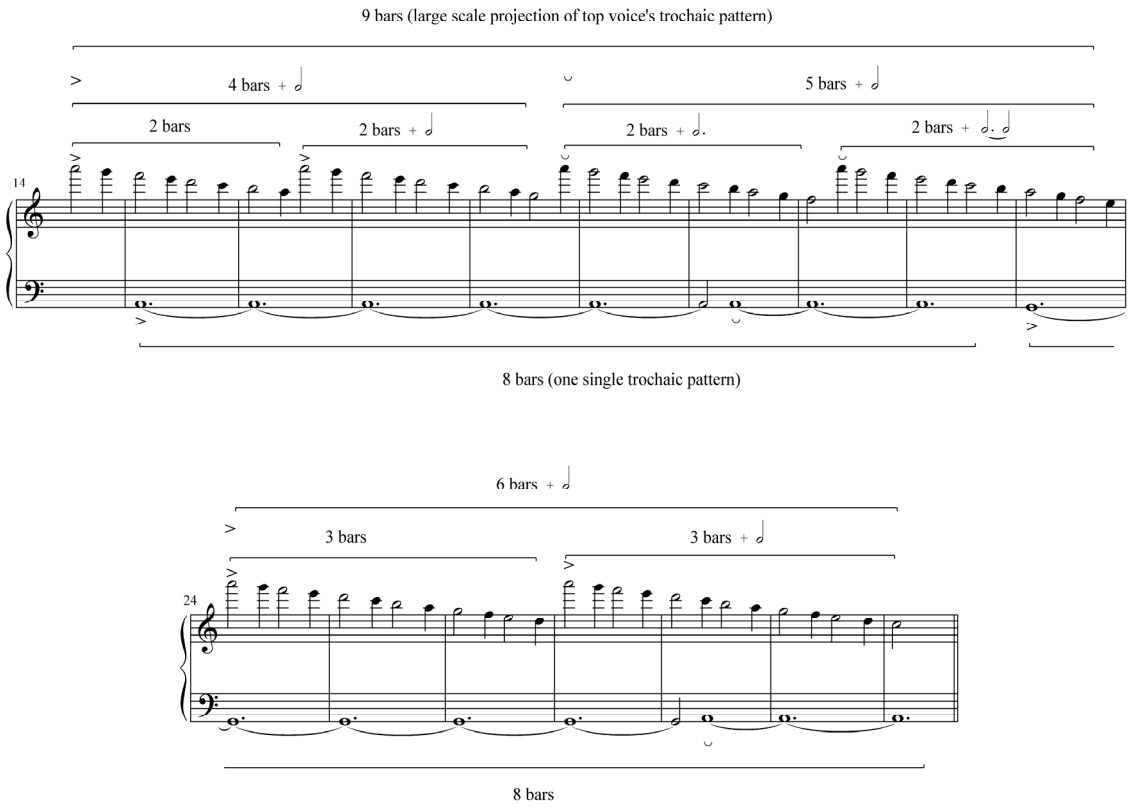

Figure 51: Melodic and agogic accents in outer voices

The rhythmic relationship between the descending gesture of the first violins and the long notes of the contrabasses is complex and always changing. In general, however, a tendency to progress from asynchrony to synchrony can be perceived (see fig. 52). The culmination of this process is the eventual arrival in m. 55 (roughly halfway into the piece), for the first and only time, at a note-onset synchrony between the bass note and the first note of the top voice descending gesture. This synchronization is especially significant since the bass note is also the first note of the bass descending gesture, the tonic note, and both notes of the outer voices are fully accented.

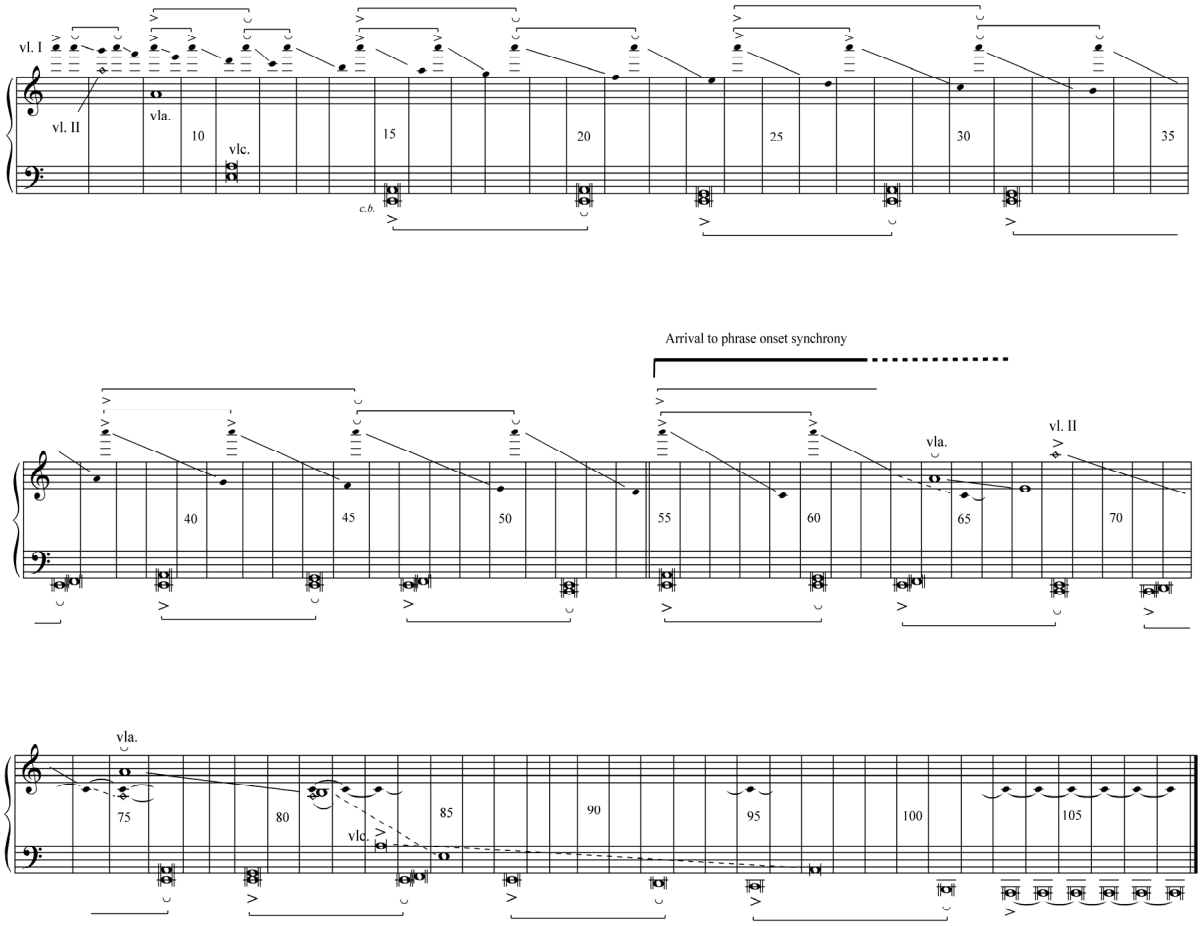

Figure 52: Summary of the relationship between the outer voices

This type of large scale synchronization can be described as phrase-onset synchrony as opposed to the local note-onset synchrony. This phrase-onset synchrony is, to some extent, also present in the phrase that immediately follows in m. 60. Although the top voice gesture and bass note of this phrase do not start exactly at the same time, they are close enough to be perceived as a continuation of the idea of m. 55. The synchronization of the beginnings of these two successive phrases spreads the expressive effect of the large-scale convergence of outer voices over about eight measures. The two-fold structure of this relatively long gesture may evoke the symmetrical arrangement of an archetypical period, and is the moment of the piece where the 'phrase' structure is by far the clearest. It is important to point out that this

expressive climax occurs towards the middle of the piece, reinforcing the already mentioned arch-like structure proposed by bass accented tonic notes as shown in figure 48.

4.5 VOICE CROSSING

The arrival at the phrase-onset synchrony of m. 55 is highlighted by three voice crossings that immediately precede it. Figure 53 shows these voice crossings: second violins crossing first violins, and cellos crossing violas in m. 53; and violas crossing first violins in m. 54.[50]

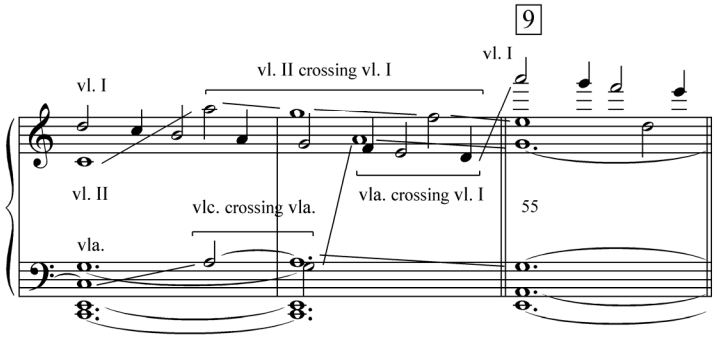

Figure 53: Voice crossings preceding m. 55

Every time one voice crosses another in this piece, the clarity of the ladder of augmentation is obscured and the latent complexity is brought to the forefront. This effect is more pronounced when the top layer is involved. For instance, in measure 53, where second violins become the higher sounding layer, there is a momentary sensation of halving the tempo. In addition, the homogeneous timbre of the

[50] For conceptual clarity, figure 53 includes only the main melodic voices plus the lowest sounding note in the texture. The omitted voices are restricted to the notes of the A minor triad and their contour is subordinated to the main melodic voices they are paired with. This technique of doubling is known as tintinnabuli and it will be discussed in more detail in Chaper 5.

string orchestra makes the individual lines difficult to follow when the voices cross. For this reason, the voice leading is especially difficult to follow when the voice crossing occurs between the first and second violins.[51] In the specific case of measure 53, the disruption of the line of the first violins becomes even more radical because the second violins cut right through the trochaic pattern (the expected 𝅗𝅥 𝅘𝅥 𝅘𝅥 𝅘𝅥 becomes 𝅗𝅥 𝅘𝅥 𝅗𝅥 𝅗𝅥). The prominence of the second violins' line is emphasized by the cellos crossing the viola, which double both the pitch class and the textural tension of the second violins' voice crossing. The crossing of violas and first violins is not as prominent as the other two because of its length and especially because of its position within the texture. However, it contributes to the generation of the anacrusis-like large gesture leading to the arrival in measure 55.

There are a total of thirteen voice crossings throughout the piece (see figures 53 and 54).[52] In the same way that m. 55 is the culmination of a progression from asynchrony to synchrony between double basses and first violins, mm. 53 and 54 are the culmination of the tension produced by voice crossings. Table 2 provides a list of the voice crossings indicating their relative importance in the piece.[53] This table is immediately followed by a description of the basic elements that determine those different degrees of importance, listed from more influential to less influential.

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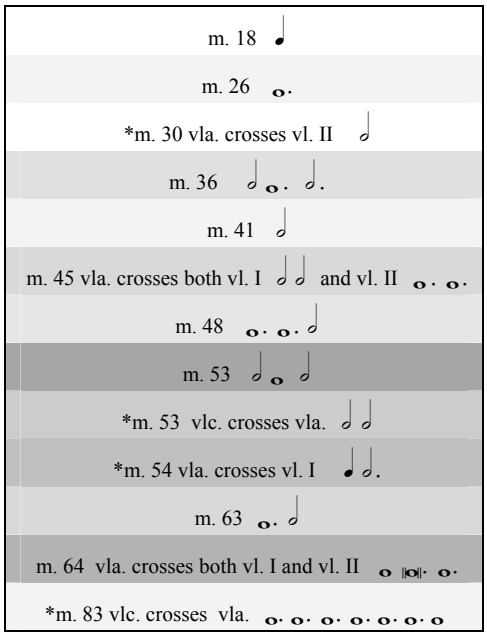
[51] It is important to point out that, whereas all the other layers are played by multiple performers using sordina, the viola line is the only layer of the texture that is played by a single player and without sordina. In addition, the viola is the only voice not doubled by a tintinnabuli voice. This treatment magnifies the trimbral differentiation between the viola and the other members of the string family.

[52] This number does not include the returning of the voices to their normal textural order, nor the moments towards the end of the piece when sustained low notes in the upper layers let the lower layers become the higher and central melodic elements.

[53] The different grades of shading in the table indicate the relative importance of the voice crossings, being the darkest the most important. Unless specified, the voice crossings occur between vl. I and vl. II. The durations indicate the length of the voice crossing. To facilitate cross references, voice crossings that are relatively hidden by the texture, because none of the voices involved in the crossing is exposed as an outer voice at that specific moment, will be marked with an asterisk preceding its measure number.

Table 2: Degree of importance of the voice crossings of the piece



1. Position in the texture. A voice crossing is more exposed if it involves the top layers. There are two ways in which this occurs in the piece: second violins crossing first violins (mm. 18, 26, 36, 41, 48, 53, and 63) and viola crossing both first and second violins (mm. 45 and 64).

2. Type of rhythmic connection/relationship. In this piece the layers involved in voice crossing can be rhythmically related in one of three ways:

a. An upbeat gesture crosses, abruptly interrupting the previous trochaic pattern (m.18,*30, 36, 53, *53, *54, and 64).

b. The voice crossing does not interrupt the first trochaic pattern, and the voice crossing is too short to let the voice that crosses complete its trochaic pattern. For this reason, there is no new speed established (m. 41, 45).

c. The voice crossing does not interrupt any of the trochaic patterns involved. For this reason, the change of speed occurs in a relatively smooth way. (m. 26, 48, 63, and *83).

3. Type of melodic connection/relationship. In this piece the layers involved in voice crossing can be melodically related in one of four ways:

a. A connection by leap creates a strong melodic disruption (m. 41, 53).

b. A connection by ascending stepwise motion creates a melodic disruption that may be perceived as a variation of the melodic line by an augmented, fragmented repetition (m. 18, *30, *53, and *54).

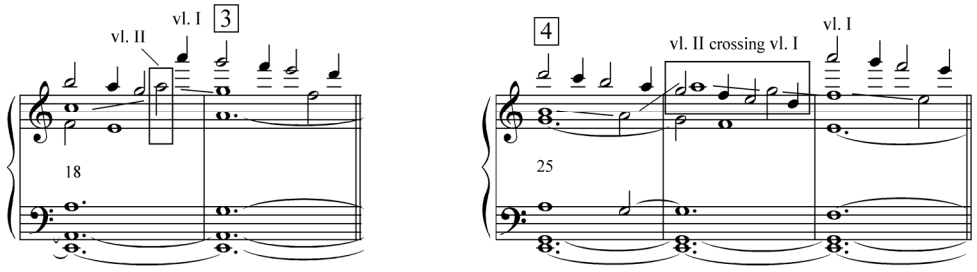
c. A connection by repeated note creates a subtle melodic disruption that may be perceived merely as a prolongation (m. 26, 36, 64, and 83).

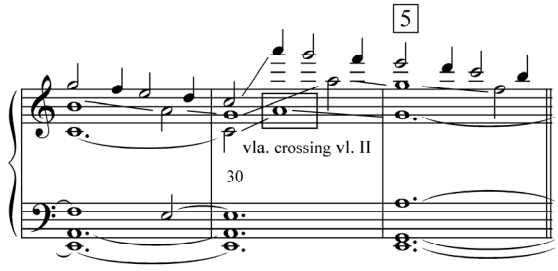
d. A connection by descending stepwise motion preserves the melodic continuity creating the illusion of an uninterrupted voice that suddenly changes its speed (m. 45, 48, and 63).

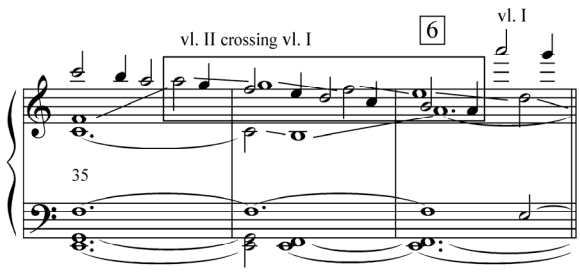
4. Length of the voice crossing. The longer the voice crossing the more exposure it receives. The longest voice crossings occur in mm. 36, 48, 64, and *83.

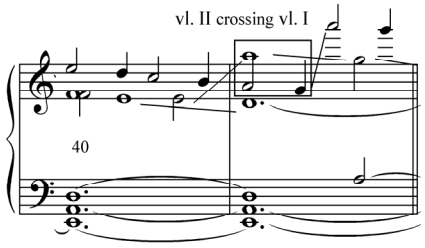
5. Speed involved. The more contrasting the speed the more tension generated by the voice crossing. In this piece, the highest contrast of speed occurs when the viola crosses the first violins as in measures 45, 53 and 64. It is important to notice, on the other hand, that a very slow speed, as in m. 83, tends to make the individual lines of the voice crossing difficult to follow.

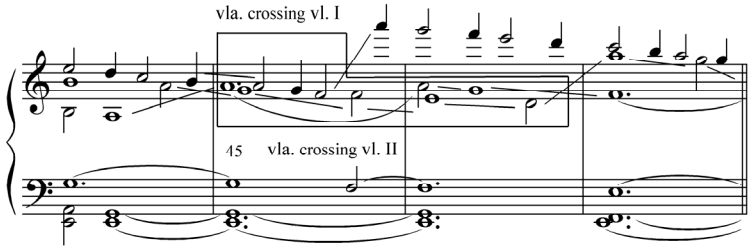
6. Number of voice-crossings occurring simultaneously or relatively close in time. Simultaneity or adjacency of voice crossings magnifies their dramatic effect as in measures 53-54.

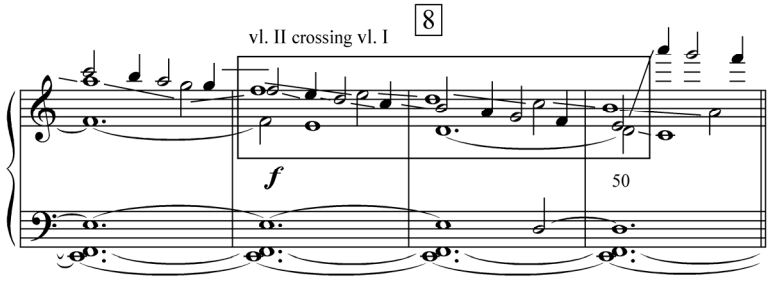


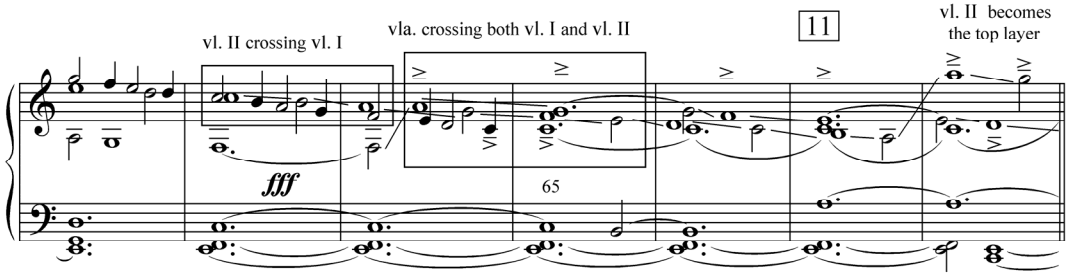

5
vla. crossing vl. II
30


vl. II crossing vl. I
6
vl. I
35


vl. II crossing vl. I
40


vla. crossing vl. I
45
vla. crossing vl. II


8
vl. II crossing vl. I
f
50


vl. II crossing vl. I
vla. crossing both vl. I and vl. II
11
vl. II becomes
the top layer
fff
65

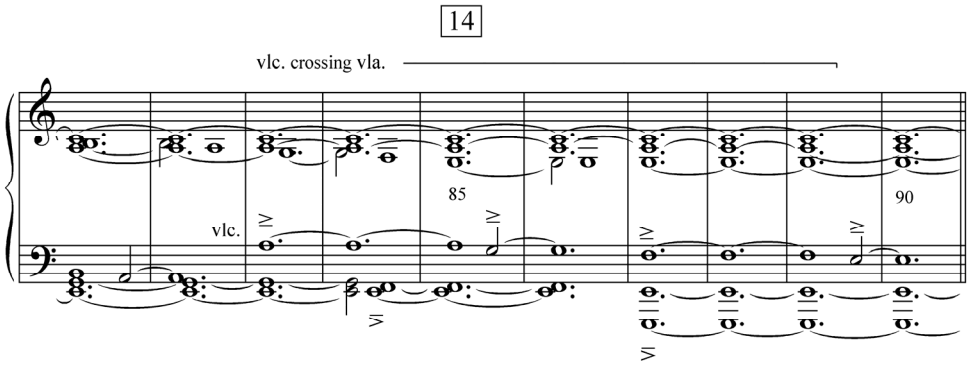


Figure 54: Voice crossings

4.6 VOICE CROSSING AND THE LADDER OF CONTRAPUNTAL RELATIONSHIPS

Since the canonic imitation is strict and the melodic and rhythmic intervals of imitation are the same for all voices in *Cantus*,[54] most of the contrapuntal relationships are restated several times throughout. For instance, most of the contrapuntal relationships between two adjacent voices, like the first and second violins, are restated by the other pair of adjacent voices: second violins and viola, viola and cellos, and cellos and double-basses.[55] This is the case of the voice crossings that occur between first and second violins in mm. 18 and 26, which are restated in mm. 30 and 45 by second violins and viola; and in mm. 45 and 83 by viola and cellos. The following table rearranges the information of table 2 to show this pattern of repetition.

[54] Although the absolute rhythmic interval of imitation changes, its ratio of change strictly follows the pattern of augmentation of the canon.
[55] Since the melodic range decreases for the lower layers, not all the contrapuntal relationships that occur between the upper layers are restated by the lower ones.

Table 3: Degree of importance of the voice crossings in *Cantus* arranged by patterns of repetition

Section of First Occurrences	Section of Second Occurrences	Section of Third Occurrences
		m. 53
m. 18	*m. 30 vla. crosses vl. II	*m. 53 vlc. crosses vla.
		*m. 54 vla. vl. I
		m. 63
	m. 36	m. 64 vla. crosses both vl. I and vl. II
	m. 41	
m. 26	m. 45 vla. crosses both vl. I and vl. II	*m. 83 vlc. crosses vla. and
	m. 48	

There are two main differences between the occurrences of a given contrapuntal scheme. First, its pitches are transposed down an octave and its durations doubled. Second, their five-voice counterpoint context changes, because every time the counterpoint is restated it occurs one level down in the textural ladder. For instance, the voice crossing between first and second violins in m. 18, as mentioned before, becomes a voice crossing between viola and second violins in m. 30, and a voice crossing between cello and viola in m. 53. These variations make every presentation of a contrapuntal scheme significantly different from each other. One of the clearest manifestations of these differences is the fact that their degrees of prominence and amount of tension change substantially from variation to variation (generally the tension increases except for m. 83) (see table 3).

The canon can be divided into seven sections where each section presents the contrapuntal scheme of the immediately previous section one level down in the textural ladder. Every one of these sections, with the exception of the first one, is also exactly twice the length of the previous section.[56]

Table 4: Sections determined by the contrapuntal scheme

Section	1	2	3	4	5	6
mm.	7-8	8-9	10-12	13-18	19-30	31-54
length	1	1.5	3	6	12	24

Section	7
mm.	55-102
length	48

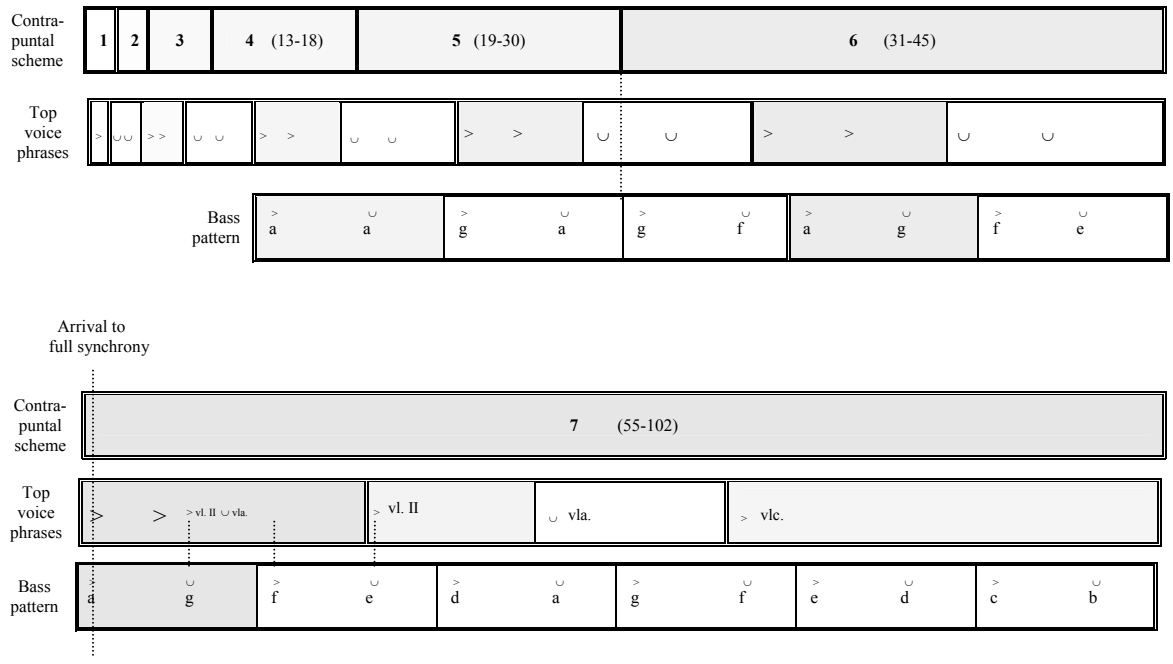
This particular subdivision coincides with two of the most important events of the piece: the arrival in m. 55 of phrase-onset synchrony after the most dramatic voice-crossings of the canon, and the arrival at the final chord in m. 103. The already discussed voice crossings from measures 18, 30, and 53 work as upbeat gestures whose tension emphasizes the beginnings of sections 5, 6, and 7 respectively. When considering harmonic aspects in the next chapter, the role of the other voice crossings in the articulation of smaller subsections will also be considered.

[56] The six initial introductory measures of solo chimes and the six measures of the sustained final chord, all omitted in table 4, can be seen as a symmetrical frame for the cumulative process of the piece. The omission of these measures in table 4 helps to emphasize the relationships between the lengths of the sections. It is important to notice that the length of every section is almost equal to the length of all the preceding sections added together.

4.7 INTERACTION OF THE THREE LARGE SCALE LADDERS AND THEIR PROCESS TOWARDS CONVERGENCE

Three major large scale structures generated by the bass trochaic pattern, top-voice phrases, and the contrapuntal scheme have been discussed. These structures have different large scale rhythmic patterns and pace, which articulate the music in different ways. Whereas the rhythmic pattern of the bass remains constant throughout, the length of the top voice phrases increases one note at a time, and the length of the contrapuntal scheme is doubled every time it is restated. Figure 55 shows how the simultaneity of these large patterns creates a complex irregular rhythmic interaction which gradually progresses towards a perfect rhythmic synchrony of the three structures in m. 55.

Figure 55: Progression towards rhythmic convergence of three main large scale structures



The grades of shading highlight large patterns of evolution within these large-scale structures: in the contrapuntal scheme, the pattern of shading emphasizes the increase in length of the sections. In the

top voice phrases the pattern of shading highlights both the large-scale projection of the trochaic pattern as well as the growing prominence of the downbeat beginnings. Finally, in the bass pattern, the shading highlights the arch-like structure generated by the accented tonic notes. It is important to consider that this arch-like structure needs the final tonic note of the bass to be completed, but that this note is not included in this figure in order to clearly illustrate the equivalence in length between the different sections. The dotted lines, on the other hand, point out moments of convergence between the structures. The first dotted line, placed between the fifth and sixth statements of the contrapuntal scheme in m. 31, coincides with the articulation of the accented 'g' in the bass. However, this double articulation does not coincide with the beginning of the top-voice phrase. This incomplete synchrony works as a preparation for the 'full' synchrony of m. 55. The relative closeness of the two downbeat beginnings of the top voice in m. 38 and m. 41, and the accented 'a' in the bass in m. 39 and the unaccented 'g' in m. 44, respectively, also prepare the 'full' synchrony of m. 55. These large scale preparations of the arrival to synchrony complement the more local accumulation of upbeat voice crossings of m. 53 and 54. All of these preparations create a general effect of the piece moving towards m. 55 that can be understood as a long, complex, and dramatic anacrusis. The intensity of these gestures might also lead to a perception of the piece where everything that happens in the canon before the arrival of full synchrony in m. 55 (not only from m. 31 but from m. 1) is just a very elaborated fifty-four bar anacrusis.

The three dotted lines following m. 55 point out moments where synchrony, although somewhat weaker, is still present. These moments of prominent, but incomplete synchrony can be seen as a logical aftermath of the arrival in m. 55. The magnitude of the fifty-four bar gesture that brings the piece towards synchrony is then organically balanced by a synchrony that does not abruptly stop, but that instead fades out gradually, requiring another fifty-four bar span to die away.

4.8 PROGRESSION TOWARDS SYNCHRONY AND THE REGISTRAL LADDER

In general terms, the perfect symmetric arch described by the progression towards synchrony is a sharp contrast to the straight descending line proposed by the canon's registral ladder.

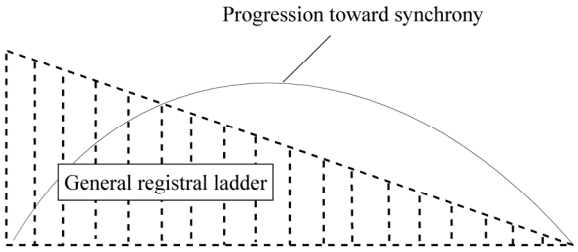


Figure 56: Apparent contrast between the registral ladder and the progression towards synchrony

However, both processes are not as contrasting as their simplified visual representations seem to imply. Every time the first violins return to the high 'a', the intervallic gap between their low and high notes increases and the ascending leap becomes wider. This increment of the intervallic tension reinforces the strong directionality of the progression towards synchrony. After the moment of full synchrony is reached in m. 55, the leaps become fewer and shorter (vl. II m. 68, vla. m. 75, and vlc. m 83), and the fading out of synchrony is then closely accompanied by the abatement of the melodic tension.

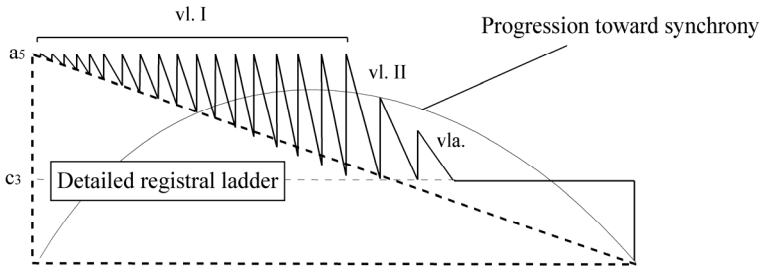


Figure 57: Similar increase of tension in the registral ladder and the progression towards synchrony

5.0 PÄRT'S *CANTUS*: A LADDER FROM LINE TO SONORITY

5.1 *CANTUS*' TINTINNABULI

As previously mentioned, the instrumental lines in *Cantus* can be divided into primary and secondary lines. Whereas the primary lines move by step (descending A aeolian scales), the secondary lines move by leap, always using notes of an A minor triad. Every secondary voice (T voice) [57] is subordinated to a primary voice (M voice) by mimicking its contour.

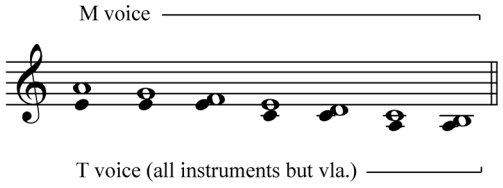


Figure 58: Tintinnabuli in *Cantus*[58]

Because the A minor triad is always strongly present, the dyads containing a note outside the A minor triad {g,f,d,b} are highly distinctive. From all of the dyads containing 'non-chord tones' the dyad

[57] In his book 'Arvo Pärt', Paul Hilliard calls the primary voices 'M voices' (melodic), and the secondary ones 'T voices' (tintinnabuli). For the sake of brevity, Hilliard's terms will be adopted for this paper. The complementation of M by T voices is the basis of Pärt's tintinnabuli technique.

[58] It is important to notice that this particular contrapuntal relationship remains invariable throughout the entire composition. There are a total of four of these M-T pairs played divisi by the first violins, second violins, cellos, and contrabasses. The violas, as mentioned in the previous chapter, are represented by a single soloist who plays an M voice. As if following the example of the viola, the other four layers eventually drop their T voice, towards the end of the piece.

'e-f', the only minor second, is arguably the most distinctive one. The prominence of the 'e-f' dyads seems to come as much from being a m2 as from including one of the notes from the tritone of A aeolian, 'b-f'. Figure 59 shows the fluctuation of tonal tension of the basic tintinnabuli sequence.[59]

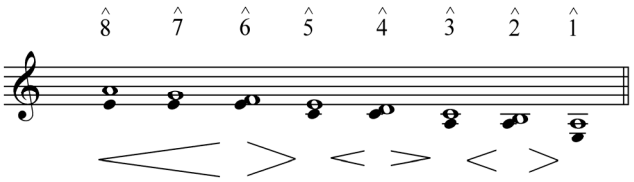


Figure 59: Fluctuation of tonal tension in the tintinnabuli sequence

The process that repetitively begins the descending scales over and over gives a special emphasis to the dyads of the beginning of the tintinnabuli sequence {e-a, e-g, e-f, c-e}, see Table 5.

Table 5: Proportion of occurrences of tintinnabuli dyads

Dyad	Proportion of occurrence
e-a	25%
e-g	21%
e-f	18%
c-e	14%
c-d	11%
a-c	7%
a-b	4%

* The dyads including non-chord tones are shaded

[59] The term 'tintinnabuli sequence' will be used to describe the particular relationship between M and T voices used by this piece.

Although the dyad ‘a-b’ is important because it immediately precedes the return to the tonic and also contains part of the ‘b-f’ tritone, its relative presence throughout the piece is rather limited (4%). The first portion of the tintinnabuli sequence, {e-a, e-g, e-f, c-e}, on the other hand, pervades the piece (78%). For this reason, its particular pattern of tension-resolution becomes one of the most influential ideas throughout the piece. The progression of tension in this four-dyad idea has two main components. In the melodic dimension, two notes of the Am triad, ‘a’ and ‘e’, are connected by non-chord tones establishing the pattern M2-M2-m2. The melodic m2 in this pattern can be perceived as its peak of tension, highlighting both the ‘f’, and the resolution to ‘e’. In the harmonic dimension, two relatively stable intervals (P4 and M3, all notes of the Am triad), are connected by two relatively unstable intervals (m3 and m2) that includes the two non-chord tones ‘g’ and ‘f’. The m2 in this succession can be perceived as its peak of tension, highlighting both ‘e-f’ and ‘c-e’.

Since the tintinnabuli sequence occurs simultaneously at different speeds, a complex superposition of arches of tension of different lengths and numerous and diverse vertical sonorities are generated. Most of these sonorities, however, can be perceived as Am triads with added notes. Two of these Am triads are specially emphasized in the piece: Am plus ‘g’ (Am7/E) and Am plus ‘f’ (Am add (♮)6 or F^{M7}/E).[60]

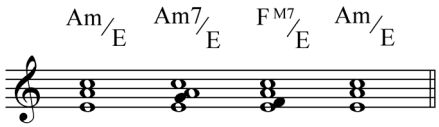


Figure 60: Main sonorities emphasized in *Cantus*

[60] For practical purposes these two sonorities are going to be referred to as Am7/E and F^{M7}/E. This type of notation is borrowed from sheet music notation, a shortcut for the description of chords in popular music. Although heavily loaded with popular music connotations, these names are more neutral than ‘i7’ or ‘VI7’. The non-chord tone status of the ‘f’ in F^{M7}/E is better accounted for by the name ‘Am add 6’. However, the former notation, F^{M7}/E is preferred because, at the local level, the perception of the sonority as a Major triad suspended over an E pedal tends to prevail. It is also important to notice that, with few exceptions, the triads in *Cantus* are inverted. The letter name after the slash describes the lowest sounding note in the sonority. The inverted state is included in the description of the sonorities because it reminds the reader of the non-traditional aspects of the sonorities in *Cantus*. Although added note chords in inversion are also used in more traditional tonal contexts (e.g. piano voicings in Jazz), they are less common than the inversion of triads with no added notes, and their usage differs from that of *Cantus*.

The sonorities shown in figure 60 could be understood as two relatively stable Am triads connected by two relatively unstable tetrachords (Am7/E and F^{M7}/E). The F^{M7}/E can be perceived as the peak of tension in this succession of sonorities, highlighting both itself and its resolution.

In a harmonically static context like that of *Cantus* the fluctuation of harmonic color can become a very important element. One of the most prominent harmonic features in the piece is the strong contrast between the harmonic color of Am7/E and F^{M7}/E. An important part of this contrast is the difference between M2 and m2. The way these two intervals influence the sonorities can be better understood if the trichords contained by every sonority are compared. Figure 61 identifies the four trichords embedded in each of the tetrachords.

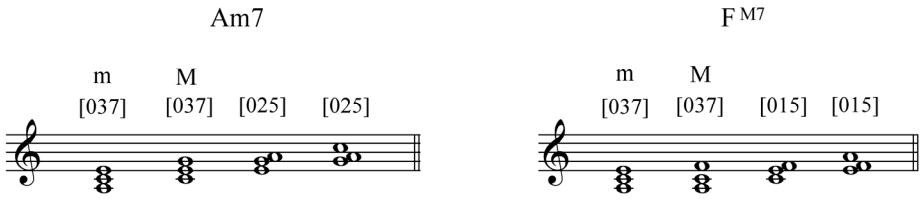


Figure 61: Trichords in Amy and F^{M7} [61]

Although both tetrachords contain a major and a minor triad, their non-triadic trichords differ. These trichords, [025] and [015], have very different harmonic colors. [025] contains a P4, a m3, and a M2, all included in the simple harmonic ambitus of a pentatonic scale. On the other hand, [015] contains a P4, a M3, and a m2, which embodies the harmonically more complex set of relationships of the diatonic scale. The contrast in harmonic color between Am7/E and F^{M7}/E can also be observed from the point of view of their triadic connotations. There are two basic ways to hear each of these two sonorities in triadic terms.

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[61] The categories [015] and [025] describe the prime form of the trichords following Alan Forte's classification of pitch class sets. See Alan Forte, *The Structure of Atonal Music*, Yale University Press, 1973.

Figure 62: Basic triadi interpretations of Am7 and F^{M7}

Depending on the inversion, doublings, voicing, and harmonic context, either of these harmonic readings may be favored. However, it is crucial to notice that the contrast between the harmonic interpretations is different for each sonority. Whereas both Am7 and C add 6 describe relatively stable events, F^{M7} usually connotes a considerably more stable harmonic idea than Am add $_{(\natural)}$ 6 does. The consequence of this larger gap between the triadic interpretations of the F^{M7}/E sonority can lead to a dramatic harmonic ambivalence which the Am7/E sonority has difficulty generating. Both the [015] trichordal component and the ambivalent triadic interpretation are important aspects of the contrast between the F^{M7}/E and the Am7/E. This strong contrast reinforces the already described tendency of the 'e-f' dyad to work as a peak of tension in the initial four-dyad pattern of the tintinnabuli sequence.

5.2 PROGRESSION OF F^{M7}/E TOWARDS PROMINENCE

The prominence of F^{M7}/E increases throughout the piece. Figure 63 shows the two last culminating statements of the F^{M7}/E sonority:

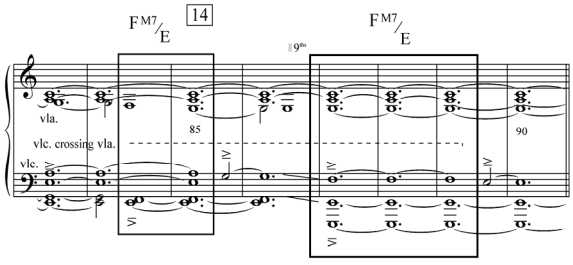

Figure 63: Last two F^{M7}/E in *Cantus*[62]

[62] It is important to notice that the last F^{M7}/E is emphasized by dropping the T voice in the contrabass and duplicating its M voice an octave lower.

Most of the harmonic sonorities in *Cantus* are restated several times, a consequence of the reoccurrences of the main contrapuntal scheme described in chapter 4 (see table 4). A retrospective comparison between the last two statements of the F^{M7}/E and its previous versions, provides us with a way to trace the path of the progression of F^{M7}/E towards harmonic prominence. Figure 64 shows the corresponding subsection to mm. 83-90 in the immediately preceding section (section 6).

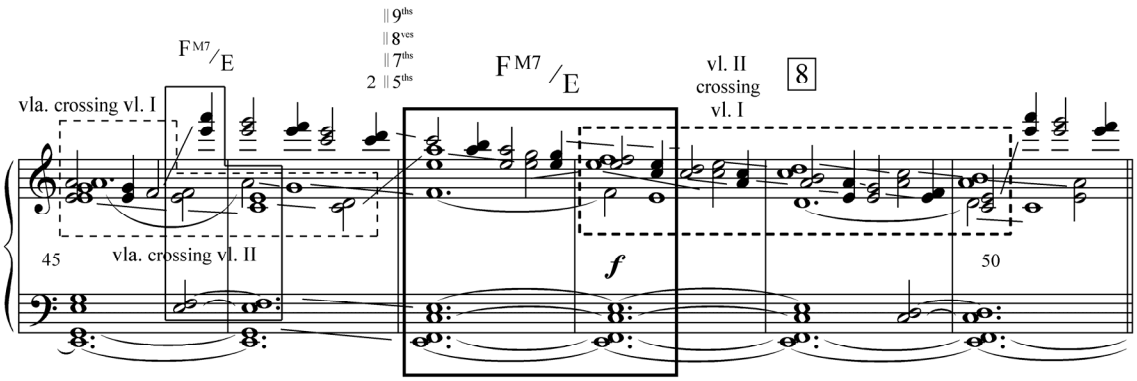

Figure 64: Last two F^{M7}/E in section 6

Whereas the F^{M7}/E of m. 47 is emphasized by metrical and agogic accents, and therefore similar in importance to the F^{M7}/E in mm. 87-89, the one in m. 45, placed on a weak metric position, is too brief to warrant any special attention. However, more importantly, the low 'g' played by contrabasses, partially masks its harmonic color. Instead of being perceived as a structural harmonic element, this subtle F^{M7}/E of m. 45 tends to be perceived as an anticipation of the more prominent F^{M7}/E of m. 47.

Although both of the last two statements of F^{M7}/E in section 5 are affected by a low 'g' as well, the second F^{M7}/E is still more prominent because of its melodic, metrical, and agogic accents.

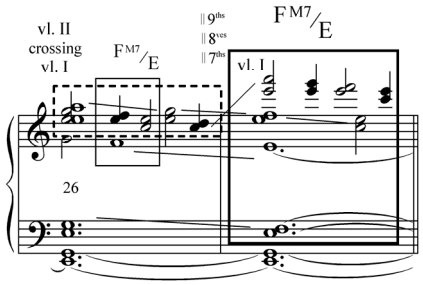

Figure 65: Last two F^{M7}/E section 5

The initial statements of F^{M7}/E sonorities in sections 1 to 4 are too brief to stand out. In addition, their lower sounding layer stays on the same note, promoting harmonic homogeneity. Their more characteristic component, however, the m2 between 'e' and 'f', tends to be perceived as an expressive harmonic punctuation in the contrapuntal flux.

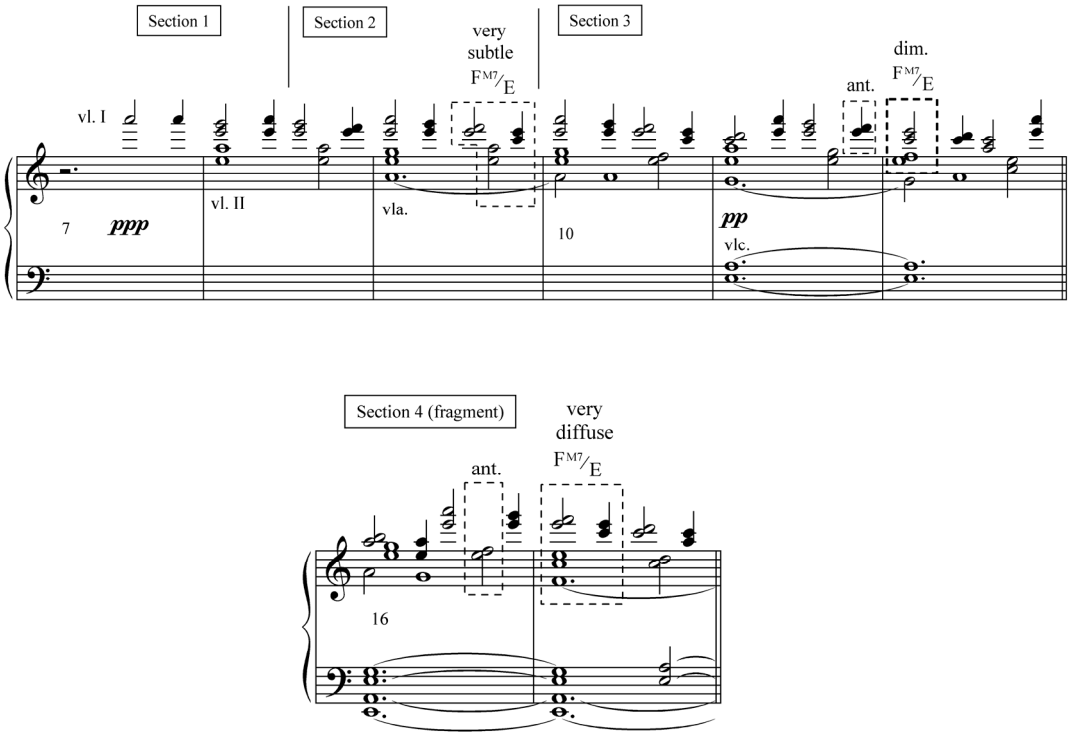

Figure 66: Last two F^{M7}/E in sections 1 to 4

There are other prominent F^{M7}/E sonorities in the piece. The most prominent one, and arguably one of the most dramatic moments of the piece, occurs in mm. 63-68.

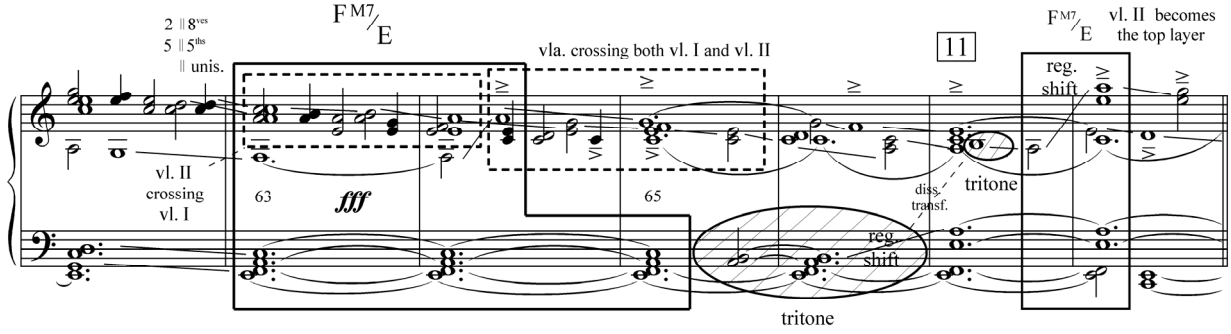

Figure 67: First F^{M7}/E in section 7

As in mm. 47 and 84, the F^{M7}/E of m.63 is built on top of the dyad 'e-f', played by the contrabasses. The density of a m2 played in a low register provides these harmonies with extra tension. In the particular case of the F^{M7}/E of m. 63, this tension is greater since most of the other notes of the chord are also placed in the low register. The conflict generated by this voicing is dramatically increased in m. 65 by the introduction of a long, syncopated 'b', creating a tritone in the low register. It is also important to notice that the arrival to the F^{M7}/E chord is emphasized by a three-bar long anacrusis in the top voice and multiple parallel fifths and parallel octaves.

Although most of these elements are also present in the first F^{M7}/E of section 6, the 'g' of the contrabasses undercuts the arrival in m. 35. When the contrabasses move from 'e-g' to 'e-f' in m. 36, the syncopated tritone is also introduced (now an octave higher and half the length), and the harmonic color of the F^{M7}/E chord is altered once more.

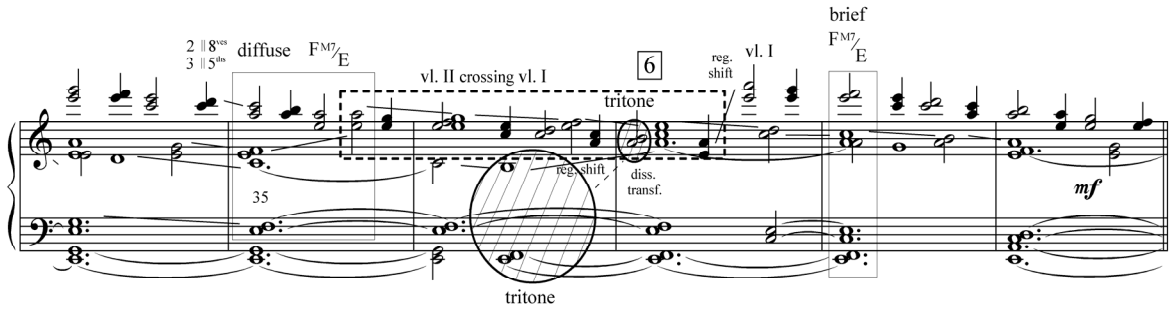

Figure 68: First F^{M7}/E in section 6

In the same way as the last F^{M7}/E sonorities in section 1 to 4, the first F^{M7}/E chord of section 1 to 5 are too short and the lowest layer too static to allow their harmonic color to be fully perceived.

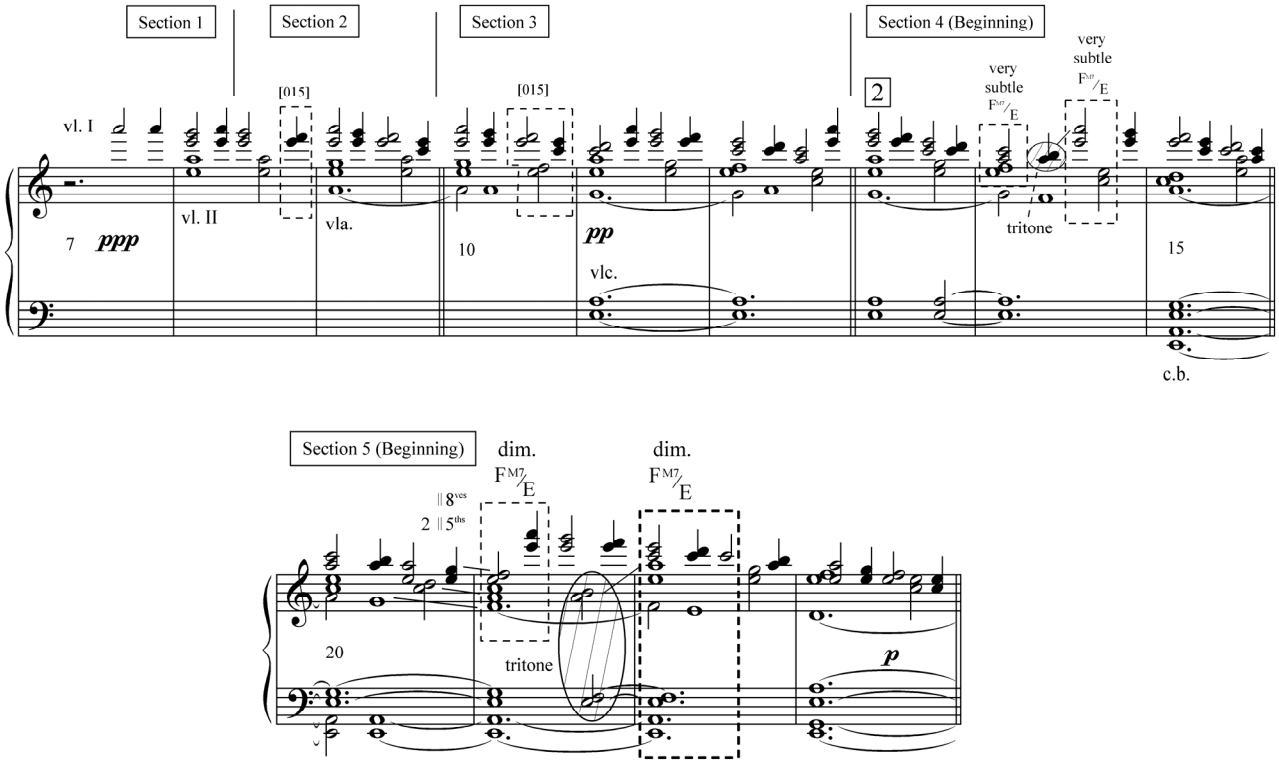

Figure 69: First two F^{M7}/E in sections 1 to 5

5.3 VOICE CROSSINGS AND F^{M7}/E: AN EXPRESSIVE ILLUSION OF CAUSE-EFFECT

In chapter 4 it was described how the arrival to full synchrony in m. 55 was immediately preceded by a group of three voice crossings. The unstable nature of the voice crossing, the conflict between speeds, and their upbeat beginnings, as well as the stabilizing nature of the arrival to full synchrony, which its down beat beginning and relatively stable Am7/E sonority, creates a strong sense of the former being an anacrusis to the latter. This anacrusis could be interpreted as the 'cause' of the moment of full synchrony, which in this particular case could even be seen as analogous to the tension-resolution aspect of a dominant-tonic move. This is actually an illusion of cause-effect, since their contiguity is a mere by-product of the overarching canonic process.

This same type of cause-effect illusion is generated between the other prominent voice crossings and the most prominent F^{M7}/E sonorities. The fully accented F^{M7}/E sonority in m. 27 is prepared by the tension generated by the voice-crossing, a brief F^{M7}/E sonority, and the parallel octaves, ninths, and sevenths that immediately precede it (see fig. 65). A similar situation can be observed in mm. 45-50. In that case, however, there is also a voice crossing that follows the fully accented F^{M7}/E sonority. Whereas the voice crossing in m. 45 can be seen as preparing the arrival to the F^{M7}/E sonority, the second voice crossing in mm. 48-50 could be perceived as a 'consequence' of the F^{M7}/E harmonic tension.

The relationship between voice crossing and the F^{M7}/E sonority in mm. 34-39 (figure 68) is more complex. Since the most prominent harmonic element in here is the 'b-f' tritone and not the F^{M7}/E sonorities, the voice crossing tends to be perceived as connected to that interval. Instead of a cause-effect illusion, both events (voice crossing and tritone) seem to blend together as a single dramatic gesture. The most intense place, however, is found again in mm. 62-68, the passage shown in figure 67. For the first and only time in the piece, the cause-effect relationship between voice crossing and the F^{M7}/E sonority is completely reversed. Here the F^{M7}/E is still prepared by the long anacrusis of the top voice and the sets of

parallel octaves and fifths that accompany it, but the dramatic voice crossing of vl. II and vla. occurs right after and not before the F^{M7}/E sonority is established.[63]

Every one of the voice crossings just mentioned creates a conflict of speeds that, in the particular case of the passages illustrated by figures 68 and 67, also includes a tense interruption of the trochaic pattern first established by the F^{M7}/E sonority. It is important to notice that this disruption happens twice after the climactic F^{M7}/E of m. 63 (fig. 67), and that these disruptions are immediately followed by two tritones, and two dramatic registral shifts. In this way, the illusion of cause-effect is spread out in a dramatic chain of eight prominent events:

Table 6: Chain of cause-effect events in mm. 60-67

mm. 60-62	Long anacrusis in top voice and sets of parallel fifths and octaves
mm. 63	Fully accented F^{M7}/E sonority
mm. 63	vl. II crosses vl. I interrupting its trochaic pattern with a syncopated upbeat creating a sudden ritardando effect
mm. 64	vla. crosses both vl. I and vl. II interrupting their trochaic patterns with a syncopated upbeat creating a sudden ritardando effect
mm. 65	vlc. introduces a long syncopated tritone
mm. 66	vlc. dramatically shifts register (asc. 7^{th})
mm. 66	vl. II introduces an accented tritone (dissonance transferred from vlc.)
mm. 67	vl. II dramatically shifts register (asc. 15^{va}) crossing vl. I

All of these events, in turn, can be seen as the aftermath of the climactic arrival to full synchrony in m. 55. In this sense, the climax of the piece is not limited to a single event, but is spread over a long section which covers mm. 55 to 67. The boundaries of this climactic section are not clear-cut, since the other important moments of tension that precede m. 55, such as the triple voice crossing of m. 53 or the fully accented F^{M7}/E of m. 47, are organically connected to it, promoting the continuity of a large-scale increase in tension.

[63] Since the voice crossing in m. 83 is not fully intelligible, a cause-effect illusion between voice crossing and the last two F^{M7}/E sonorities of the piece is not generated.

5.4 FOCUSING ON F^{M7}/E AND THE C-B APPOGGIATURA

Although following F^{M7}/E by the voice crossing could be argued to be a variation of the original scheme where the voice crossing precedes F^{M7}/E, this does not seem to be the case. The multiple elements related to the arrival of F^{M7}/E in m. 63 (long anacrusis, parallelism, voice crossing, tritones, and registral shifts) follow each other in such a seamless way that the previous arrivals on F^{M7}/E seem to be diffused, incomplete, distorted versions progressing towards the 'true version' of the F^{M7}/E, instead of a theme developing through a set of variations. In other words, all the occurrences of F^{M7}/E before m. 63 can be perceived as diffuse versions that gradually come into focus. This perception is strongly promoted by *Cantus*' overall progression towards phrase-onset synchrony which culminates in section 7 with the FM7/E of m. 63.The arrival of every prominent F^{M7}/E gives a special emphasis to the trochaic pattern played by the upper part at that particular time. It is important to notice that this set of two trochaic notes changes throughout the piece. Table 7 shows the pitches highlighted by the different occurrences of the F^{M7}/E chord.

Table 7: Upper layer pitches emphasized byprominent F^{M7}/E sonorities

Section	First F^{M7}/E in the section	Last F^{M7}/E in the section
1	No F^{M7}/E	No F^{M7}/E
2	f [015] (m. 8)	f-e (m. 9)
3	f-e (m. 10)	e-d (m. 12)
4	c-b (m. 14)	f-e (m. 17)
5	f-a (8^{ve}) (m. 22)	a-g (m. 27)
6	c-b (m. 35)	c-b (m. 47)
7	c-b (mm. 63-68)	c (f-e) (mm. 87-89)

* The shading indicates both relative amount of occurrences throughout the piece as well as degree of importance

The order in which these notes are emphasized roughly outlines a descending scale (f-e-d-c-b-a-g). The rhythmic, metric, and melodic characteristics of these two notes (accented long note followed by an unaccented short note a second lower), although only roughly related to the archetypical appoggiatura

figure, is still charged with its expressivity. This is especially true whenever the melodic interval is a m2 and the harmonic intervals involved are relatively unstable, always the case whenever the two emphasized notes are 'c-b.'

Table 8: Melodic and harmonic intervals generated by the 'appoggiatura' figure

Melodic Interval	Harmonic interval from the root	Harmonic interval from the bass
f-e (m2)	P8-M7	m9-M10
e-d (M2)	M7-M6	P8-m7
c-b (m2)	P5-T	m6-P5
a-g (M2)	M10-M9	P11-P10

* The shading indicates the degree of tension

Shading in tables 7 and 8 identifies other aspects of the 'c-b' gesture: first, it is the melodic gesture that predominates in the last and more prominent appearances of the F^{M7}/E in the piece. Second, of all the different melodic gestures that are emphasized by the F^{M7}/E throughout the piece, 'c-b' is the one most used (four times in total). Finally, of the gestures emphasized by the F^{M7}/E, it is the one with the highest tension in terms of its melodic and harmonic intervals.

Three of the most prominent arrivals on F^{M7}/E (mm. 35, 47, and 63), those placed towards the climax of the piece, present the 'c-b' gesture in their upper layer. The 'c-b' appoggiatura is therefore linked to the 'true version' of the F^{M7}/E. The degree of tension of this appoggiatura helps this gesture to generate dramatic poignancy. All of these characteristics complement the process of the F^{M7}/E coming into focus. The intrinsic dramatic aspect of the 'c-b' appoggiatura melodic gesture provides the F^{M7}/E sonorities in measures 14, 35, 47, and 63 with extra tension. However, the other already discussed aspects that affect the prominence of the F^{M7}/E sonorities (e.g. the bass line) determine the extent of the tension. For instance, the longer melodic anacrusis and the tenser voice crossing make the 'c-b' appoggiatura slightly more dramatic in m. 63 than in m. 47 (see figures 67 and 64).

5.5 F^{M7}/E AND THE 'E-F' DYAD IN THE BASS

There is at least one additional important reason for the higher prominence of the F^{M7}/E that has not been fully described. This reason has to do with the large-scale patterns generated by the bass line: there are only four instances where the 'e-f' dyad is played by contrabasses. Only two of these are agogically and metrically accented (measures 47 and 63). These accents in the lower foundation of the sonorities give a special emphasis to the F^{M7}/E sonorities. The accented 'e-f' dyads in the contrabasses mark the beginning of the eight-bar pattern proposed by the trochaic pattern in the contrabasses (see figure 50). These accented 'e-f' dyads are part of a larger pattern that includes the accented 'e-a' dyads as well.

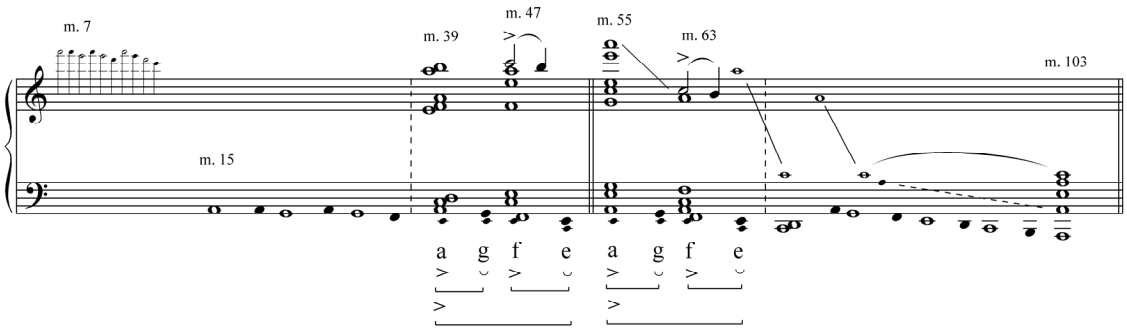

Figure 70: Accented 'e-a' and 'e-f' dyads in the bass

These larger patterns {e-a, e-g, e-f, c-e} are placed towards the middle of the piece and their emphasis on the tonic note are part of the piece's process towards synchrony and stability. However, the second accented tonic note (m. 55) occurs in a more stable place than the first one (m. 39) does. This stability comes as much from the already mentioned arrival to full onset synchrony in m. 55 as from the sonorities that occur in each case (an unstable hexachord in m. 39 and a relatively stable Am7/E in m. 55). Although a somewhat subtle effect, this degree of stability of the accented A in the contrabasses affects the prominence of the F^{M7}/E sonorities that are placed on the accented F in m. 47 and 63. The more stable

A of m. 55 establishes a clear beginning, and a strong point of reference and set of expectations for what comes right after it. The long phrase encompassed by this A (mm. 55-59) is immediately followed by a phrase that starts in a similar way but is placed above a G in the bass (mm. 60-62). Both of these large gestures possess phrase-onset synchrony and relatively consonant sonorities. When the F^{M7}/E of m. 63 interrupts the large scale symmetry suggested by the first 'phrase' and the beginning of the second one, its role as a disruptive, contrasting element meant to dramatically intensify the tension is clearly understood. On the contrary, the relatively unstable A in m. 39 does not establish a clear beginning and the degree of tension of the sonority that occurs above it does not allow the tension of the F^{M7}/E of m. 47 to be fully appreciated.

5.6 PARTIAL SUMMARY

Table 9: Partial summary of the main processes in *Cantus*

Most autonomous Processes	Description	Goal / Intelligibility	Type
Top voice phrases length/range (see fig. 45 and 47)	Length/range increases additively	Uncertainty of the exact goal, which is only possible in general terms: Completing the range (different for each instrument) arriving to a low sounding member of the Am triad.	Cumulative (additive?) (1, 1+1, 1+1+1…) until vl. I stops its descent
Fixed melodic interval between entrances (see fig. 49)	Octave (1:2)	Completes the range available of pitches and string instruments (5: vl. I vl. II vla. vlc. cb.)	Regular
Fixed rhythmic relationship between entrances (see fig. 49)	Augmentation (1:2) (mensuration canon)	No clear goal (stops when a perceptual practical limit has been reached?)	Regular
Rhythmic displacement between entrances	The voice that imitates always enters on the third note of the imitated voice	No clear goal	Regular (1:2)
Bass pattern (eight-bar pattern) (reinforced by rhythmic stratification) (see fig. 50 and 55)	Generated by bass' trochaic pattern	No clear goal (however the local goal is clear: to achieve note-onset synchrony)	Regular (eight-bar pattern)
Arch-like structure proposed by the bass pattern accented tonic notes (see fig. 48)	Arch-like	Difficult to follow (Complete the arch)	Semi-regular (symmetric)
variations of the contrapuntal scheme (Seven sections) (determined by rhythmic stratification) (see table 4 and fig. 55)	In each new section Rhythms double values, register moves an 8ve lower, contrapuntal scheme moves one layer in the textural ladder	No clear goal?	Regular (1:2)
General registral ladder (see fig. 56)	Descent	The arrival to a low register is easy to predict but the exact notes are not	Regular until vl. I stops its descent
Detailed registral ladder (see fig. 57)	Expansion of the interval of the melodic leaps between phrases	The expansion of the leap is easy to predict but the exact point when it is going to stop is not	Regular until vl. I stops its descent

Tintinnabuli (see fig. 58)	Double the M voice with a T voice, but not in vla.	No clear goal	Semi-regular?
Less autonomous processes	**Description**	**Goal / Intelligibility**	**Type**
Projection of the trochaic pattern of the top voice phrases to a large scale (see fig. 46 and 55)	The trochaic pattern is projected to the large scale	No clear goal	Regular sequence, length increases additively
Increase of tension, length and prominence of voice crossing (changes of speed get more conflictive) (see table 2 and fig. 53 and 54	Partially determined by each of the seven occurrences of the contrapuntal scheme	No clear goal (stretto of voice crossings? or get a lower voice to become the upper layer?)	Semi-regular
Progression of F^{M7}/E towards prominence (see fig. 63-69)	Partially determined by bass, top voice phrases, contrapuntal scheme, register, phrase-onset synchrony, degrees of dissonance, the 'c-b' appoggiatura, etc.	Relatively clear goal	Semi-regular
Increase of tension and prominence of the appoggiatura of the top voice of prominent F^{M7}/E (see tables 7 and 8)	f-e, e-d, c-b, a-g	Achieved (to reach c-b which is the most expressive appoggiatura in that context)	Semi-regular
Convergence of two processes	**Description**	**Goal / Intelligibility**	**Type**
Contrapuntal scheme and bass pattern (m. 31 and m. 55) (see fig. 55)	Convergence	Achieved (convergence)	Semi-regular
Prominent FM7/E and arch-like structure proposed by the bass pattern accented tonic notes (see fig. 70)	Convergence	Achieved	Semi-regular?
Phrase-onset synchrony (between top voice and bass): m. 55, m. 60 vl. I, 63 vl. II m. 68 vl. II (see fig. 55)	Convergence	Achieved (convergence)	Semi-regualr?
Progression towards synchrony and general registral ladder (see fig. 56)	Convergence?	Divergent in nature	Regular
Progression towards synchrony and detailed registral ladder (see fig. 57)	Convergence	Achieved (convergence)	Regular until vl. I stops its descent
Transformation of the cause-effect relationship between voice crossing and prominent F^{M7}/E sonorities (see table 6)	Convergence	Not easy to predict until it happens (reversing the order of cause-effect)	Semi-irregular
Convergence of three processes	**Description**	**Goal / Intelligibility**	**Type**
Progression towards full synchrony: Contrapuntal scheme, top voice phrases, and bass pattern (m. 55) (see fig. 55)	Convergence	Achieved (convergence)	Regular (additive)

6.0 CONCLUSIONS

6.1 REGISTRAL LADDERS AND TEXTURAL DEPTH

One of the most prominent processes in both Pärt's and Górecki's canons is their gradual transformation of registral span. While in Górecki's canon the variation of span can be associated with the image of a stepladder, the span in Pärt's canon only resembles the 'descending' portion of that stepladder.

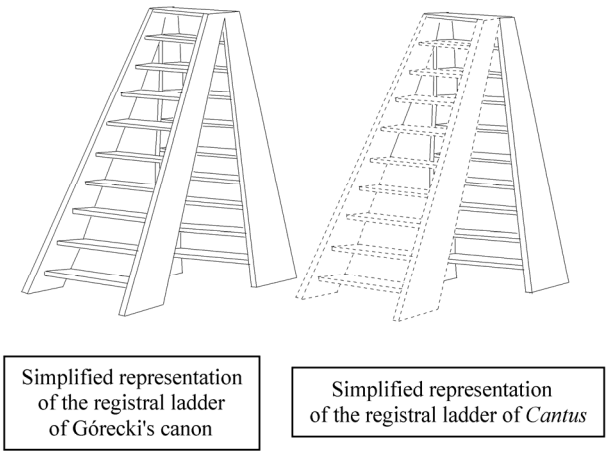

Figure 71: Visual metaphors for the transformation of span

In both cases, however, there are local events periodically crossing through the texture that remind the listener of the music's span. In Górecki's canon the most prominent element that crosses through the texture is the ladder of dissonance. As described in chapter 2, this ladder of dissonance is produced by the contrapuntal dissonance created by the arrival of each individual voice at its melodic

apex. In *Cantus*, on the other hand, there are two main types of events that remind the listener of the music's span. First, the particular rhythmic stratification of the work includes numerous moments of note-onset asynchrony between the voices. These moments of asynchrony allow each voice to briefly be singled out by exposing the attack of one or several of its notes.[64] Second, the rapid descents of the top layer work as a kind of ruler which periodically measures the distance between the highest note and the middle register of the piece.

In both pieces, the local events that periodically cross through the texture not only give the listener information about how far apart the outer voices are, but also give a hint about the possible number of voices involved at that given point of the piece. While the measurement of span can be seen as providing information about 'registral depth', the identification of the number of voices (usually just an approximate estimation)[65] provides the listener with information about the piece's 'textural depth'.

In these two pieces the textural depth tends to be experienced at two basic levels. On a large scale level, the initial gradual introduction of each voice provides the listener with an opportunity to easily count the exact number of voices in the piece. In a more local level, the elements that cross through the texture serve as periodic reminders of the textural depth at different moments in the piece. Both of these rulers of textural depth are salient enough to potentially generate intense musical expression through isomorphism with experiences of moving through space. In addition, each of these levels can be experienced in two different ways. On the one hand, each can be related to the motion of one's body through vertical space, as in climbing a stepladder (this metaphorical ascent is especially suitable to describe the experience of Górecki's ladders of dissonance). On the other hand, the textural depth of a piece can be related to one's response to a visual image of such characteristics. For instance, the 'textural

[64] Of all the voices that come to the spotlight via this mechanism, it is the viola part that tends to stand out the most. This is mostly due to its timbral differentiation (solo player, senza sordina).
[65] David Huron in his article 'Voice Denumerability in Polyphonic Music of Homogeneous Timbres' (1989) suggests that in polyphonic textures with homogeneous timbre that have more than three voices, the number of voices tend to be underestimated by the listener.

depth' in *Cantus* might evoke feelings of awe or vertigo via its association with images such as a very steep cliff viewed from a distance or one's placement on the top of that very same steep cliff.[66]

Table 10: Main elements involved in the perception of registral and textural depth

General Description	Specific Aspect/Types	Górecki's canon	Pärt's canon
Important events or features that make span and number of voices clearer	Usually events whose crossing through the texture is noticeable (i.e. note-onset asynchrony)	Ladder of dissonance	Note-onset asynchrony
Registral Depth	Span (virtual space created by the interaction of the voices)	Stepladder	Descending section of the stepladder
Textural Depth	Number of Voices	Stepladder	Fast simple ladder
Levels textural depth can be experienced	Large scale textural depth	Accumulation of the first entrances of each voice	
	Local level textural depth	Elements crossing the texture	
Ways to experience textural/registral depth in spatial/motional terms	Direct, one-dimensional textural depth	Vertical motion of one's body in a vertical space	
	Indirect, subtle but complex textural depth	View of a steep object	

6.2 THE EMERGENCE OF HARMONIC STRUCTURES AND ITS RELATIONSHIP WITH THE METAPHORICAL LADDER

The harmonic processes in Pärt's and Górecki's canons are significantly more subtle than the textural and registral processes. In both pieces, the general harmonic process can be described as a gradual emergence of particular salient harmonic features. Whereas in Górecki's canon the harmonic structure that emerges throughout is the periodic occurrence of the G-C-D chordal succession, in Pärt's canon it is a single sonority, the F^{M7}/E, that gradually comes into focus. Both of these harmonic ideas are restated over and over, gradually expanding in both length and resonance through the variation of register

[66] It is very important to take into account that the actual evocation of these images in one's brain while experiencing the music is not a requirement for the generation of musical expression via the isomorphism with bodily experience. In other words, the listener might still experience awe when listening to these pieces, even if he/she does not associate the music with these metaphors. The isomorphism seems to occur at a deep level of musical perception, where actual metaphorical relationships do not have to be attached to specific real world objects.

and voicing. This gradual emergence of the harmonic structures can be associated with the metaphor of the ladder via the general metaphorical mapping 'greater is higher' (in this particular case 'greater harmonic definition' would be metaphorically associated with 'being higher on the ladder').

However, there is a way both harmony and the idea of the ladder can be associated at a deeper level. In *Cantus*, the F^{M7}/E becomes longer, lower, and its voicing more compact. This process is somewhat analogous to the visual phenomenon that takes place when a viewer comes closer to the viewed object.[67] When a person with average vision comes closer to the object he/she is looking at, the object seems to increase in size and detail. This metaphor could be combined with the metaphor of the ladder in order to create a two-fold metaphor.[68] In this compound metaphor, the emergence of the F^{M7}/E could be associated with the way a viewed object, placed towards the bottom of the ladder, becomes bigger from the viewer's perspective when he/she descends the ladder. This compound metaphor encompasses both the salience of a harmonic idea as well as the general registral descent of *Cantus*.

As pointed out in the analysis of *Cantus* in chapter 5, the piece's climax occurs halfway through the piece (mm. 55-68), with the arrival of full synchrony between the outer voices. However, that point does not coincide with the arrival of the longest, lowest, and most compact chordal disposition of the F^{M7}/E, which occurs in m. 87. This does not necessarily represent a failure of the metaphorical account of the piece via the idea of the ladder's descent, but it can be seen rather as an additional level of sophistication of the metaphor. The optimal view of an object is usually neither the closest nor the furthest apart since both of these extremes tend to promote a misrepresentation of the object, either by lack of detail or by providing an incomplete account of it. Similarly, the longest and most compact F^{M7}/E chord

[67] It is important to consider that after a certain range the combination of low register and compact voicing creates a muddy effect that can be seen as equivalent to the blurry view usually obtained when the viewer is too close to the viewed object.

[68] Once again, it is important to point out that the specific images and actions of one's climbing or going down a ladder to get closer to a given object are just a way to promote a better understanding of the complexity of the musical processes and their potential to generate intense emotional responses. It is never suggested that these specific images and actions are necessarily part of the listener's experience. In other words, the author of this paper has never considered that most of listeners would have thought of these images when listening to these pieces, nor that listeners' experience of these pieces could be improved if these metaphors are incorporated into it.

may not necessarily represent the optimal version of this sonority, in terms of harmonic perception. Most listeners are trained to deal with the perception of harmony under certain specific conditions. In general terms, most listeners seem to grasp harmonic structures better when the harmonic rhythm is not too slow, and the overall register not too low.[69] In addition, in the specific case of the F^{M7}/E of measure 47, the harmonic dimension of this chord seems to be activated by its role as accompaniment to a distinctive melodic layer. This traditional role of the harmonic dimension is not present in the long F^{M7}/E of m. 87 where the melody is not prominent enough to suggest a complementary relationship.

The compound metaphor of approaching an object by using a ladder can also be applied to Górecki's canon. The main difference is that, in the case of Górecki's piece, an object is being approached by climbing the ladder rather than by descending it. Another important difference is that in Górecki's piece the apotheosis of the G-C-D harmonic structure, the longest and more resonant version (mm. 190-208), this time coincides with the apex of the registral stepladder of the piece.

Table 11: Main elements involved in the perception of depth of the harmonic process

<table>
<tr><th>General Description</th><th>Specific Aspect/Types</th><th>Górecki's canon</th><th>Pärt's canon</th></tr>
<tr><td>'Depth' of the Harmonic Process</td><td>Gradual emergence of harmonic structures through certain types of increase in length, and the combination of certain types of voicing, register, and span</td><td>Emergence of the G-C-D pattern</td><td>Emergence of F^{M7}/E chord</td></tr>
<tr><td rowspan="3">Ways to experience harmonic depth in spatial/motional terms</td><td>Direct, one-dimensional depth of the harmonic process</td><td colspan="2">Vertical motion of one's body in a vertical space via the metaphorical mapping 'greater harmonic definition equals higher position on the step ladder'</td></tr>
<tr><td rowspan="2">Indirect, subtle but complex depth harmonic of the harmonic process</td><td colspan="2">An object gradually gets bigger and more detailed from the viewer's point of view</td></tr>
<tr><td>Harmonic consolidation of G-C-D coincides with climax</td><td>The optimal view is not the longest, slowest, and most compact voicing of the F^{M7}/E chord</td></tr>
</table>

[69] This threshold of harmonic clarity in terms of register and voicing is taken into account, among others, by orchestrational practices. Several manuals of orchestration, including Walter Piston's (1955), propose notes around the 4-foot C as the safe low limit where intervals smaller than a fourth are recommended if harmonic clarity is desired.

6.3 WEB OF PROCESSES AND STRUCTURAL DEPTH

At the end of chapters 4 and 6, tables describing the different processes of each canon were provided. These tables partially summarized the intricate web of relationships that the simultaneity of processes generates. This phenomenon of simultaneity, as well as its complexity, can be seen as mirroring the intricate contrapuntal relationships that exist between the voices of the two canons. Both webs, of processes and of voices, are made of relatively independent lines that, moving at their own pace, eventually intersect, sometimes supporting each other, and other times confronting each other. In the same way that the onset asynchrony of important events in the different layers (e.g. dissonant arrivals to the apex of each voice in Górecki's canon and note-onset asynchrony in Pärt's canon) makes the listener aware of the textural depth of these canons, the onset asynchrony of important events in the different process accounts for some of the structural depth of these two pieces. For instance, the occurrence of the registral climax and the climax generated by the relationship between outer voices at different points in time in Górecki's canon (see figure 13) may enable the listener to perceive both processes as being independent from each other.[70] Such independence establishes a virtual space that is 'deep' enough for both process to coexist and freely interact, in the same way that the independence of polyphonic voices establishes a virtual space that is 'deep' enough for the contrapuntal lines to coexist and freely interact.[71]

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[70] Another way structural depth can become clearer is by the simultaneity of processes that, although they may share the same shape of tension (i.e. having their climaxes at the same time), are very different in nature (i.e. simultaneity of harmonic and rhythmic processes).

[71] An example of a 'shallow' virtual space where different voices do not freely interact occurs in the 'polyphonic' procedure of 'planing'. In this type of procedure, voices are tied to each other in parallel motion, keeping their vertical relationships. A succession of parallel chords in first inversion is an example of planing. This measurement of the virtual space that superposed processes occupy could be described, by analogy to register, as 'structural span'. However, since there is not a clear difference between 'structural span' and the number of superposed processes, both categories can be fused in the larger concept of 'structural depth'.

Textural depth and structural depth are very similar concepts. However, although some of the elements that generate textural depth in these canons may also participate in the generation of their structural depth, the two types of depth should be regarded as essentially independent of each other. The result of this independence is a doubling of depth at a large scale level. This means that a listener might experience the depth of the musical discourse at two different levels simultaneously, creating a condition that could be described as a multi-dimensional depth. Returning to Davies-Scruton's notion of musical expression as being generated by musical structure's evocation of emotion through isomorphism with expressive bodily experiences, this multi-dimensional depth could be argued to be an important source of the intense emotional reaction that these pieces provokes in many listeners.

Table 12: Main elements involved in the perception of structural depth

General Description	Specific Aspect	Górecki's canon	Pärt's canon
Important events or features that make structural depth clear	Usually events whose crossing through the texture is noticeable	Onset asynchrony between important events in different processes (i.e. onset asynchrony between general climax and the climax generated by the relationship of the outer voices)	
Structural Depth (Encompasses both ideas of structural span and depth of the number of processes)	Virtual space created by the interaction of independent processes	Irregular stepladder (the increase in prominence of the different processes increases the general intelligibility of their superposition, but this increase is not gradual)	
Ways to experience spatial/motional depth	Direct, one-dimensional textural depth	Vertical motion of one's body in a vertical space	
	Indirect, subtle but complex textural depth	View of a steep object	

6.4 NOVELTY OF THIS DISSERTATION'S IDEA OF STRUCTURAL DEPTH AND THE PROPOSED REQUIREMENTS FOR STRUCTURAL DEPTH TO BE EASILY PERCEIVED

This dissertation demonstrates that indeed an intricate web of processes is generated in both Arvo Pärt's *Cantus* and the canon from Henryk Mikołaj Górecki's Symphony No. 3, *The Symphony of*

Sorrowful Songs. The kind of structural depth I have found in these pieces is analogous to the kind of structural depth that Schenkerian analysis uncovers in 18th and 19th century tonal masterworks. One important difference, however, is that whereas Schenkerian analysis systematically examines the hierachical ways and levels that structural and non-structural notes interact in a piece, the analysis of structural depth in this dissertation examines chains of prominent events regardless of the musical parameter that produce them. Although it could be argued that many pieces of music are structurally deep in these terms, since most of them present rhythmic, melodic, registral, and/or harmonic processes unfolding simultaneously, it is important to notice that in very few of such pieces are the processes as gradual and the contour of tension as basic. Hence few pieces have such an easily perceived basis for their structural richness. There seem to be at least two requirements for this kind of structural depth to be clearly perceived:

a. Intelligibility of the individual processes. One of the ways this intelligibility can be achieved is by presenting a very simple tension contour such as an arch of tension (gradual accumulation of tension followed by a gradual resolution of the tension)

b. Some of the most prominent events should not coincide in time (onset asynchrony of prominent events), and/or the processes should be perceived as being independent (e.g., high vs. low register processes) or significantly different from each other (e.g., rhythmic vs. timbral processes)

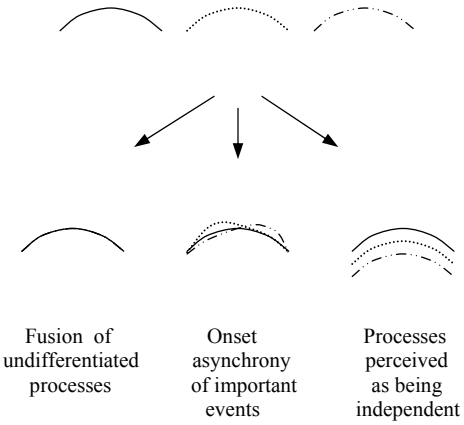


Figure 72: Different models of interaction between processes

It is possible that the type of structural depth found in these two pieces (fully intelligible, multilayered and enriched by coherent progression towards convergence) is not only a natural consequence of a large scale canon but that also this type of structural depth would be difficult, though not impossible, to find in a non-canonic piece. A manifestation of this phenomenon seems to be the fact that only canonic pieces in the repertoire of these two composers seem to generate such structural depth.[72] In addition, older tonal canonic works, such as those of Bach, demonstrate similar structural depth, even though they do not often display long gradual processes of accumulation and convergence of processes. The systematic establishment of criteria and methodology for the identification and analysis of structural depth in this dissertation leaves the door open for its application in the analysis of other pieces.

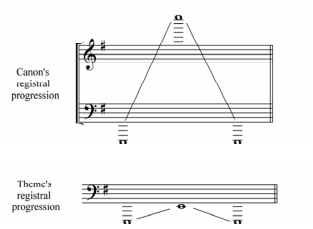
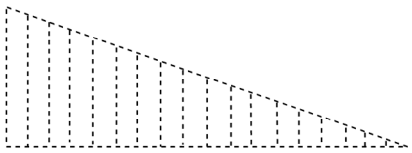
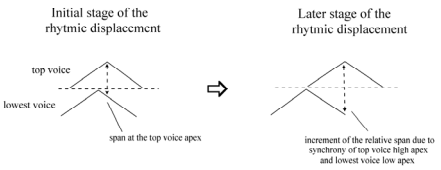
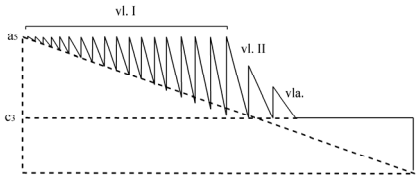
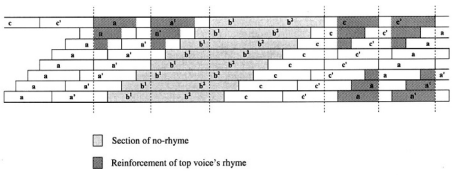
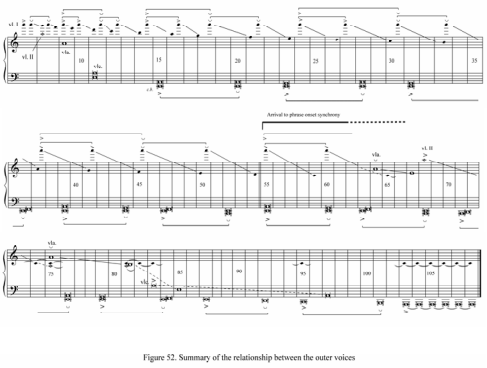
[72] Arvo Pärt uses a similar approach to mensuration canon in pieces like *Arbos* (1977), *Stabat Mater* (1985), *Festina Lente* (1988), and *Miserere* (1989).

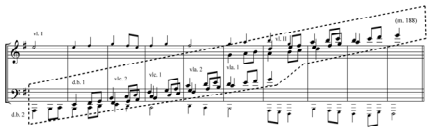
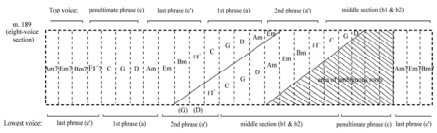
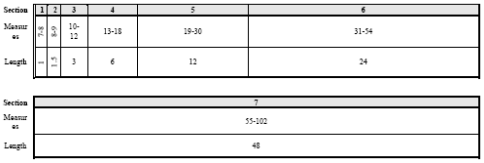
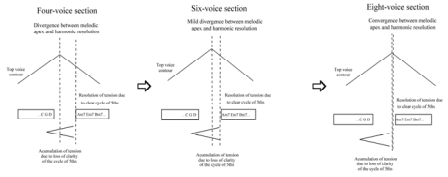
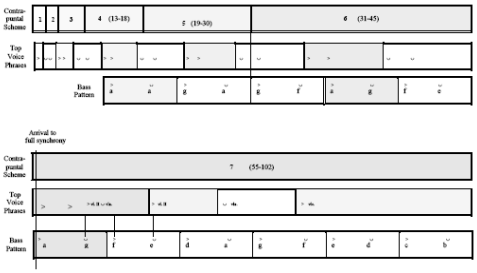
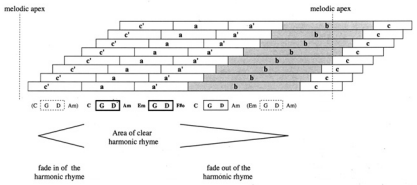
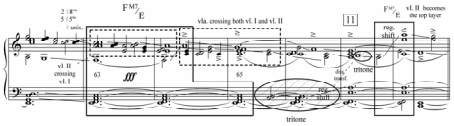
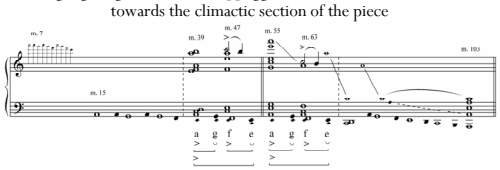
APPENDIX A

SIMPLIFIED SUMMARY OF PROCESSES

The following list of processes is provided in order to facilitate comparison between the processes of the two canons examined in this dissertation. It is important to notice that in order to establish a one to one correspondence between the two pieces, this list omits some of the processes and modifies the order of the processes discussed in the main document.

Table 13: Simplified summary of processes

	Level of structure or degree of detail	**Canon from Górecki's Symphony No. 3**	**Pärt's *Cantus***
1. Contour	General	 Figure 9. Registral progression at two levels of structure	 General Registral ladder
	Detailed	 Figure 11. Process towards registral expansion (span increment) at the level of local registral progressions	 Detailed Registral ladder
2. Prominent element of phrase structure	Local	Rhyme / no-rhyme / rhyme	Trochaic pattern
	Large Scale	Process towards the placement of the no-rhyme section as a long, tense anacrusis to the canon's climax  Figure 17. Superposition of rhyme schemes	Large-scale projection of the trochaic pattern determines phrase-onset synchrony between outer voices at the climax of the piece  Figure 52. Summary of the relationship between the outer voices
3. Prominent element	Local	Consonance-dissonance-consonance	Voice crossing

of the two-voice counterpoint	Large scale	Emergence of the ladder of dissonance and its becoming a large, tense anacrusis  Figure 14. Ladder of dissonance	Increase of tension and prominence of voice crossing as well as a process of going from being anacrusis to being climactic aftermath
4. Prominent consequence of the contrapuntal blocks	General	Transpositional and harmonic structure of asc. 5ths  Figure 25. Gradual transition between the two main structures of asc. 5ths	Seven sections determined by the transposition and augmentation of the basic contrapuntal block 
	Detailed	Gradual alignment of the tension-resolution scheme generated by the clarity of the root motion of asc. 5ths and the tension generated by the melodic peak of the top voice  Figure 24. Process towards the convergence of the melodic apex and the peak of harmonic tension due to the lack of clarity of the harmonic structure	Gradual alignment of the beginning of the basic contrapuntal block and the beginning of the phrases of the outer voices. This alignment culminates at the climactic section of the canon. 
5. Emergence of harmonic structures	General	Emergence of the harmonic rhyme generated by the G-C-D idea	Emergence of the F^{M7}/E
	Detailed	Gradual alignment of the tension-resolution scheme generated by the fading out of the G-C-D harmonic rhyme and the melodic peak of the top voice through out the piece 	Process towards the placement of the F^{M7}/E before voice crossing creating the illusion of a cause-effect relationship at the climax of the canon  Figure 67. First F^{M7}/E in section 7
6. Structures determined by the convergence of prominent melodic events and emergent harmonic structures	General	1. The progression established between the first chords of every new entrance of the theme recreates the harmonic progression of the first eight bars of the theme 2. There are four instances syntactic accent and G-C-D rhyme coincides	The F^{M7}/E highlights different pitches in the top-voice throughout the piece. The order these pitches are highlighted outlines a descending scale.
	Detailed	1. The relationship between the top voice and the chordal root at every new entrance of the theme establishes the intervallic progression 3^{rd}-5^{th}-7^{th} 2. The parallel motion between the outer voices that occurs when syntactic accents and the G-C-D rhyme coincides establishes the intervallic progression 6^{ths} -10^{ths} -8^{ves}	The highlighting of the tensest appoggiatura-like idea, 'c-b', intensifies towards the climactic section of the piece  Figure 70. Accented 'e-a' and 'e-f' dyads in the bass

APPENDIX B

STRUCTURAL DEPTH AND INTELLIGIBILITY OF PROCESS IN STEVE REICH'S *PIANO PHASE* (1967): AN AFTERTHOUGHT

To illuminate the potentially confusing notion of structural depth as a source of intense musical expression, a brief comparison between Reich's *Piano Phase* and Pärt and Górecki's canonsmay be helpful. In *Piano Phase* a twelve sixteenth-note long melodic pattern is played in unison by two pianos.

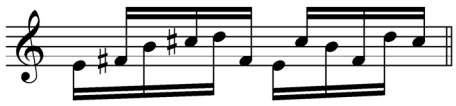


Figure 73: First pattern in Reich's *Piano Phase*

After several repetitions one of the pianos accelerates until the two pianos get out of phase by a sixteenth-note. The process is repeated until the two pianos come to phase again. After this arrival to unison, the pattern is reduced to eight sixteenth-notes and a variation of some of the original pitches is introduced by one of the pianos.

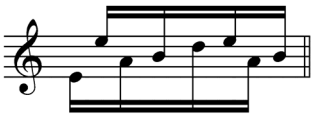


Figure 74: Second pattern in Reich's *Piano Phase*

The process of 'moving out' and 'moving into' phase is then repeated. By the end of this process, the melodic pattern is reduced to only four sixteenth-notes and the melodic variation first introduced by one of the pianos in the preceding section is now adopted by both of the pianos. The process of moving out and into phase takes place one last time, after which the piece comes to an end. The following table summarizes the main processes of the piece:

Table 14: Partial summary of the main processes in Steve Reich's *Piano Phase*

Most autonomous Processes	**Description**	**Goal / Intelligibility**	**Type**
Phasing	Continuous sixteenth-note readjustment of the imitation accomplished by gradual and subtle accelerando of one of the voices	The goal is to return to unison. However, the climax of tension is uncertainly spread among some of the out-of-phase stages	Regular from the angle of performance but irregular in perceptual terms
Diminution	The total length of the melodic pattern is reduced by a quarter note every time a cycle of phasing is completed	The process stops when no further diminution is possible (1st section lasts a dotted half-note, 2nd section lasts a half-note, and the 3rd section lasts a quarter-note)	Regular (its prominence is emphasized by the change of sonority through the introduction of new higher pitches)
Gradual introduction of a new set of notes	1st section: {e3, f#3, b3, c#4, d4} 2nd section: {e3, f#3, b3, c#4, d4} + {a3, e4} 3rd section: {e3, a3, b3, d4, e4}	Substitution of the original set (it is most likely to be perceived as a general increase of pitch density whose tension is resolved by the set of pitches of section 3)	Regular / sectional
Less autonomous processes	**Description**	**Goal / Intelligibility**	**Type**
Progression towards the prominence of the two registrally determined new lines	The highest and lowest notes of the polyphonic mass tend to be perceived as creating independent new lines based on repeated pitches	No clear goal. The perception of the virtual lines is mostly dependent on the listener	Irregular
Convergence of processes	**Description**	**Goal / Intelligibility**	**Type**
Convergence of phasing, diminution, and the gradual introduction of a new set of notes	The processes do not progress toward convergence because they are in synchrony throughout due to the formal design	This type of convergence is not a goal but rather a permanent state	Regular (additive)

While the emphasis of process in this piece is undeniable, the intelligibility of the process itself may be debatable. Most of our perception of the phasing process as being easy to follow is promoted by its conceptual simplicity. Most of us hang an idea of simplicity and intelligibility on the phasing process once we realize the simplicity of its mechanism.[73] In addition, this partially false conception is perpetuated by systematically assuming that conceptual simplicity as well as simplicity of harmonic and rhythmic source materials implies a simplicity of the result of the process. However, when a listener experiences a piece like *Piano Phase* for the first time without knowing what the piece is about, he/she is likely to perceive the contrasting effects of the 'in phase' and 'out of phase' stages without really knowing what the inner mechanism is. It is important to clarify that this is not the case for all of Reich's phasing pieces. For instance, in Reich's *Come out* (1966), which uses recorded speech, the natural capacity of human perception to identify the more subtle nuances of speech enables the listener to distinguish the two layers of speech despite their similarities and close superposition. On the other hand, in *Piano Phase*, and especially in *Clapping Music* (1972), the two layers are likely to fuse into one another making their individual identification very difficult to achieve.[74] If the individual layers cannot be identified, the constant readjustment of the interval of imitation might be difficult to follow. The general perception of the piece as being focused on process might be promoted by other process-like characteristics of the piece other than the intelligibility of the main process. Some of these process-like features are the alternation of note-onset asynchrony and note-onset synchrony,[75] or the machine-like

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[73] This tends to be the case since the mechanism of phasing is usually significantly easier to understand than its musical result.

[74] In fact, for most listeners the main appeal of these pieces tends to be that, since the superposed lines cannot be distinguished, the focus of perception shifts to the new melodic-rhythmic patterns that the superposition generates. Although these new patterns suggest some gradual evolution that could be followed as if it were a 'process' (for instance, the very prominent transformation of the initial pair of 'e's from eighth-notes to sixteenth-notes between measures 6 to 7), the perception of the 'processes' is usually fragmentary, not allowing the listener to follow a single consistent thread of process throughout the piece.

[75] In the case of *Piano Phase*, the instances when one of the voices gradually accelerates creates a distinctive flanger-like effect which is very contrasting with the moments of immediately before and after of note-onset synchrony. The periodic succession of note-onset synchrony sections and flanger-like transitions (note-onset asynchrony sections) tends to be easily grasped by the listener. This type of pattern gives to the piece a very clear process-based logic. However, this process is only a superficial manifestation of the phasing process that remains

appearance of the constant repetition of the small, diatonic pattern that generates an uninterrupted flow of sixteenth-notes. In this type of listening experience, the listener knows that the piece is changing and that there is a process-like quality in the music, but he/she is most likely to have no knowledge about the local direction of the piece, therefore getting confused[76] about the specific shape that the tension derived from the process describes. There is increase of tension but it is difficult to be certain about where the climax is exactly. When one thinks that the tensest rhythmic relationship has been reached in the piece, one may find that there were other tenser sections to come.[77] This experience can be engaging and meaningful depending on how active the listener's participation is.

Reich's *Piano Phase* is not structurally deep in the same way that Pärt's and Górecki's canons are. This lack of structural depth is not only determined by the low degree of intelligibility of the phasing process, but also because the number of processes is considerable smaller and their interaction simpler (compare tables 1, 9, and 13). This should not be taken as a suggestion that the canons analyzed in this paper are better music that *Piano Phase*.[78] It just means that the former provides a number of easy-to-follow elements which guide the progression towards a defined climax, whereas the latter heavily relies in the listener's involvement and active participation. For example, in Pärt's and Górecki's canons the listener is gradually introduced and then surrounded, covered, transported, and effortlessly immersed in a deep, intricate, and intense ocean of processes. On the other hand, *Piano Phase* presents an object that is supposed to invite the listener to actively participate in the piece. There is no deep ocean of processes, but a stream of surprising new objects that gives the impression of waiting to be discovered by the listener with concentration and an open musical imagination.

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unchanged throughout (note-onset synchrony alternating with flanger-like sections), and therefore is not enough for the listener to fully follow the process.

[76] This state of confusion is only one of many possible effects of the piece, likely to be avoided if the listener is not trying to follow the process or the shape of the tension of the piece.

[77] The general effect can be compared to the experience of walking around a kinetic sculpture, following a predetermined pace but being free to shift between looking close, looking from further away, or not looking at all for a while.

[78] In fact, from the performer's standpoint the opposite may be argued. Whereas the specific type of phasing used in *Piano Phase* is especially challenging for most performers, the repetition of a slow melody over and over, with no variation, in Górecki's canon, is not very interesting from the purely physical aspect of performance.

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BURNING THE DEEP RED SEA

Burning the Deep Red Sea

For Chamber Ensemble

Ivan Jimenez (2007)

Instrumentation

flute
oboe
clarinet Bb
bassoon
violin
violoncello
vibraphone
harp
piano

Score in C

duration c. 12'

Score in C

Burning the Deep Red Sea

For Chamber Ensemble

Ivan Jimenez (2007)

A

♩ = 60 Incandescent but subtle

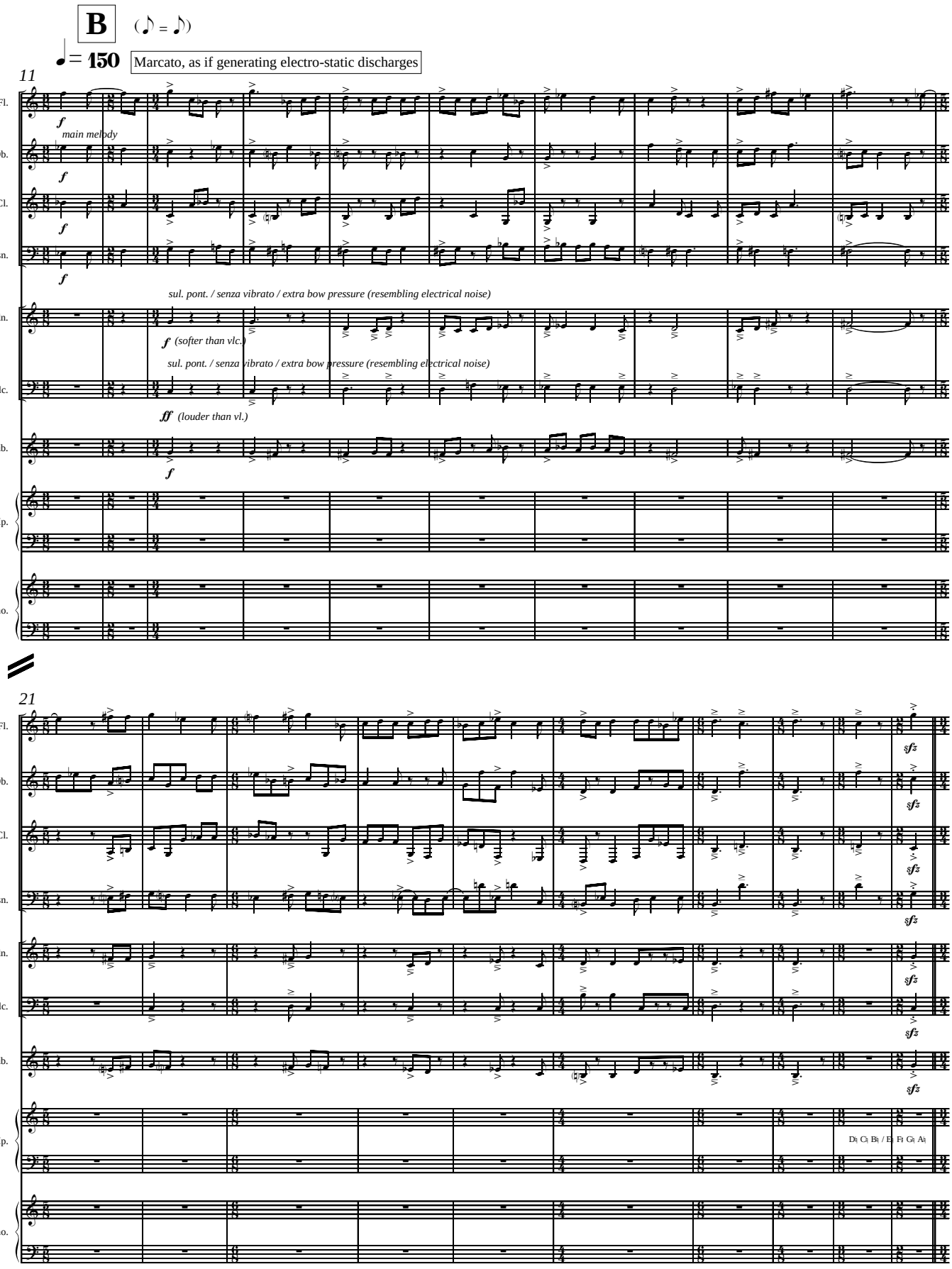
Flute
Oboe
Clarinet in B♭
Bassoon
Violin
Cello
Vibraphone
Harp
Piano

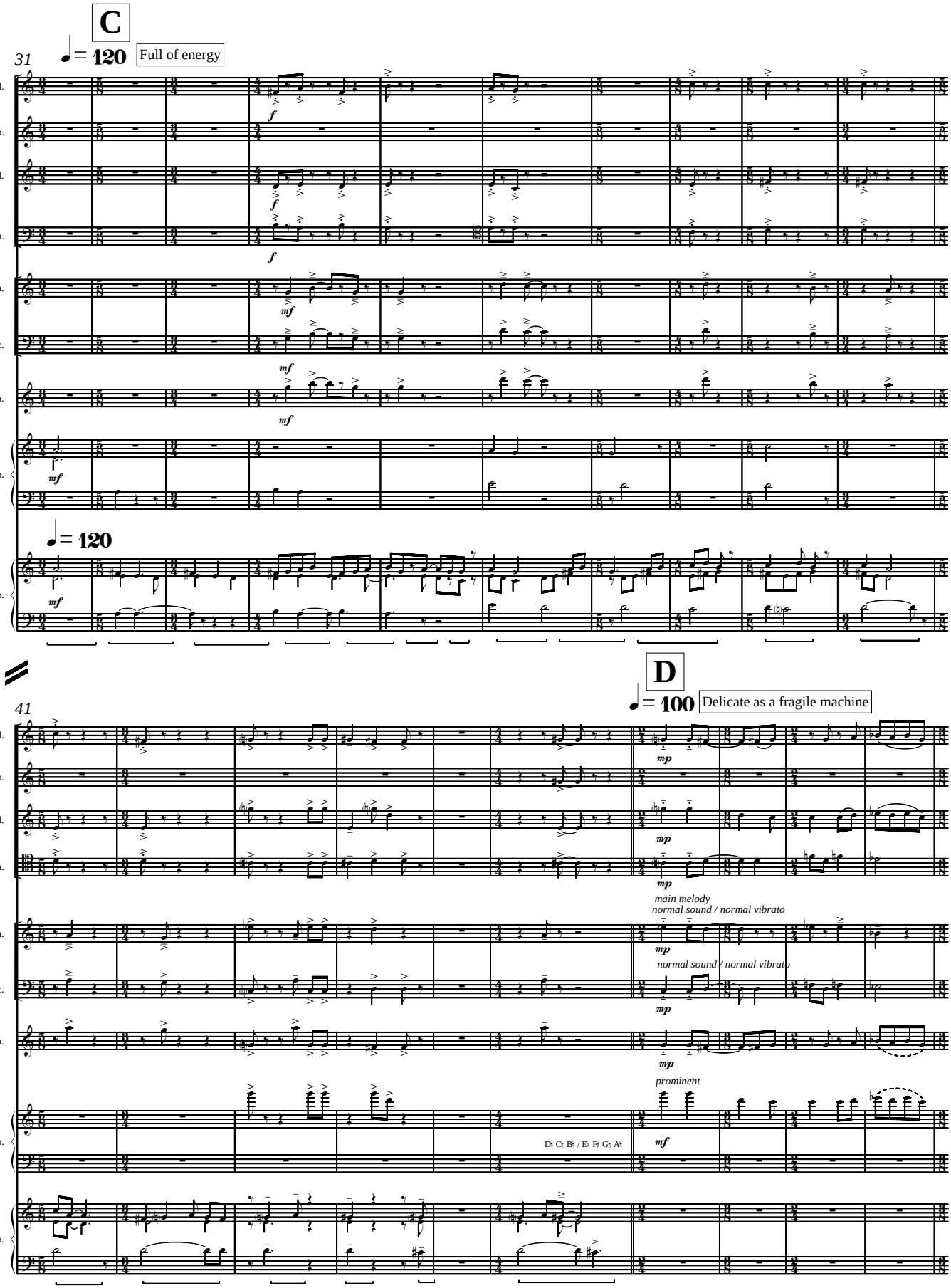
pp p cantabile espressivo mp mf pizz. espressivo arco molto cantabile sul. pont. motor off all throughout D♭ C♭ B♭ / E♭ F♭ G♭ A♭

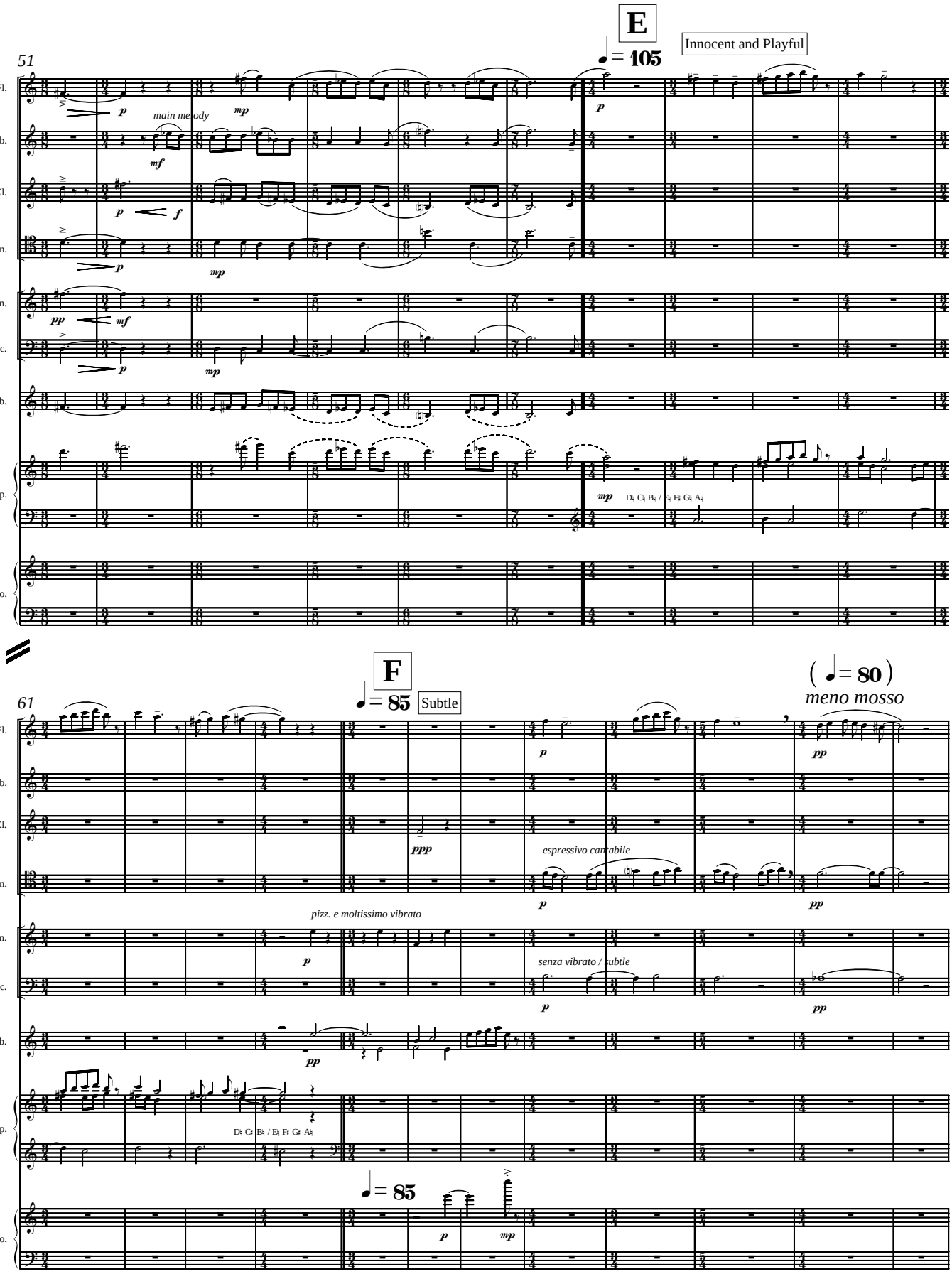
6

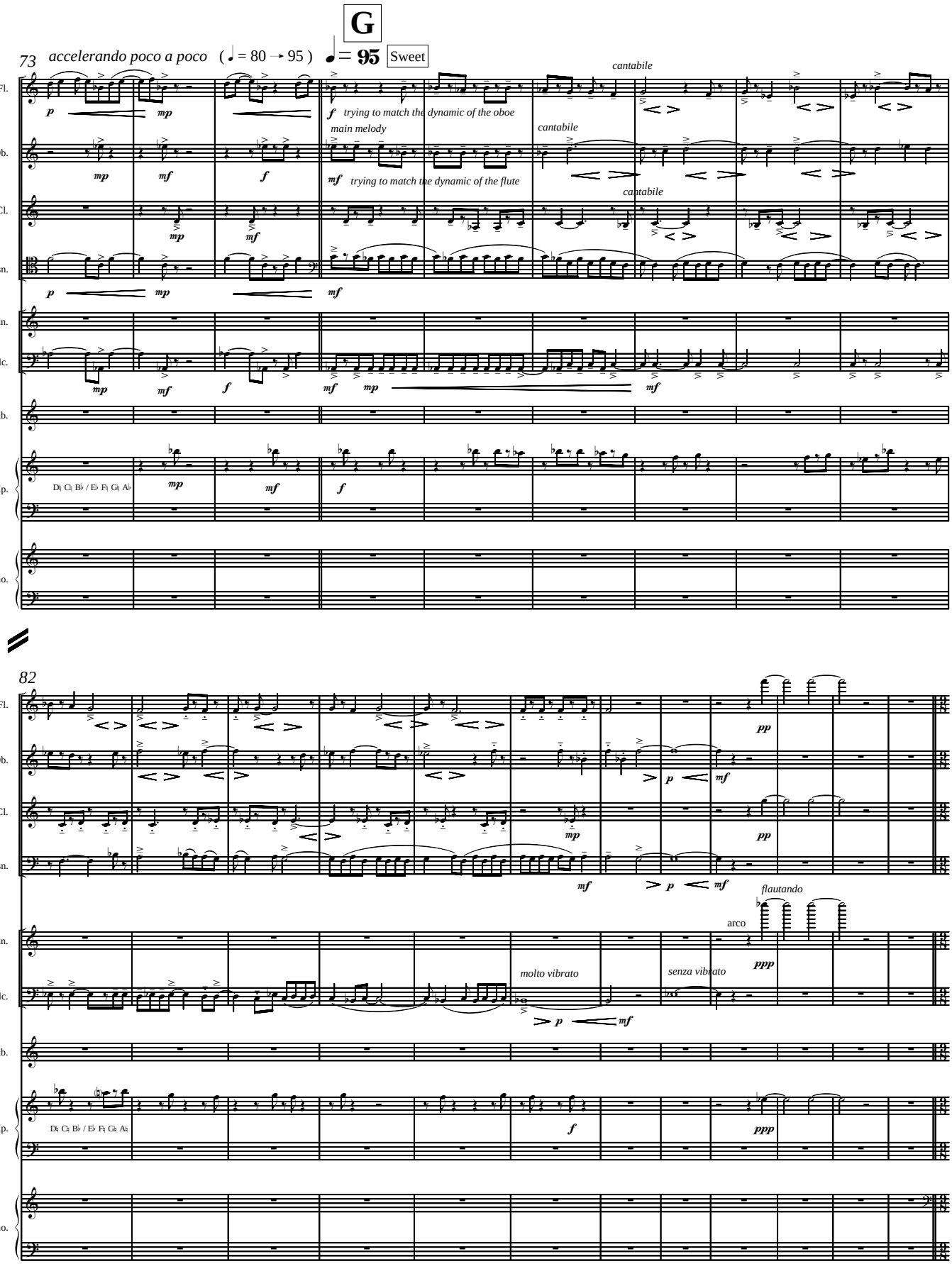
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.

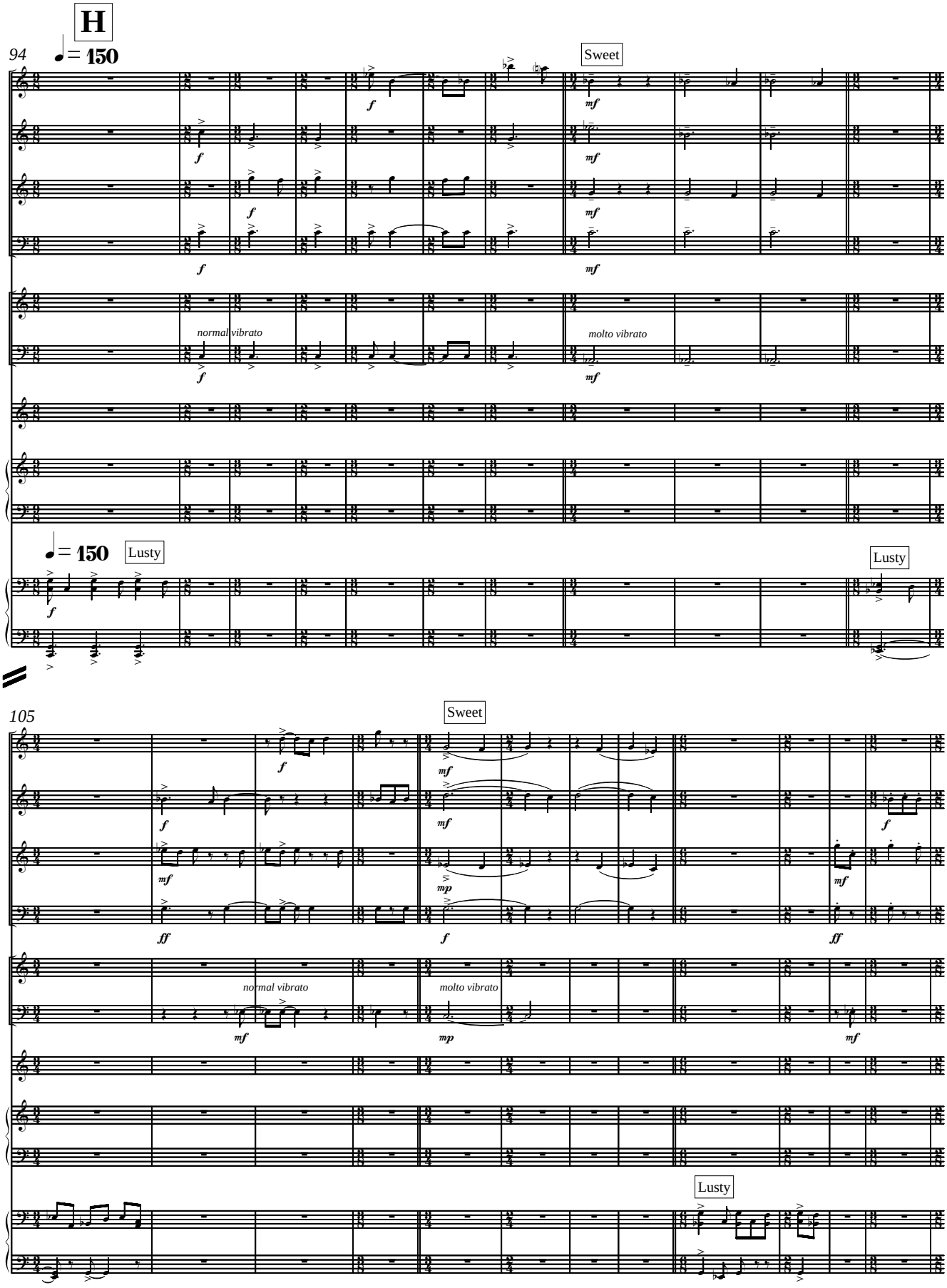
molto espressivo molto vibrato arco sul. pont. mf f

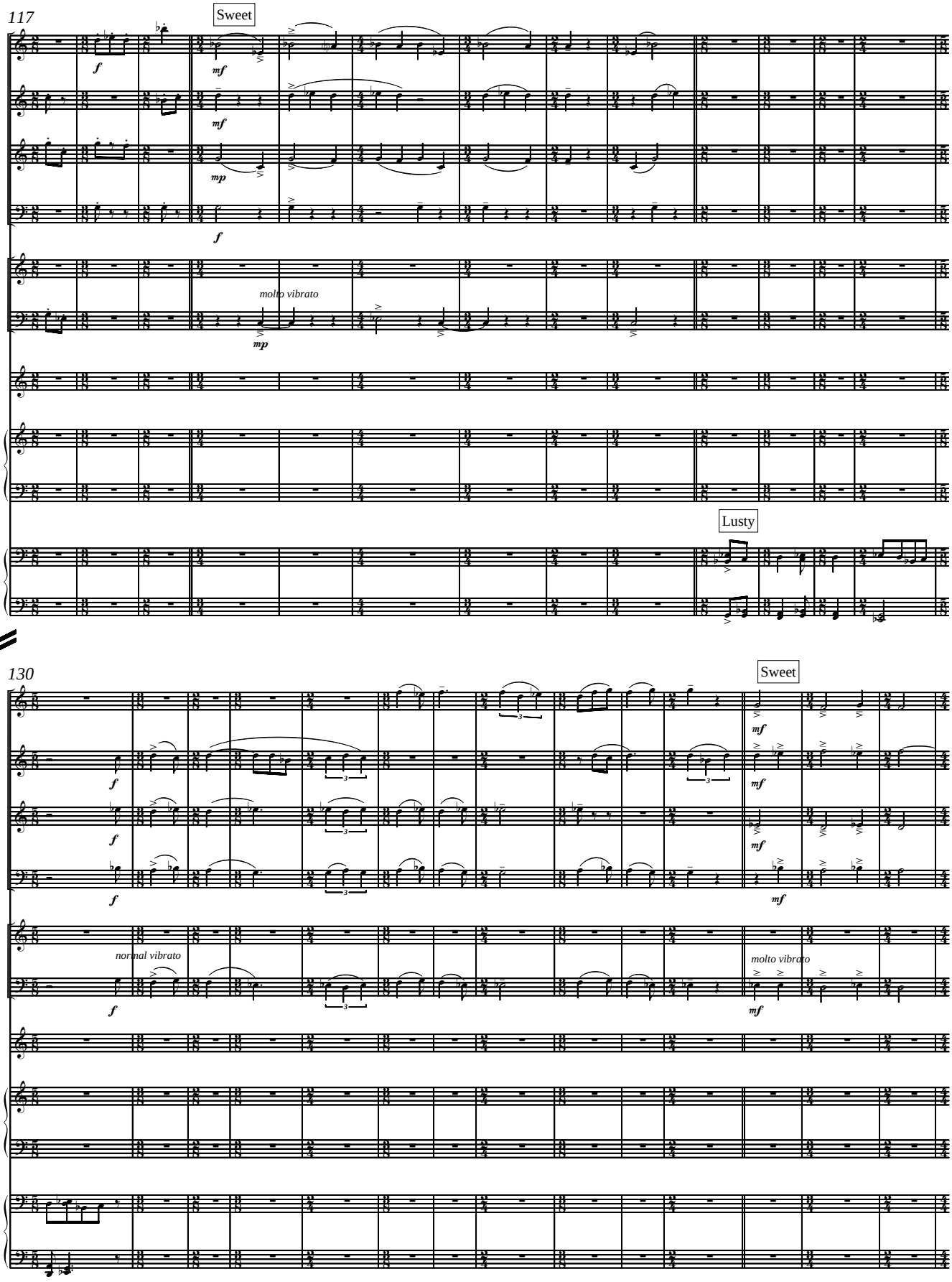

B
(♪ = ♪)
♩= 150
Marcato, as if generating electro-static discharges
11
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
f
main melody
sul. pont. / senza vibrato / extra bow pressure (resembling electrical noise)
f (softer than vlc.)
ff (louder than vl.)
21
sfz
D♭ C♭ B♭ / E♭ F♭ G♭ A♭

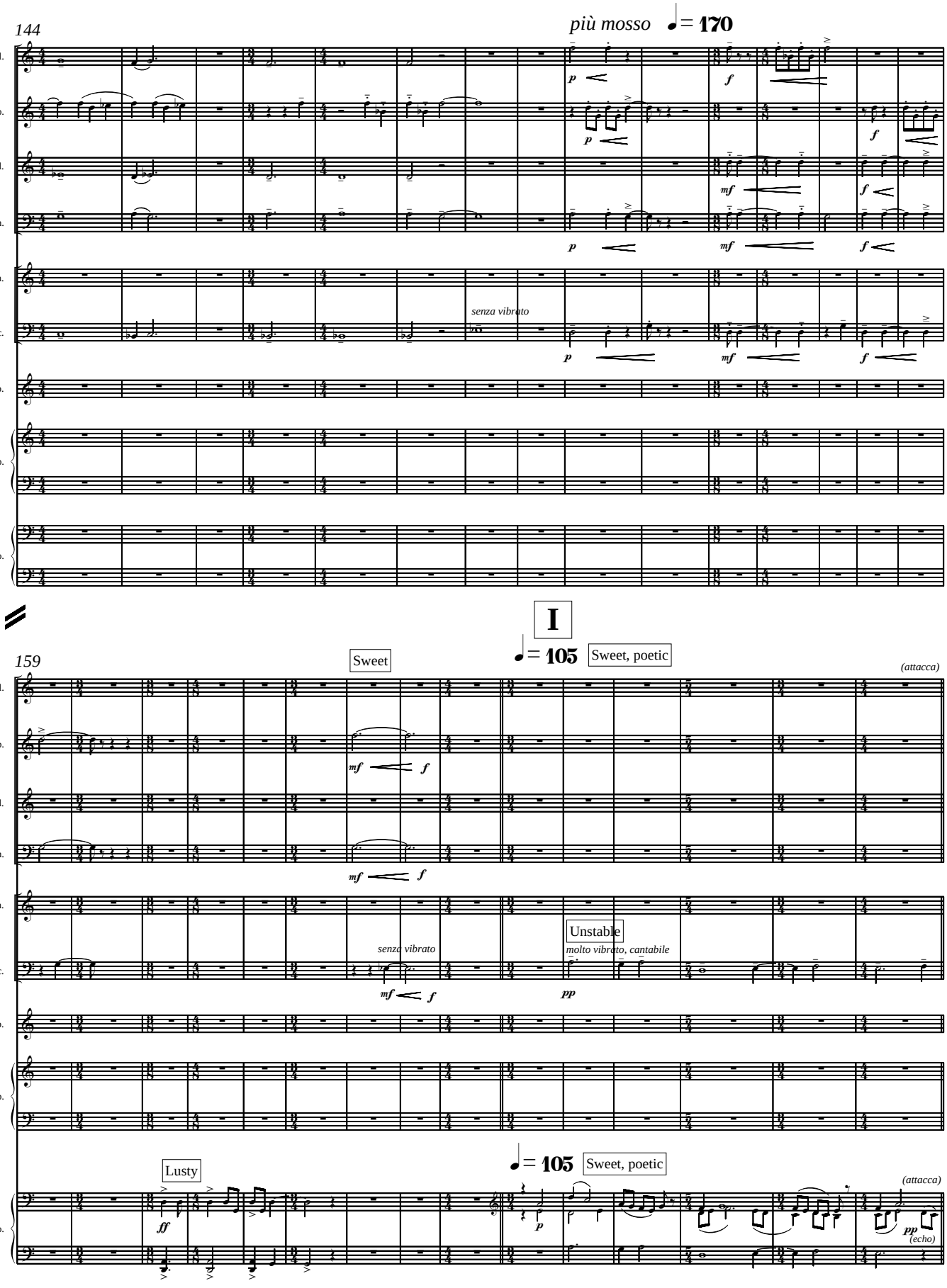

C
31
♩= 120
Full of energy
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
♩= 120
D
41
♩= 100
Delicate as a fragile machine
main melody
normal sound / normal vibrato
normal sound / normal vibrato
prominent
D♭ C♭ B♮ / E♭ F♭ G♭ A♭

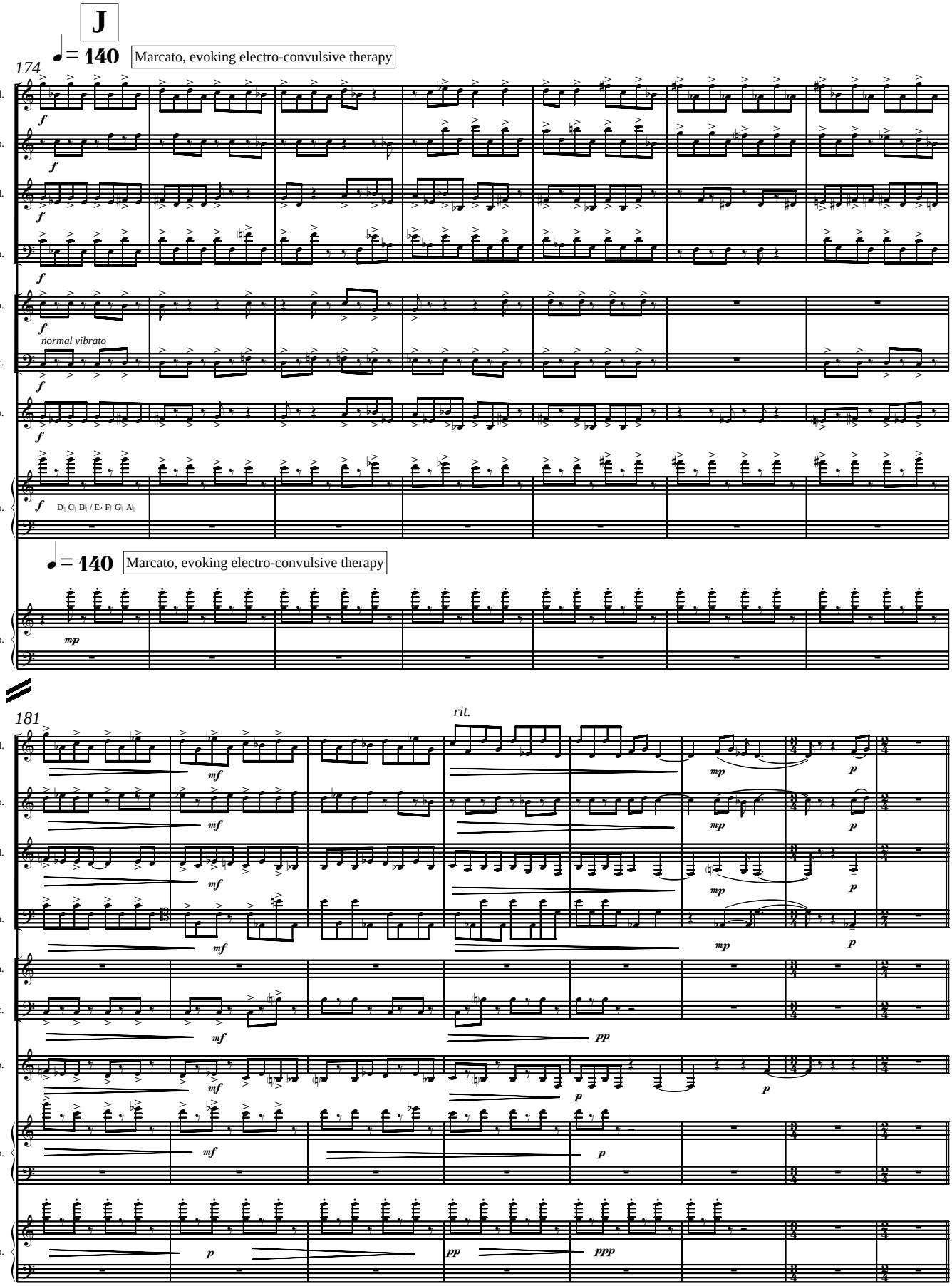

E
Innocent and Playful
51
♩= 105
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
main melody
mp
mf
p
f
pp
D♭ C♭ B♭ / E♭ F♭ G♭ A♭
F
♩= 85
Subtle
61
(♩= 80)
meno mosso
ppp
espressivo cantabile
pizz. e moltissimo vibrato
senza vibrato / subtle

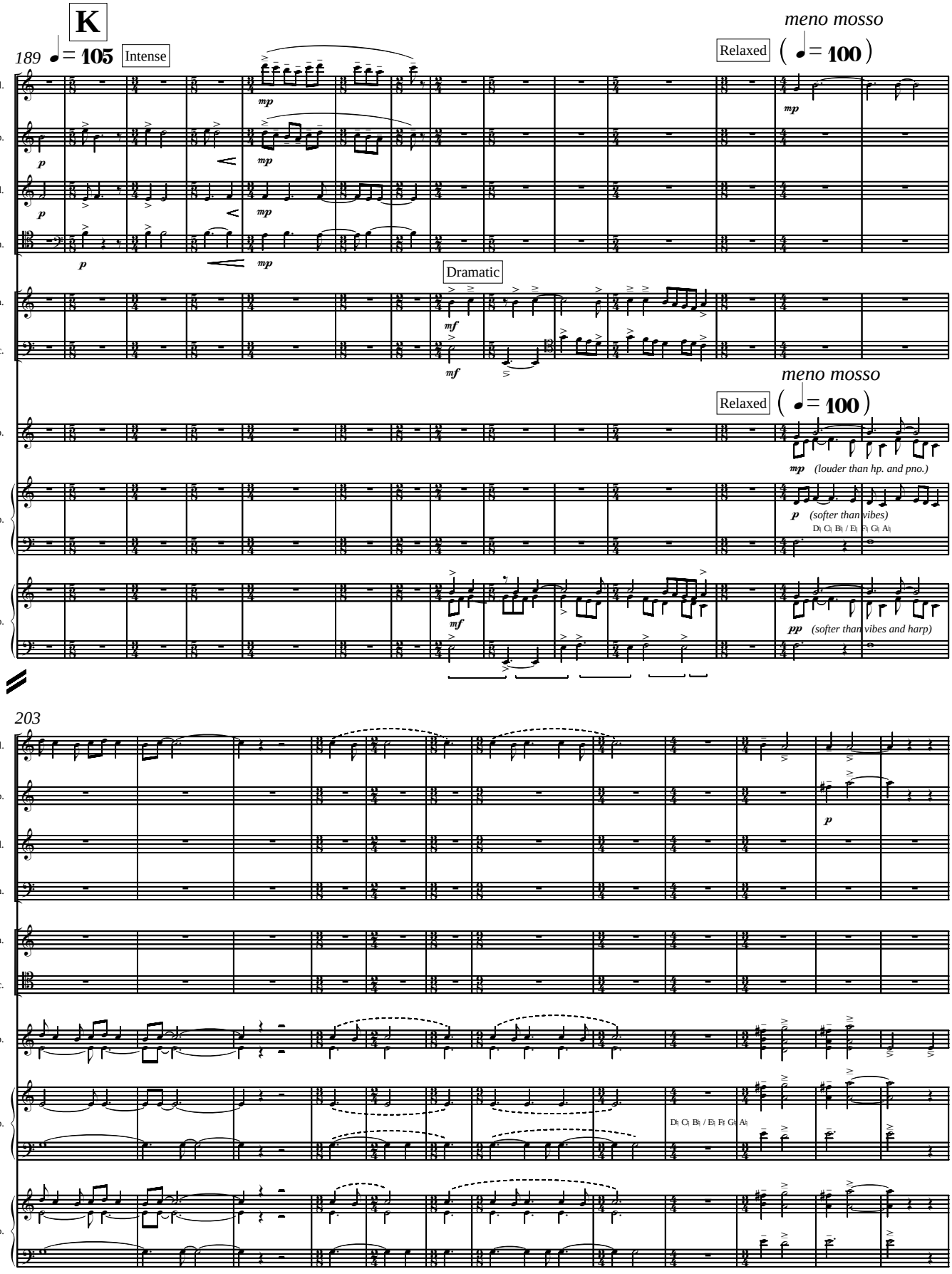

G
73
accelerando poco a poco
(= 80 → 95)
= 95
Sweet
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
cantabile
trying to match the dynamic of the oboe
main melody
trying to match the dynamic of the flute
82
flautando
arco
molto vibrato
senza vibrato

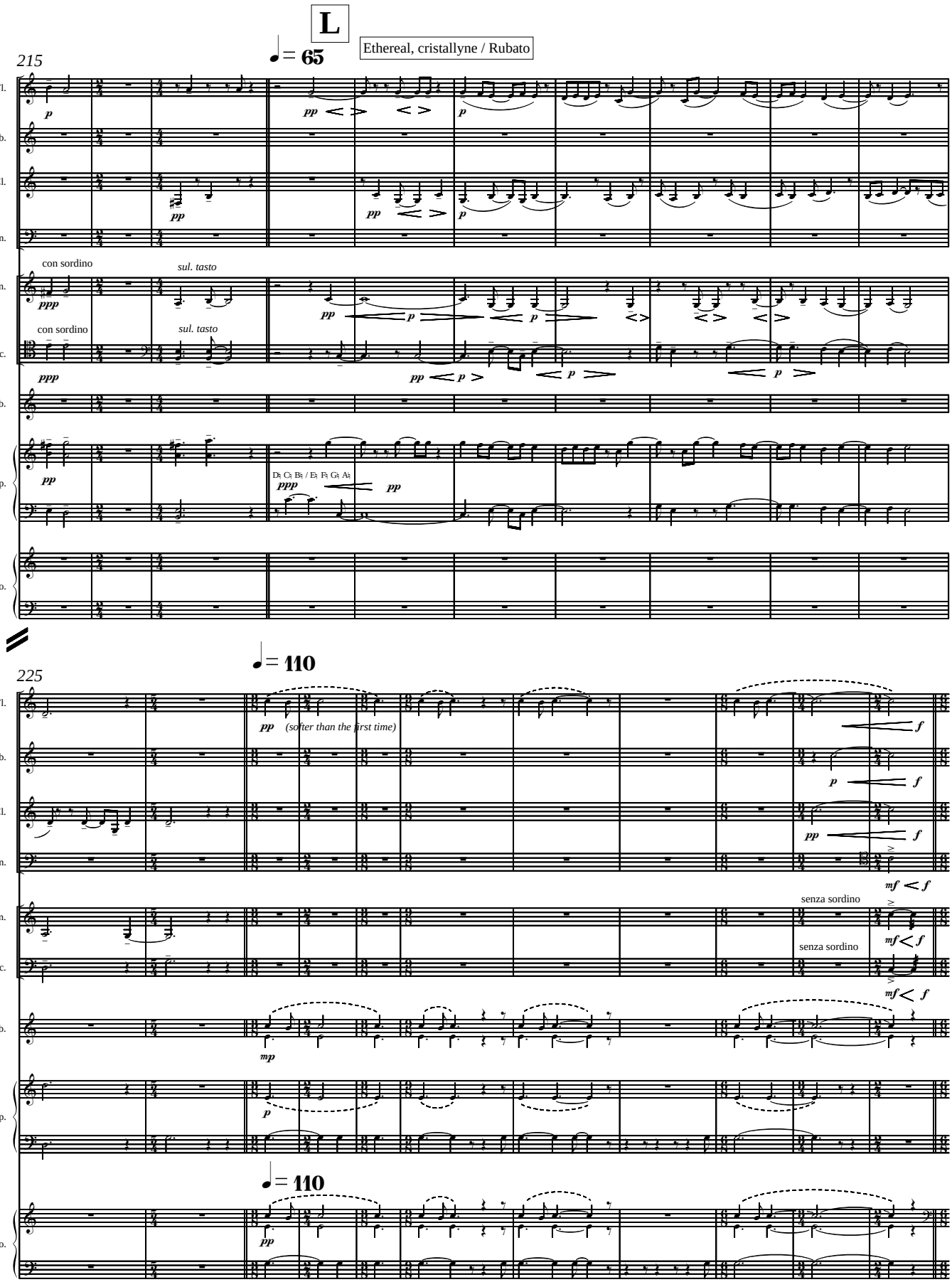

H
94
♩= 150
Sweet
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
normal vibrato
molto vibrato
♩= 150
Lusty
Lusty
105
Sweet
normal vibrato
molto vibrato
Lusty

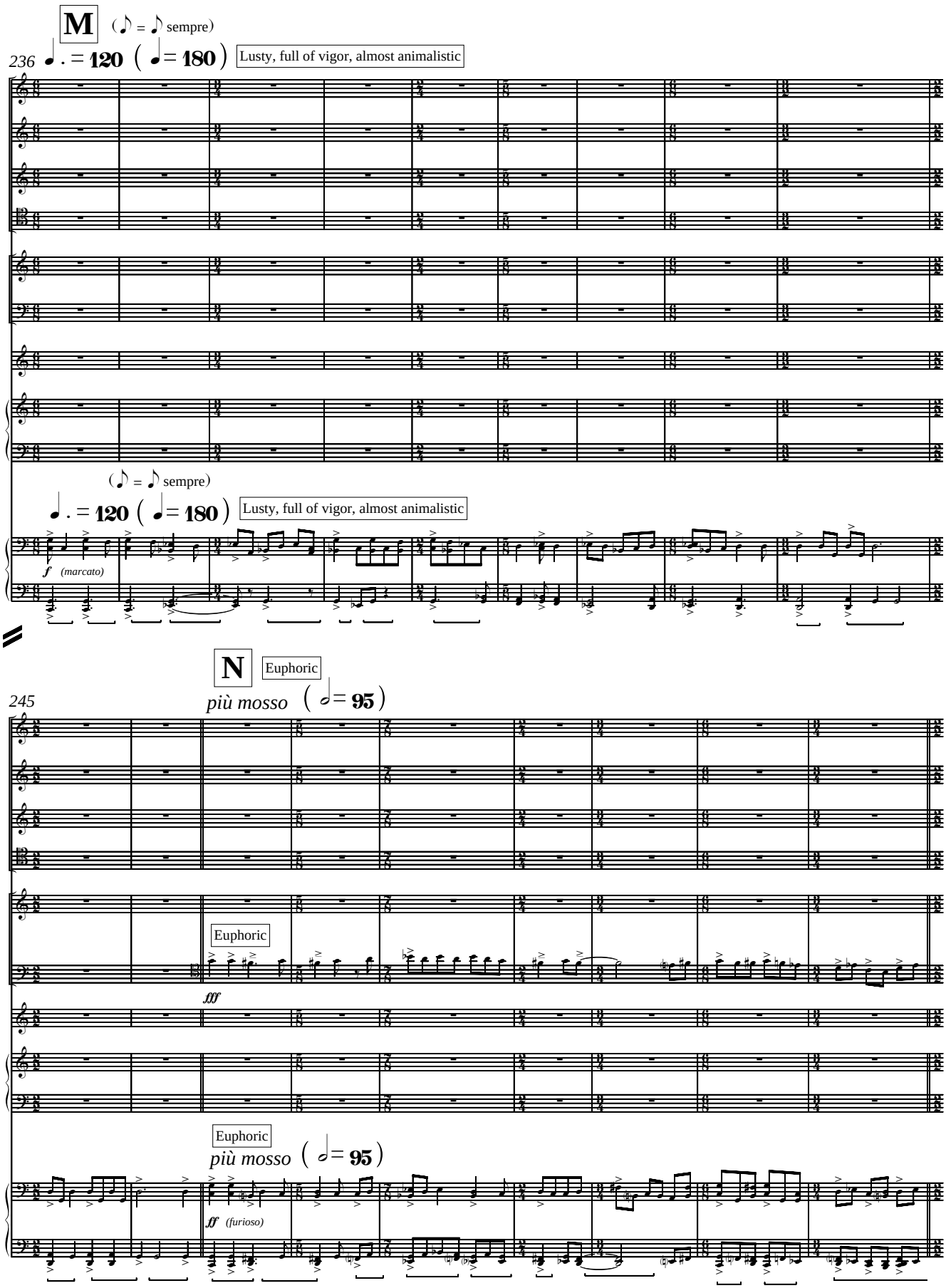

117
Sweet
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
molto vibrato
Lusty
130
Sweet
normal vibrato
molto vibrato

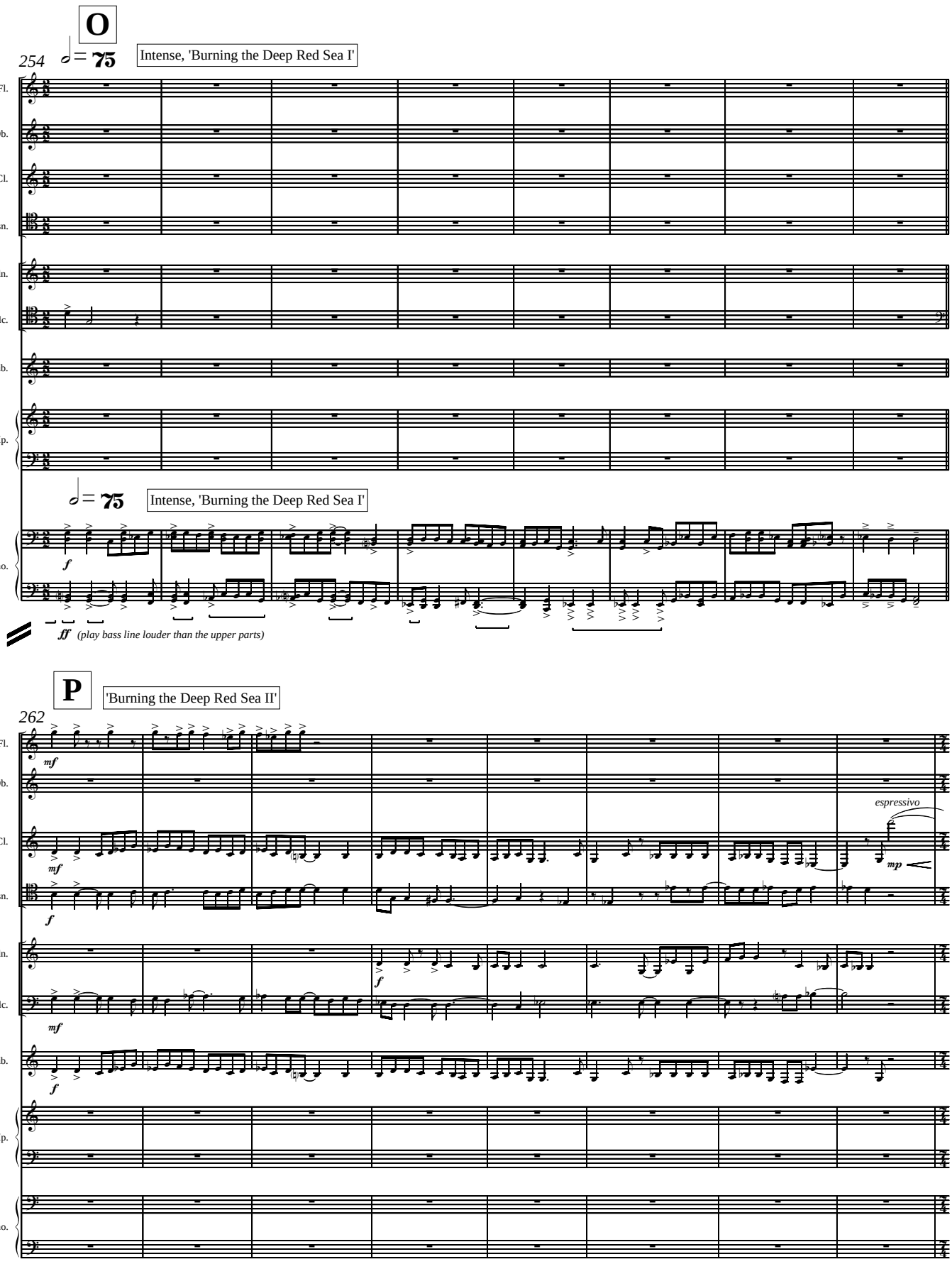

144
più mosso
♩= 170
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
senza vibrato
I
159
♩= 105
Sweet
Sweet, poetic
(attacca)
Unstable
molto vibrato, cantabile
Lusty
(echo)

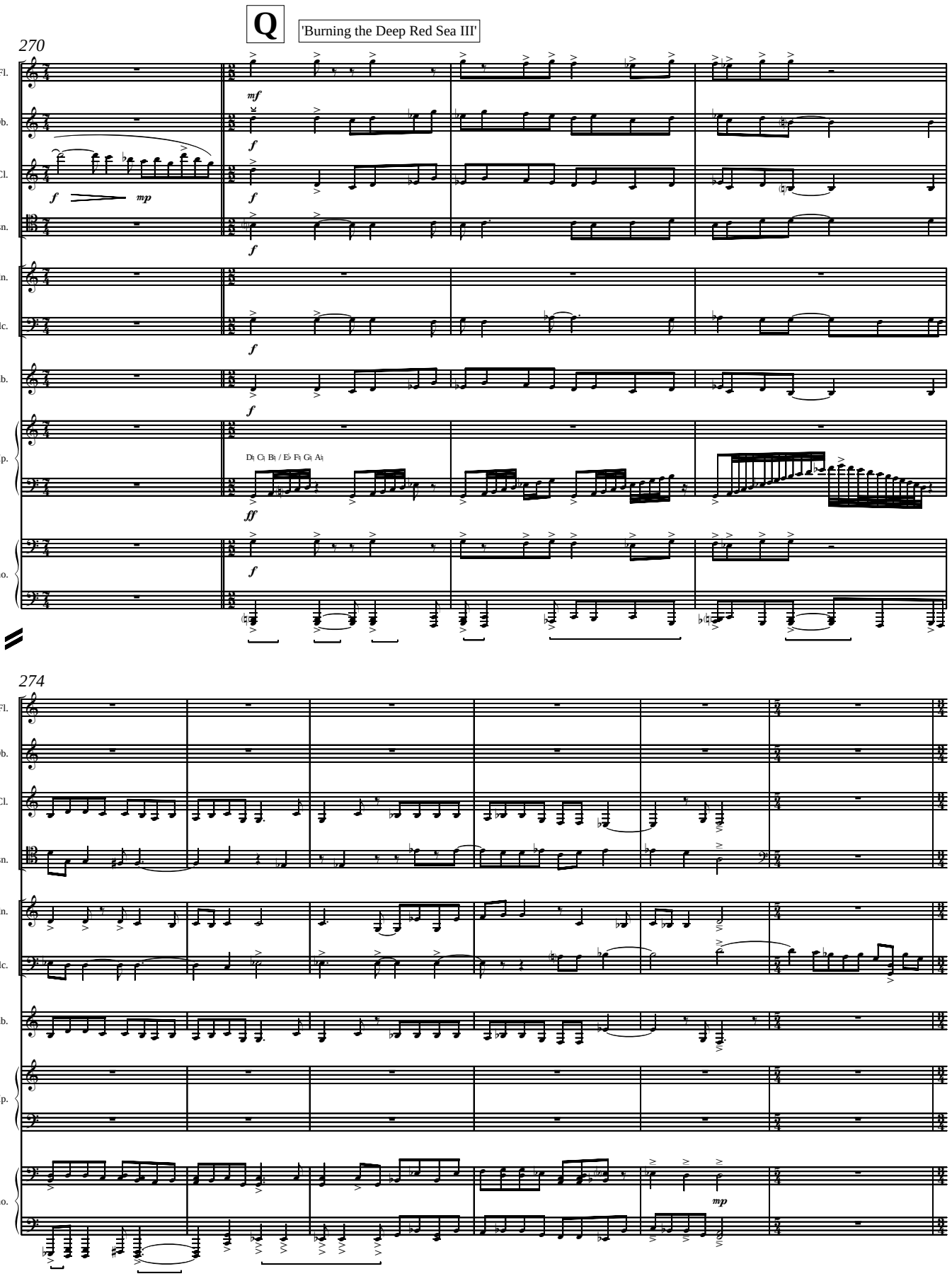

J
♩= 140
Marcato, evoking electro-convulsive therapy
174
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
normal vibrato
D♮ C♮ B♮ / E♭ F♮ G♮ A♮
♩= 140
Marcato, evoking electro-convulsive therapy
181
rit.

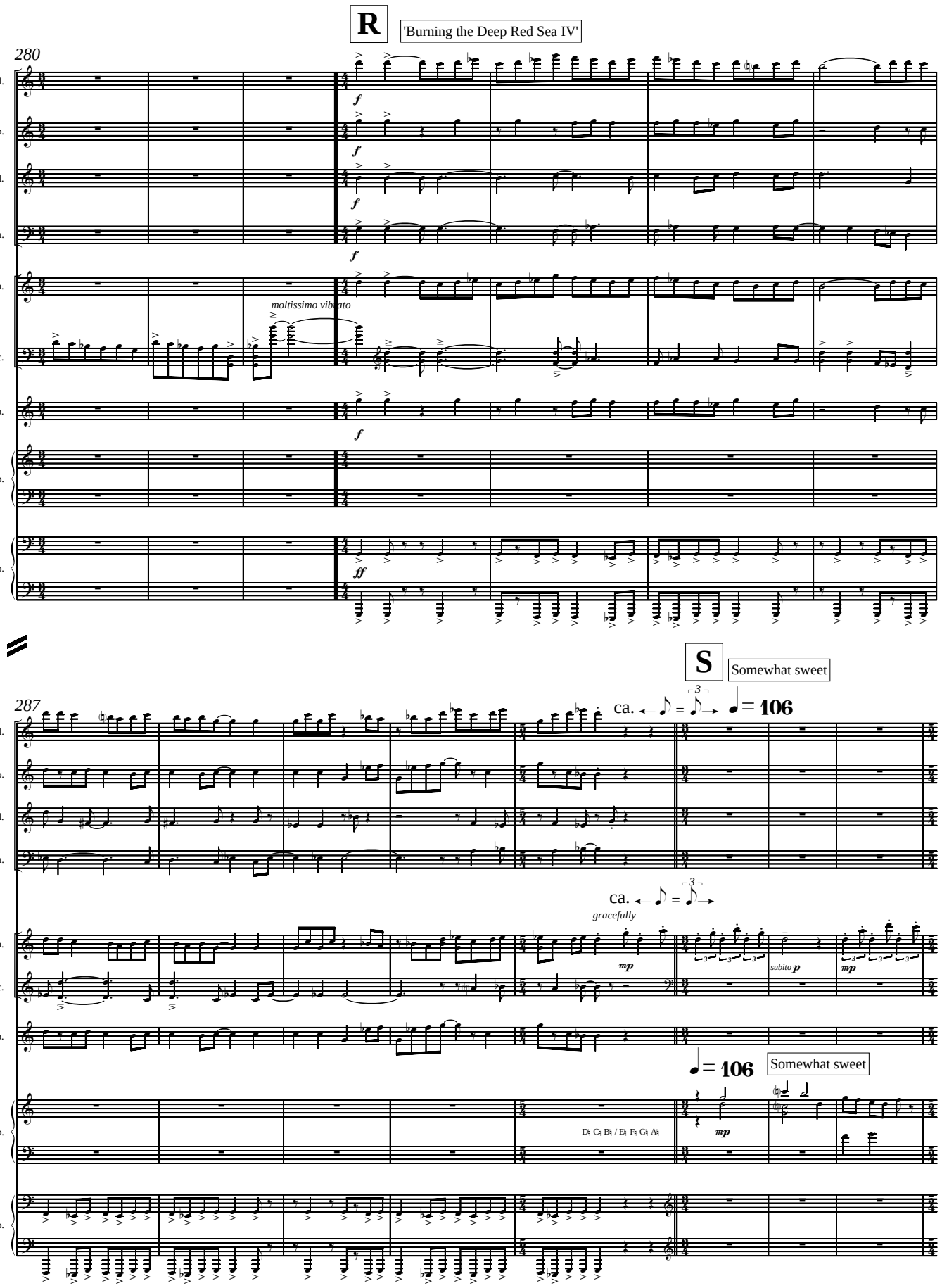

K
189
♩= 105
Intense
meno mosso
Relaxed
♩= 100
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
Dramatic
mp
mf
p
(louder than hp. and pno.)
(softer than vibes)
(softer than vibes and harp)
203

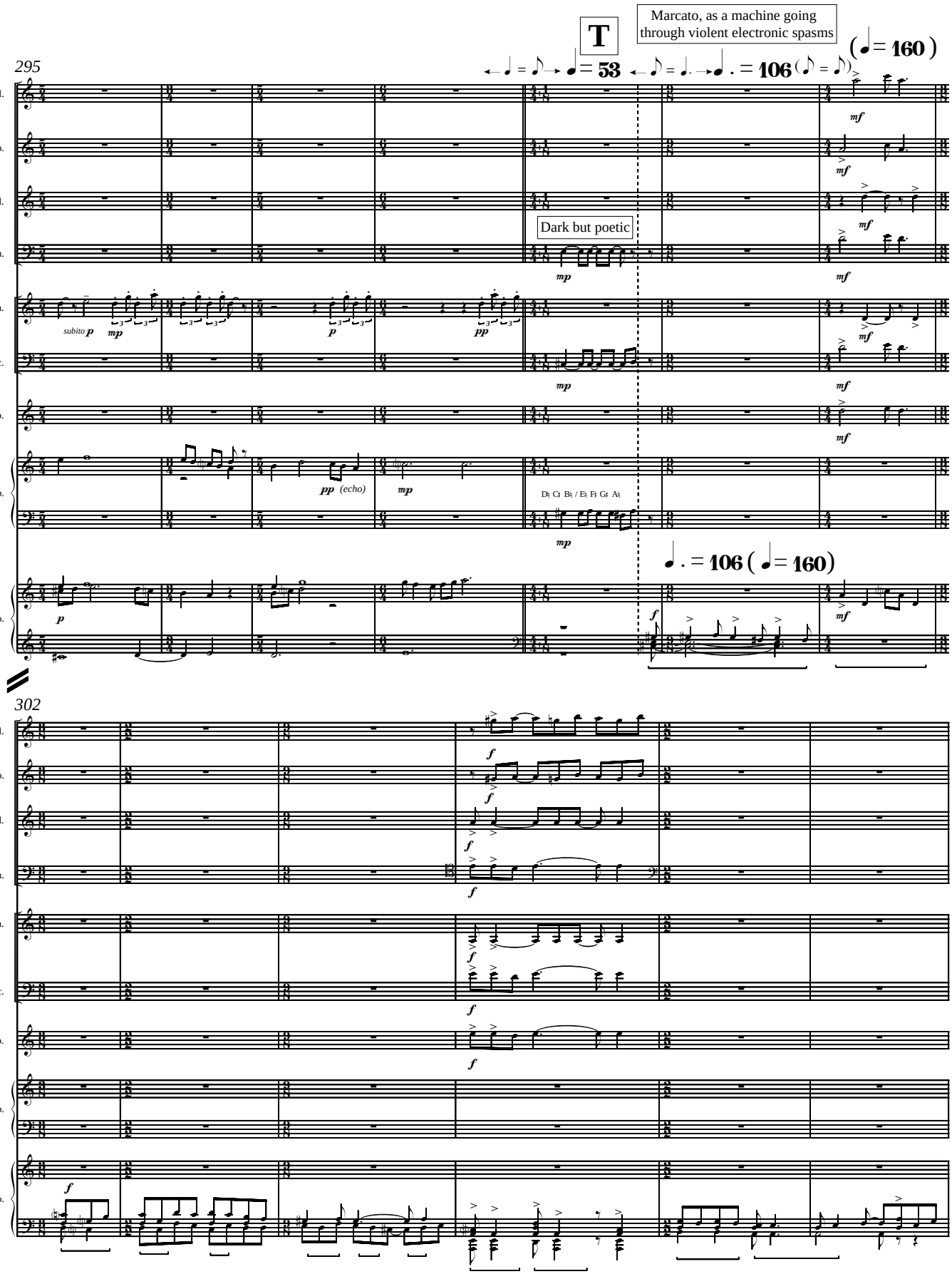

L
215
♩= 65
Ethereal, cristallyne / Rubato
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
con sordino
sul. tasto
con sordino
sul. tasto
D♭ C♭ B♭ / E♭ F♭ G♭ A♭
225
♩= 110
(softer than the first time)
senza sordino
senza sordino
♩= 110

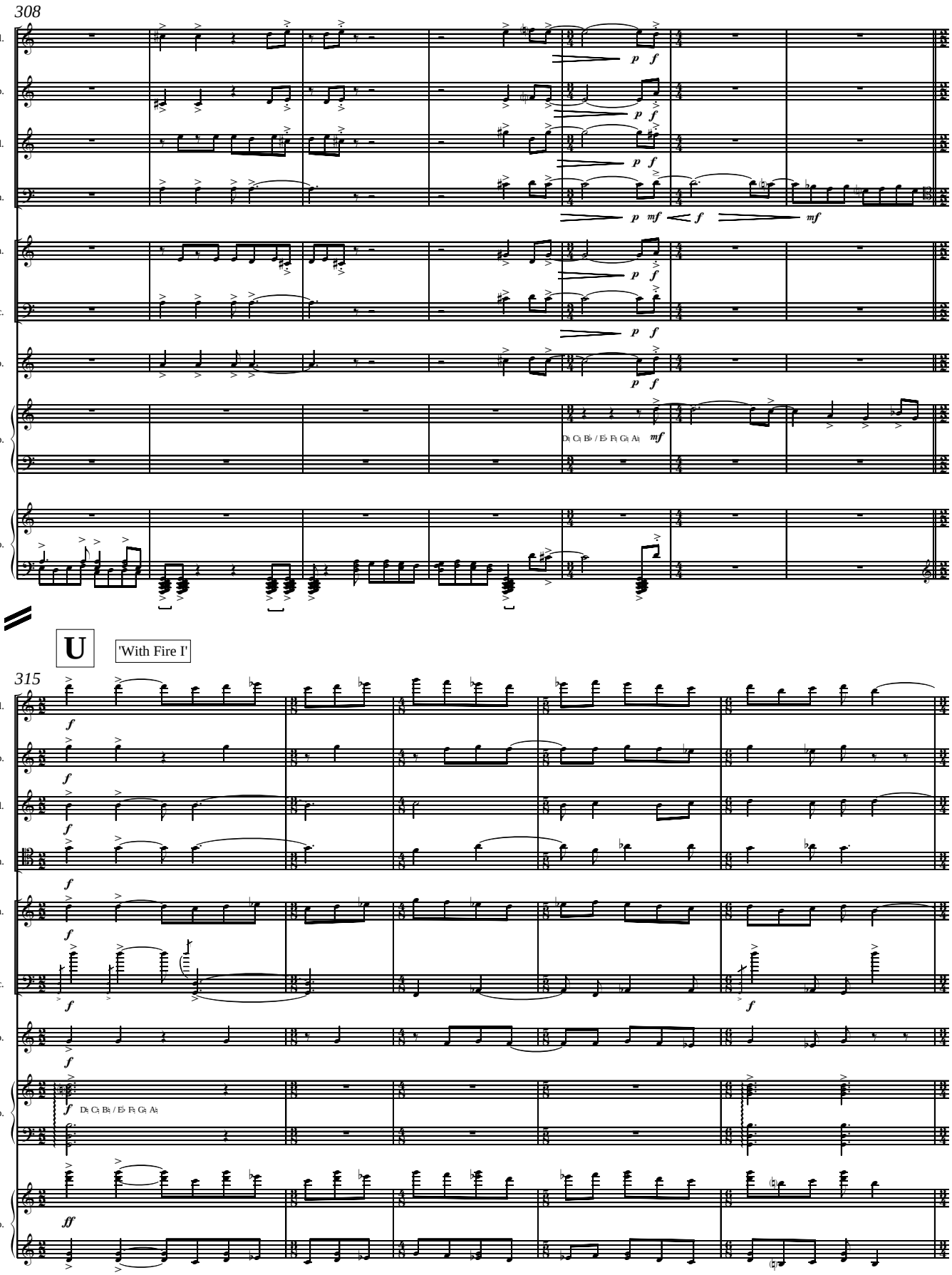

M
(♪ = ♪ sempre)
236
♩. = 120 (♩ = 180)
Lusty, full of vigor, almost animalistic
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
(♪ = ♪ sempre)
♩. = 120 (♩ = 180)
Lusty, full of vigor, almost animalistic
f (marcato)
N
Euphoric
245
più mosso (𝅗𝅥 = 95)
Euphoric
fff
Euphoric
più mosso (𝅗𝅥 = 95)
ff (furioso)

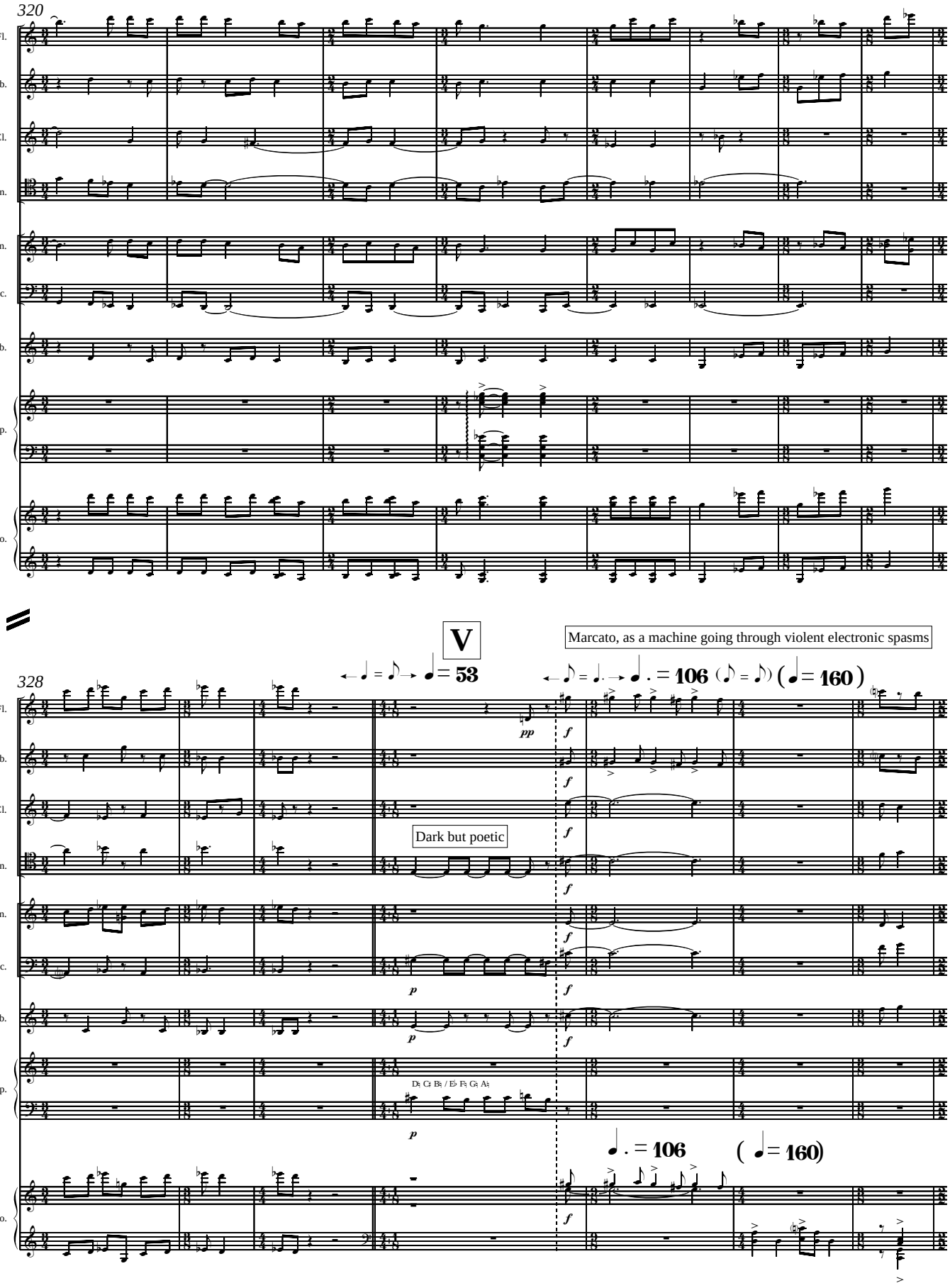

O
254
♩= 75
Intense, 'Burning the Deep Red Sea I'
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
♩= 75
Intense, 'Burning the Deep Red Sea I'
Pno.
f
ff (play bass line louder than the upper parts)
P
'Burning the Deep Red Sea II'
262
mf
f
espressivo
mp

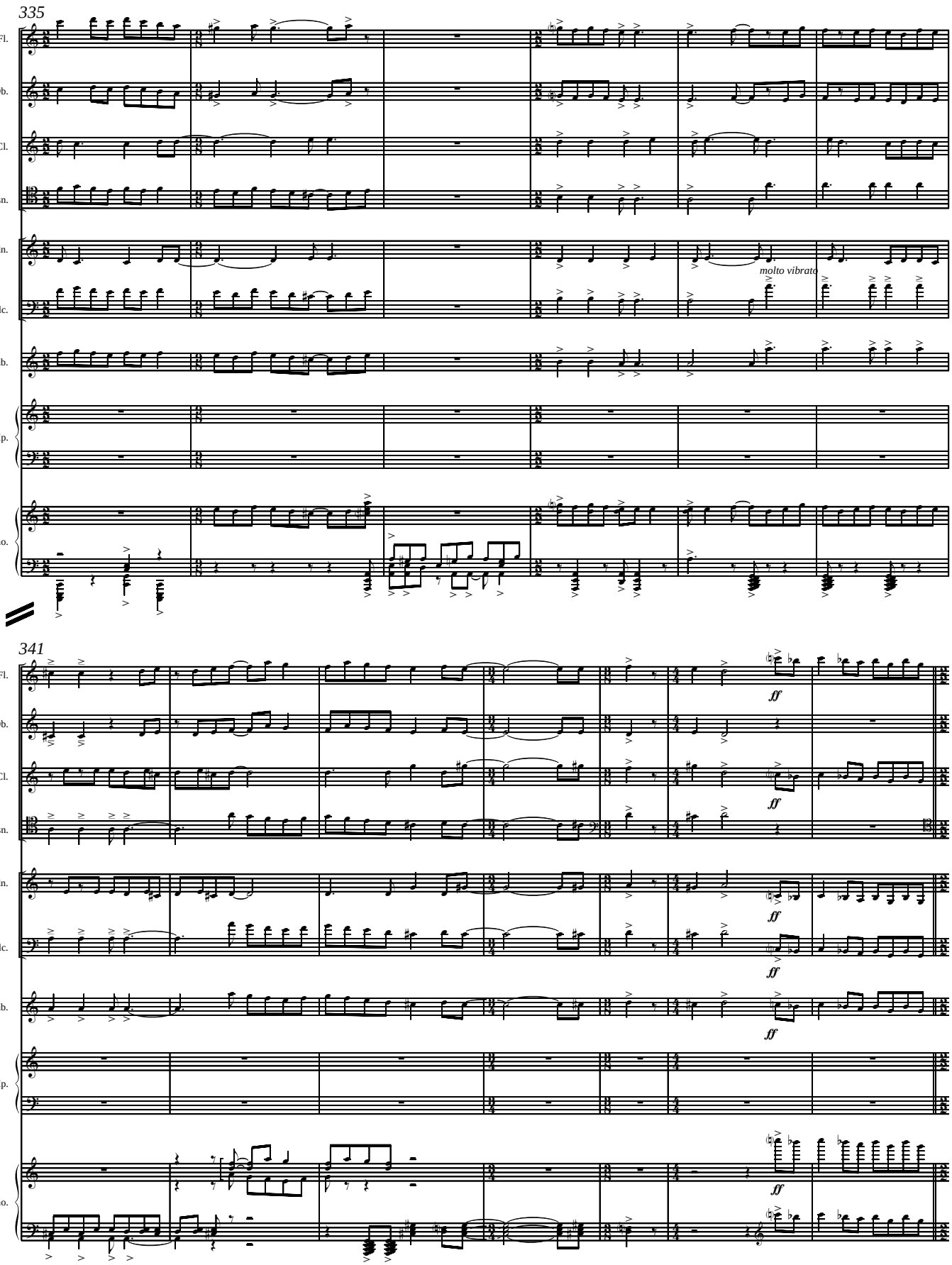

Q
'Burning the Deep Red Sea III'
270
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
mf
f
mp
ff
274
mp

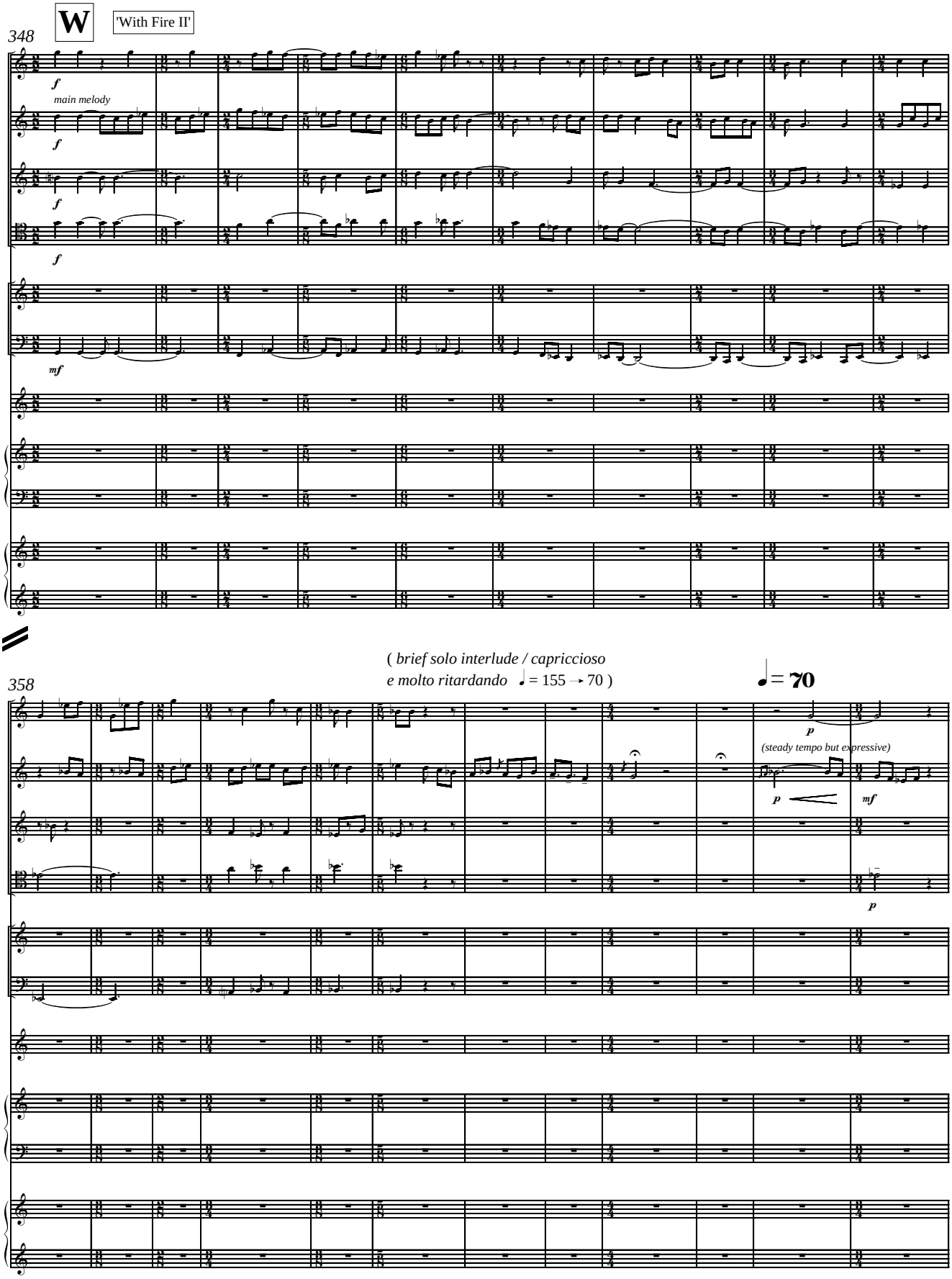

R
'Burning the Deep Red Sea IV'
280
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
moltissimo vibrato
S
Somewhat sweet
287
ca.
♩ = 106
gracefully
mp
subito p
Somewhat sweet
D♭ C♭ B♭ / E♭ F♭ G♭ A♭

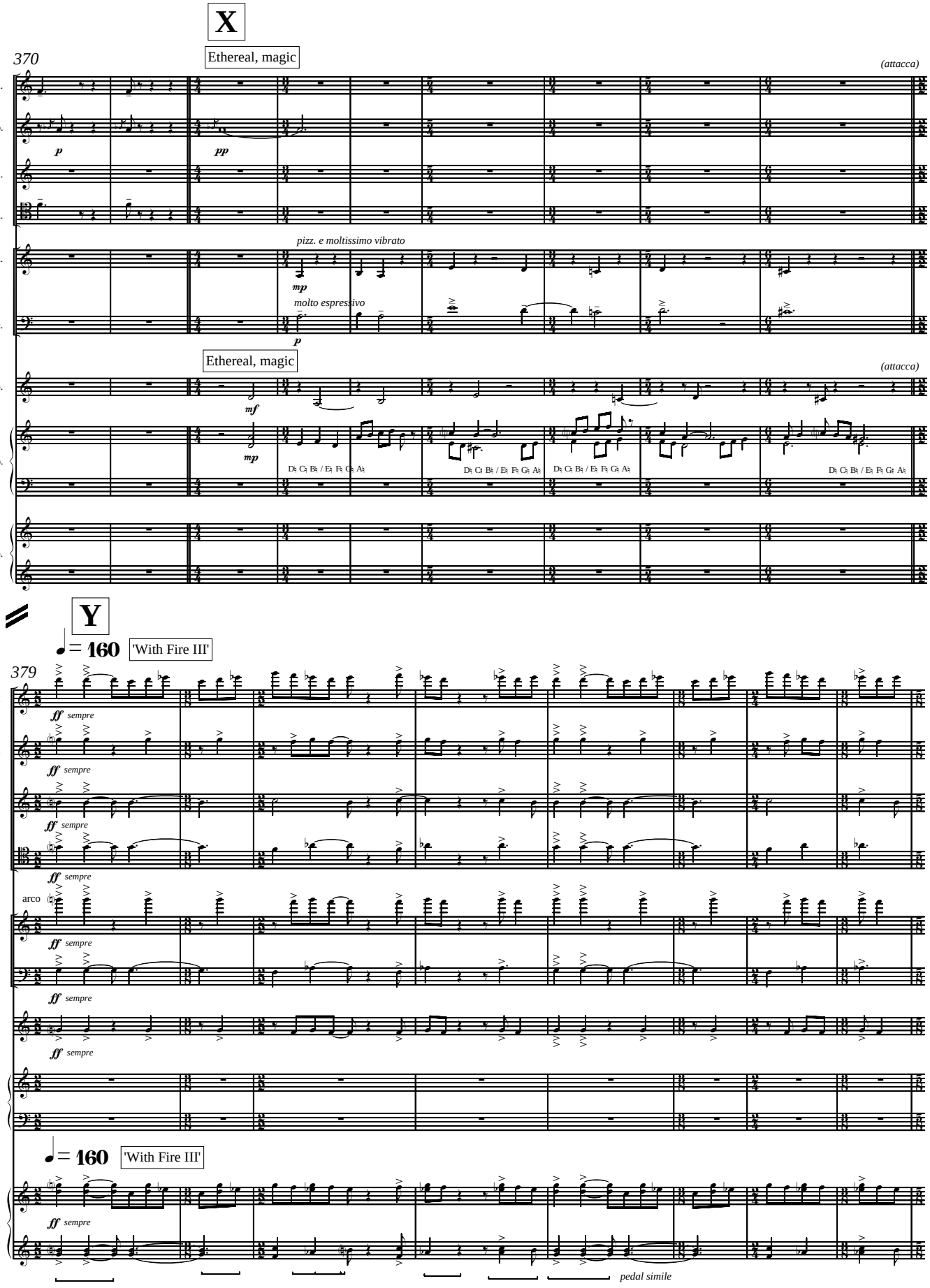

T
Marcato, as a machine going through violent electronic spasms
295
♩ = ♪ ♩ = 53
♪ = ♩. ♩ . = 106 (♪ = ♪)
(♩ = 160)
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
Dark but poetic
mf
mp
subito p
p
pp
(echo)
D♭ C♭ B♭ / E♭ F♭ G♭ A♭
♩ . = 106 (♩ = 160)
f
302

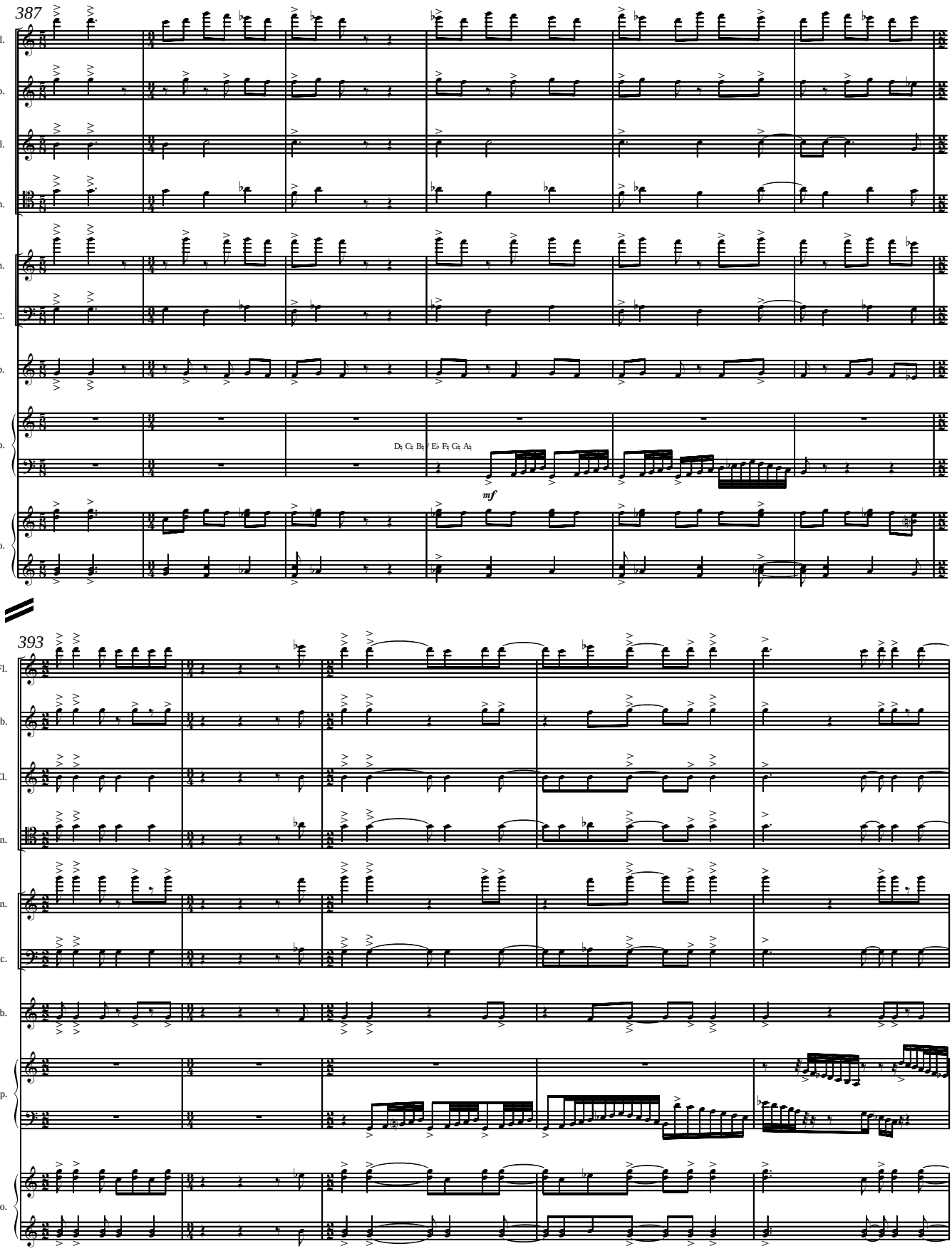

308
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
p f
p mf f mf
D♮ C♮ B♭ / E♭ F♮ G♮ A♮
mf
U
'With Fire I'
315
f
D♮ C♮ B♮ / E♭ F♮ G♮ A♮
ff

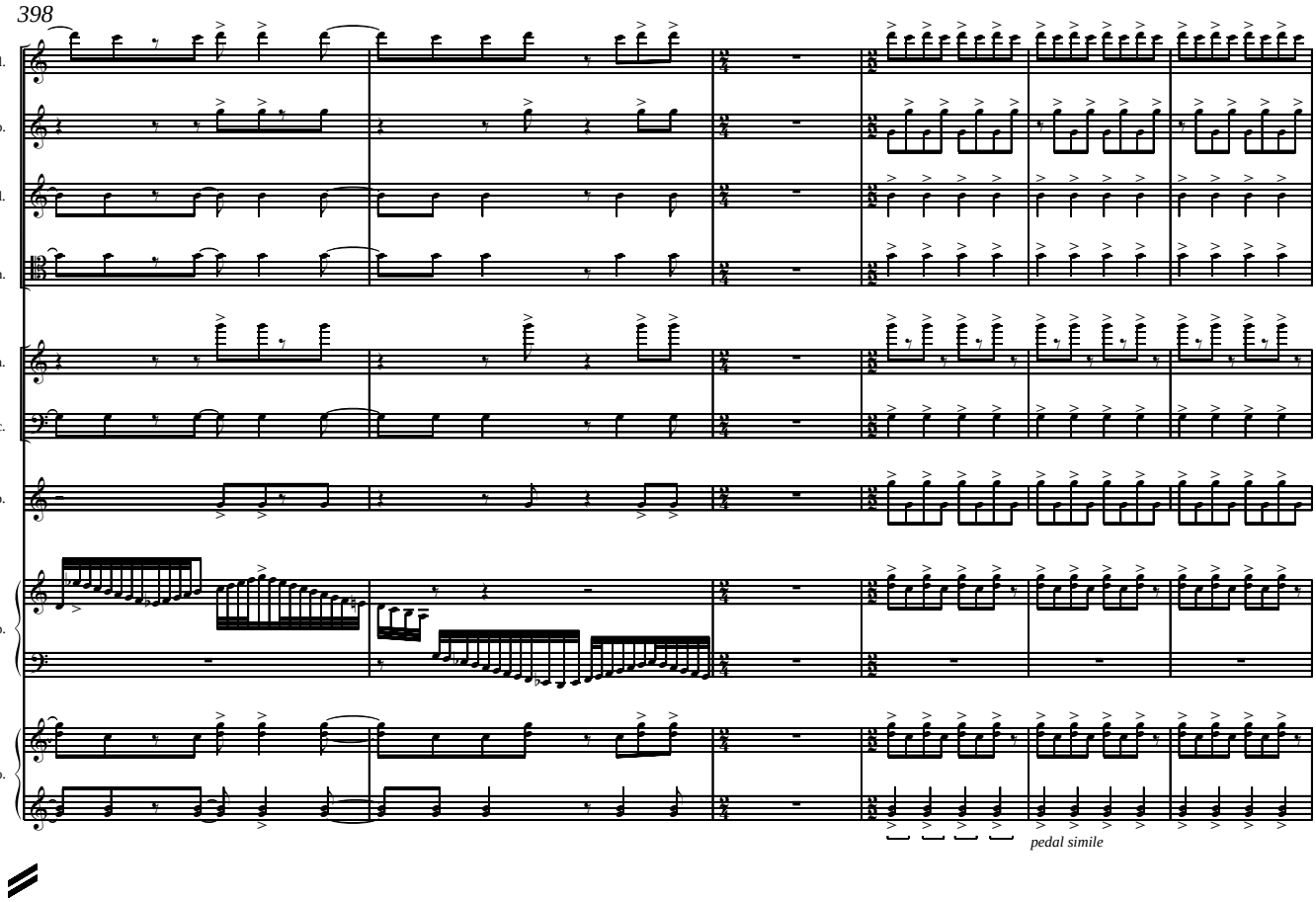

320
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
V
Marcato, as a machine going through violent electronic spasms
328
♩ = ♪ → ♩ = 53
♪ = ♩. → ♩. = 106 (♪ = ♪) (♩ = 160)
pp
f
Dark but poetic
p
D♭ C♭ B♭ / E♭ F♭ G♭ A♭
♩. = 106 (♩ = 160)

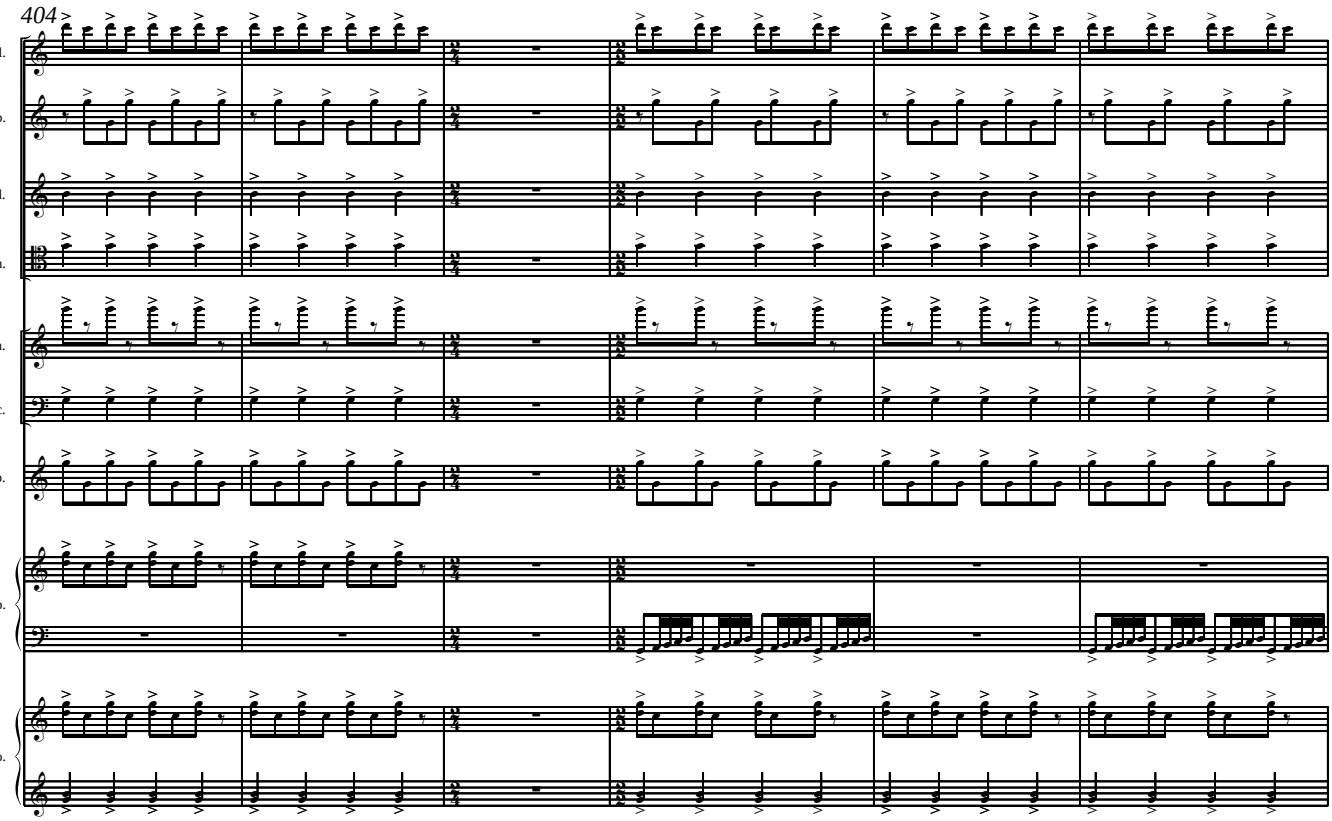

335
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
molto vibrato
Vib.
Hp.
Pno.
341
ff

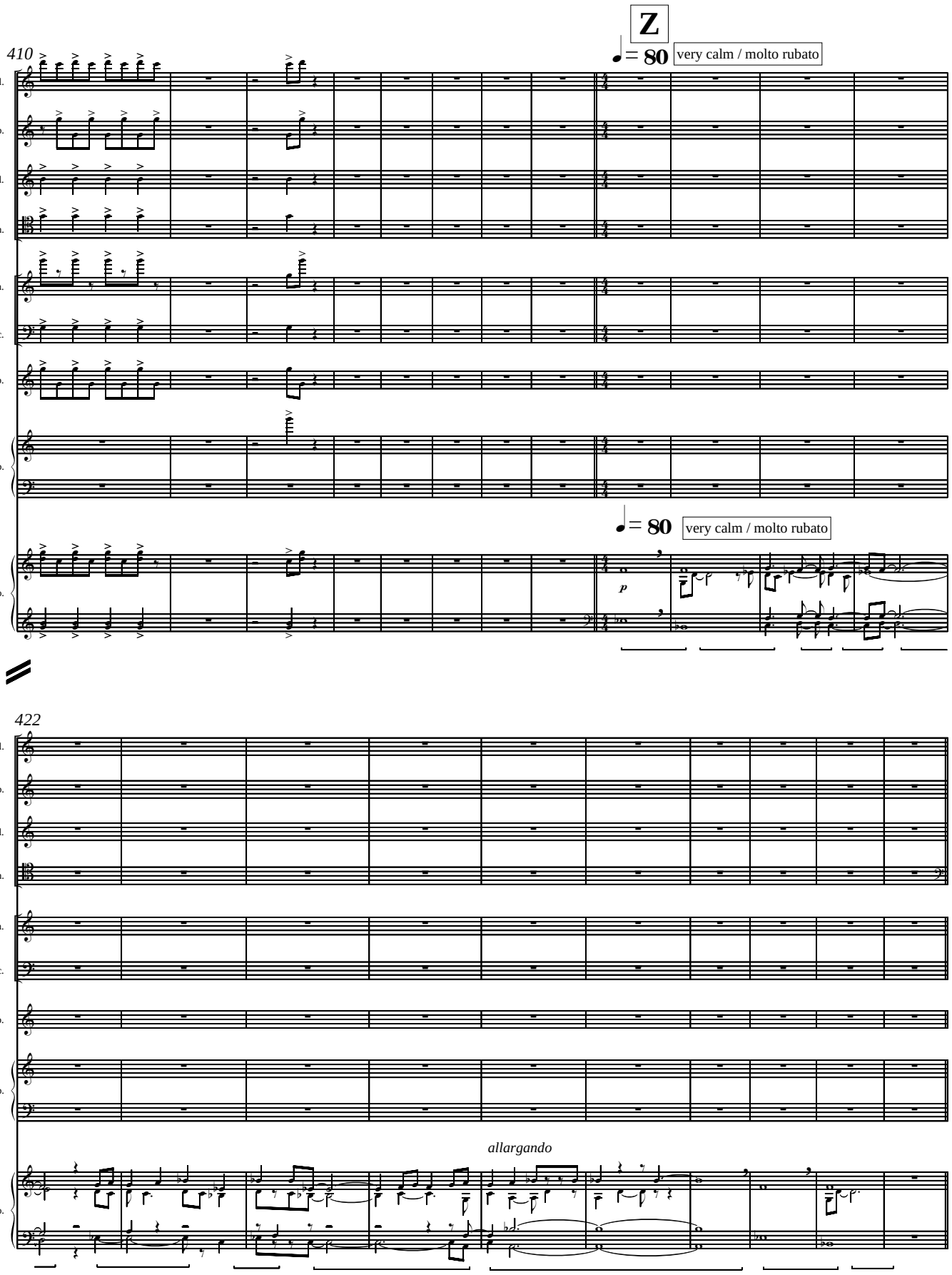

W
'With Fire II'
348
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
f
main melody
mf
(brief solo interlude / capriccioso
e molto ritardando ♩ = 155 → 70)
358
♩ = 70
p
(steady tempo but expressive)
mf

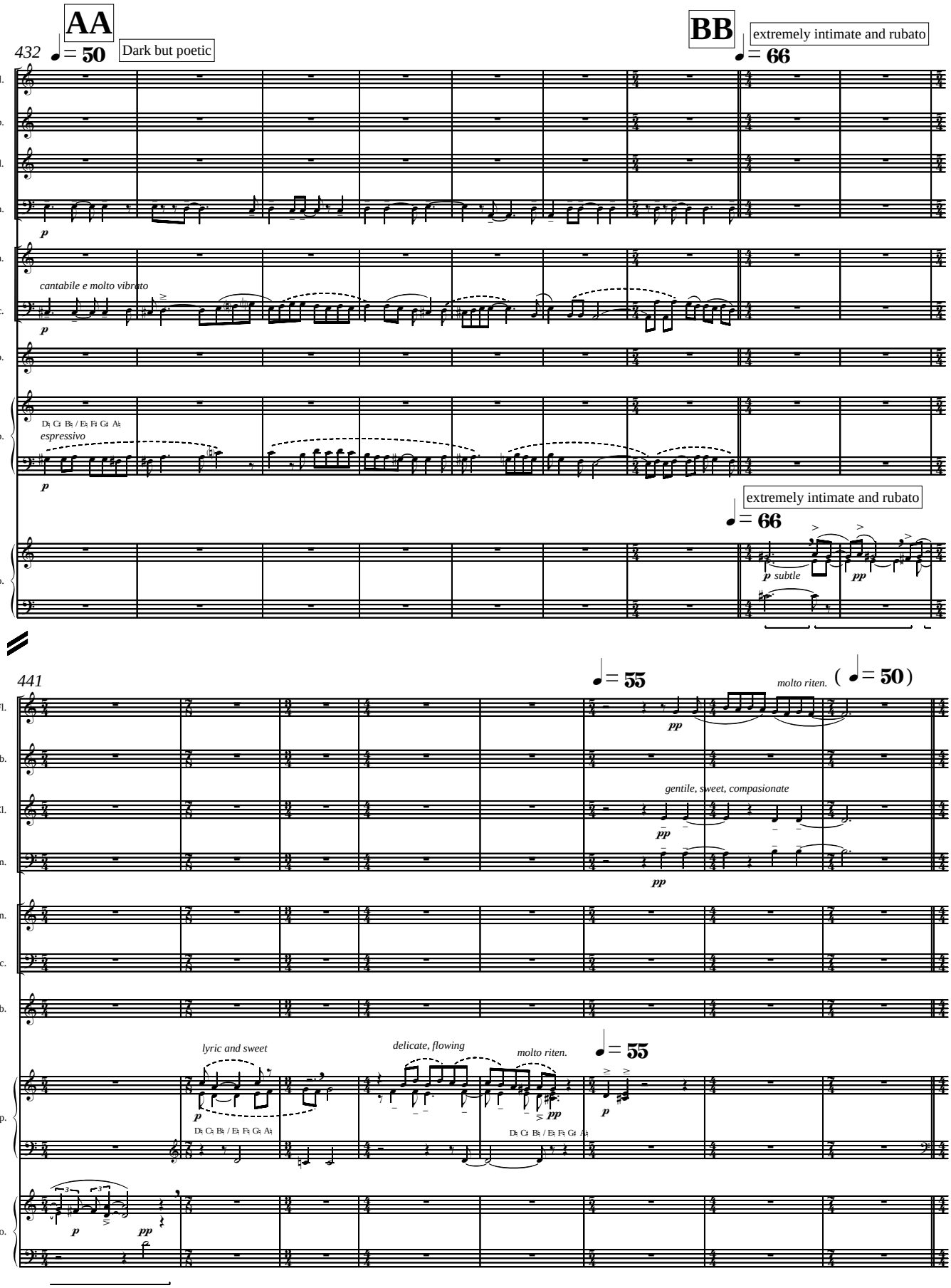

X
370
Ethereal, magic
(attacca)
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
pizz. e moltissimo vibrato
molto espressivo
Ethereal, magic
(attacca)
Vib.
Hp.
Pno.
Y
♩= 160
'With Fire III'
379
sempre
arco
♩= 160
'With Fire III'
pedal simile


387
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
D♮ C♮ B♮ E♭ F♮ G♮ A♮
mf
393
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.


398
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
pedal simile

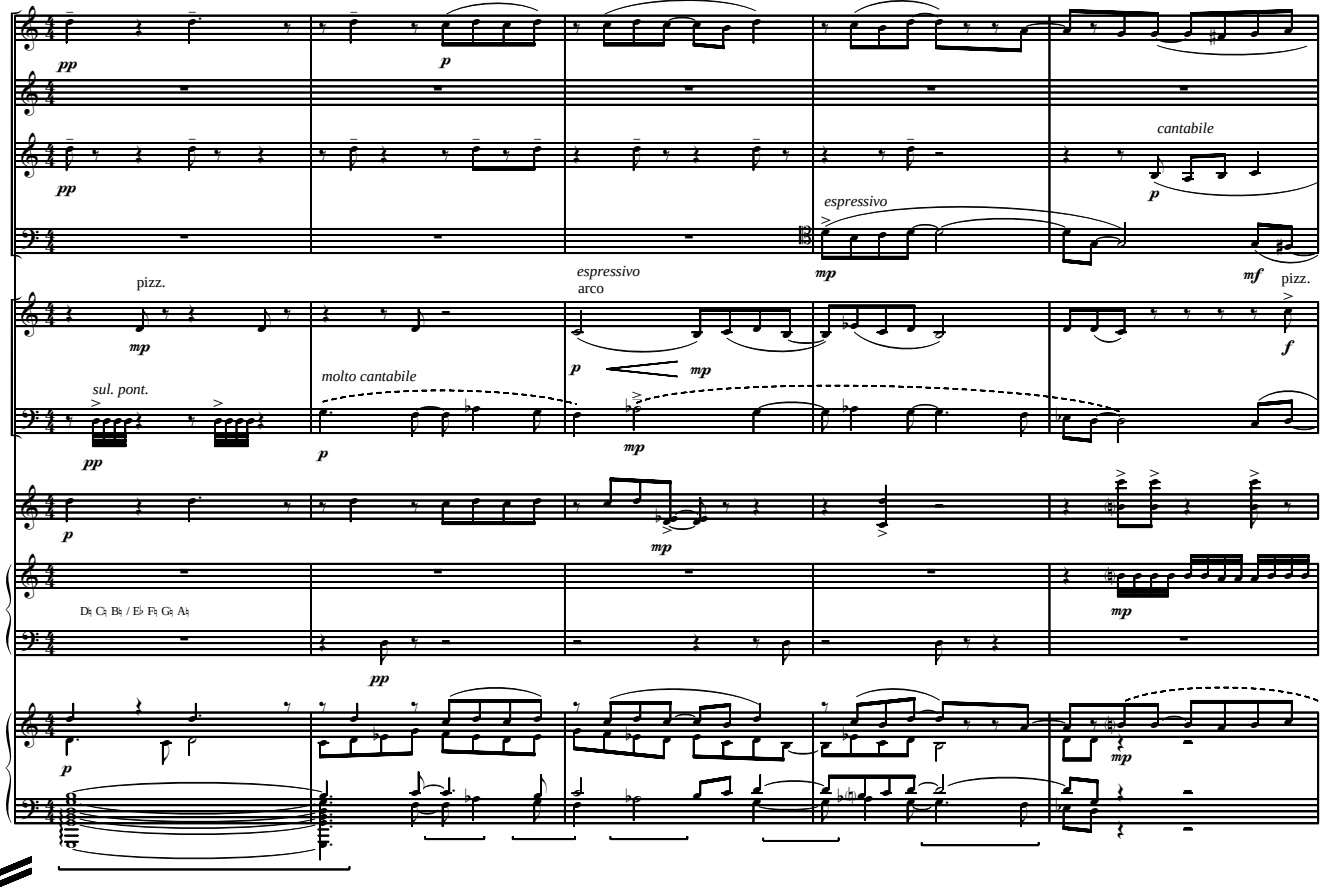

404
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.


Z
410
♩= 80
very calm / molto rubato
Fl.
Ob.
B♭ Cl.
Bsn.
Vln.
Vlc.
Vib.
Hp.
Pno.
p
422
allargando

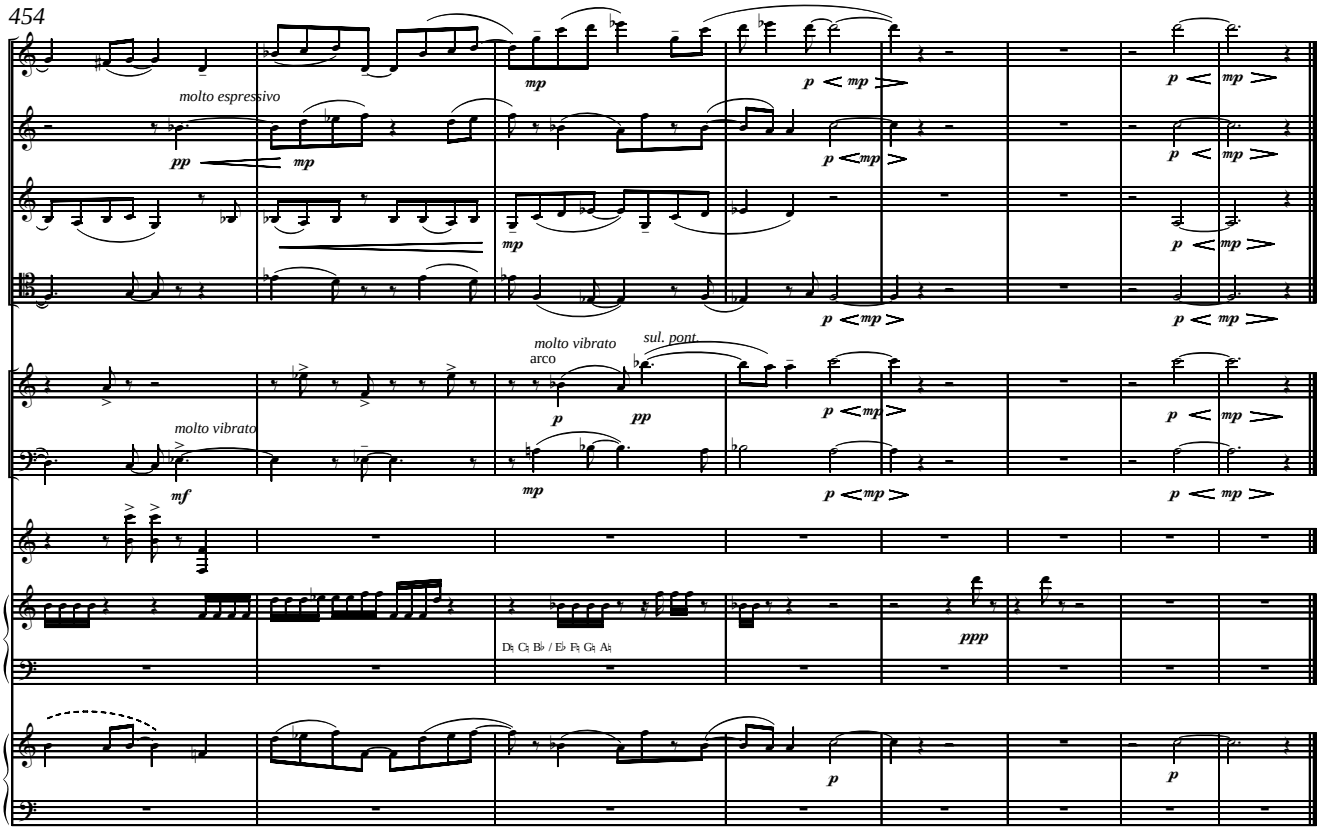

AA
BB
432
♩= 50
Dark but poetic
extremely intimate and rubato
♩= 66
Fl.
Ob.
B♭ Cl.
Bsn.
p
Vln.
cantabile e molto vibrato
Vlc.
p
Vib.
Hp.
D♭ C♭ B♭ / E♭ F♭ G♭ A♭
espressivo
p
extremely intimate and rubato
♩= 66
Pno.
p subtle
pp
441
♩= 55
molto riten.
(♩= 50)
Fl.
pp
Ob.
gentile, sweet, compasionate
B♭ Cl.
pp
Bsn.
pp
Vln.
Vlc.
Vib.
lyric and sweet
delicate, flowing
molto riten.
♩= 55
Hp.
p
D♭ C♭ B♭ / E♭ F♭ G♭ A♭
pp
p
D♭ C♭ B♭ / E♭ F♭ G♭ A♭
Pno.
p
pp

CC

449 ♩ = **60** Incandescent but subtle



454



Pittsburgh, January 17, 2007