Apparent Motions

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ABSTRACT

Apparent Motions is an original composition for an ensemble of fifteen musicians consisting of percussion, harp, keyboards, and stringed instruments. This dissertation is comprised of the composition as well as a written analysis of the composition. The analysis presents the most important technical features of the piece, including pitch organization, counterpoint, and motivic elaboration. Techniques are related to the overall objectives of the work, which involve the composer's personal approach to musical time. The particular treatment of time in the piece results from the coexistence of linear/developmental organization along with cyclical organization. The cyclical features intentionally interfere with the implication of progress by the linear/developmental features. The work's temporal strategy is analyzed in relation to theories regarding musical time put forward by Jonathan Kramer.[1] The primary conclusion reached is that the piece makes use of Kramer's "multiply-directed linear time."

RÉSUMÉ

La pièce *Apparent Motions* est une œuvre originale pour quinze musiciens, soit un ensemble de percussions, harpe, claviers et instruments à cordes. Cette dissertation comporte l'œuvre et une analyse écrite de cette oeuvre. L'analyse présente les éléments techniques les plus importants de la pièce, y compris l'organisation de la hauteur, le contrepoint et l'élaboration des motifs. Les techniques reposent sur les objectifs globaux de l'œuvre, qui sont liés à l'approche personnel de l'auteur en matière de temps musical. Dans cette pièce, le traitement spécifique du temps résulte de la coexistence d'une organisation linéaire / développementale avec une organisation cyclique. Les éléments cycliques causent une interférence volontaire à l'idée de progrès véhiculée par les aspects linéaires / développementaux. La stratégie temporelle de l'œuvre est analysée en fonction des théories sur le temps musical émises par Jonathan Kramer.[1] La conclusion principale concernant cette pièce et qu'elle comporte une « temps linéaire à direction multiple » (*multiply-directed linear time*) de Kramer.

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[1] Jonathan Kramer, *The Time of Music: New Meanings, New Temporalities, New Listening Strategies* (New York: Schirmer, 1988).

ACKNOWLEDGEMENTS

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My thesis supervisor, Professor Denys Bouliane, has maintained a remarkable vigilance in his guidance of my work over several years. Our discussions together had an especially siginificant influence on the development of a process for the expansion of structural harmonies, and the establishment of interruption as an important musical force early in the composition.

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CHAPTER ONE

INTRODUCTION

1.1 Description

Apparent Motions is a composition for an ensemble of fifteen musicians consisting of percussion (two performers), harp, keyboards (two performers), and ten stringed instruments. The instrumentalists are positioned in two separate groups on stage (Figure 1-1). The two groups are approximately balanced with one another: the stringed instruments are disposed symmetrically, and there is one percussionist and one keyboard player in each group. The pianist in the left group is also called upon to play celesta, while harp is unique to the right group. The primary function of the spatial separation of the two groups is to clarify certain contrapuntal features, in particular hocketing, which is used extensively. The importance of antiphony is secondary to that of hocketing. It should be noted here that the instrumentation is modeled on that of Béla Bartók's *Music for String Instruments, Percussion and Celesta* (1936), although unlike *Apparent Motions* it calls for entire sections on each of the ten string parts.[2] The instrumentation devised by Bartók offers a palette of timbres which are distinctive yet may be blended and balanced effectively. Bartók's division of the ensemble into two groups is particularly relevant to the concern with hocketing in my own work.

The duration of *Apparent Motions* is approximately eighteen minutes. The work consists of nine sections which follow one another without a break. Certain sections share

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[2] Béla Bartók, *Music for String Instruments, Percussion and Celesta* (London: Universal, 1937).

thematic or textural relationships, so that a number of sections later in the work function as continuations, developments, or variations of earlier sections.

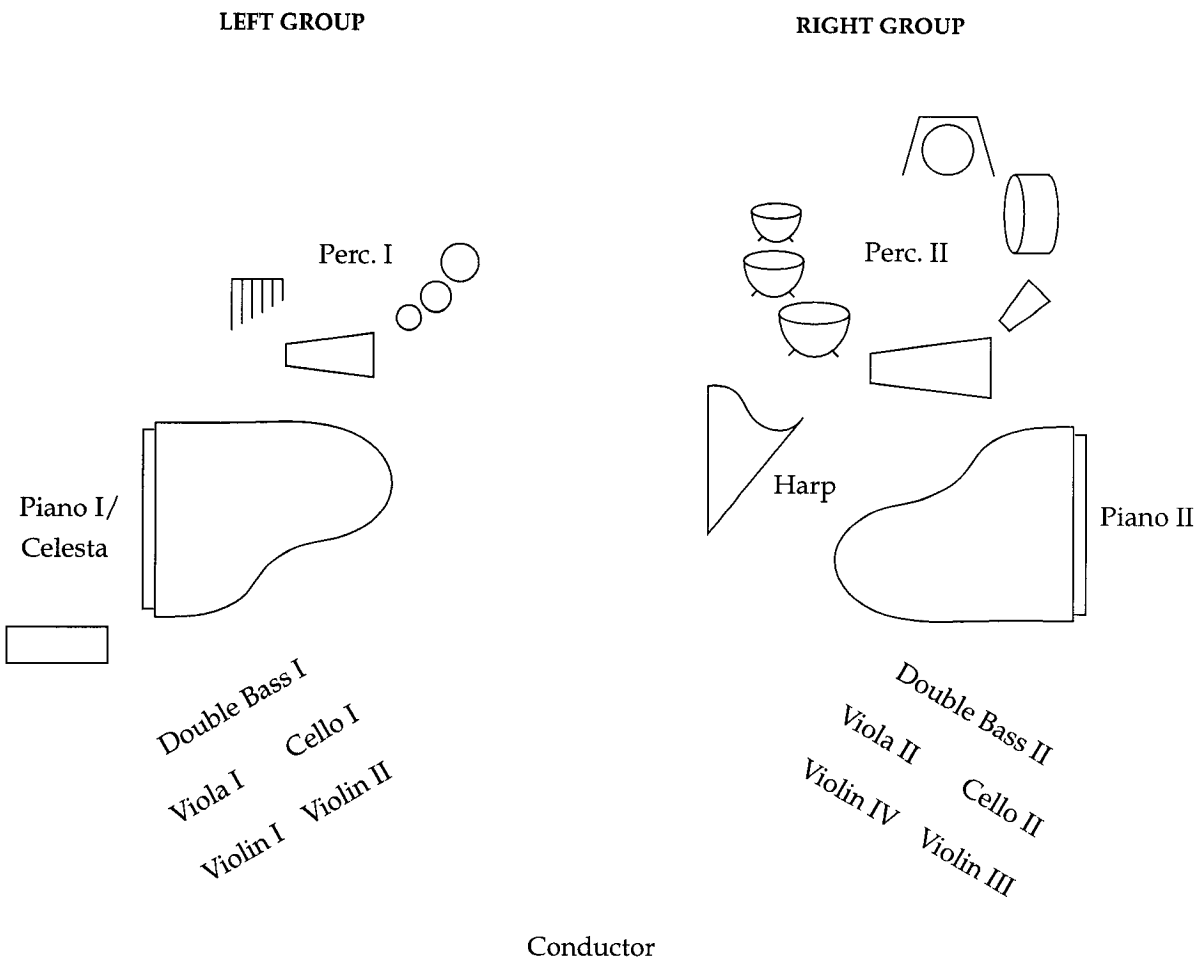

Figure 1-1. Placement of performers in *Apparent Motions*

1.2 Original Contribution

The original contribution of this work is an individual approach to musical time, as realized in the overall formal shape, localized structural details, and pitch organization. This approach is characterized by a balance between cyclical/non-developmental aspects

and linear[3]/developmental aspects. There is a tendency to uproot the development of thematic elements (such as distinctive textures or collections of motives) with the use of intervening material between thematically-related sections. Thus, transformed versions of given thematic elements are separated in time from previous presentations of related material, so that the developmental shape tends to be "terraced" rather than arched. When a transformed theme is distanced from its original, the impression of linear development brought about by the modification of the theme is tempered by the circular impression of returning to something from the past.

Pitch organization plays an important role in balancing circular and linear forces in *Apparent Motions.* Pitch collections are grouped in cycles, but the contents of these cycles gradually evolves over the course of the work, so that differing degrees of development and stasis exist at different structural levels.

1.3 Objectives

The main objective of the approach to musical time was to build a musical form which unfolds in an interesting way, but does not embrace the implication of progress, an implication which is an inherent ideal in many developmental strategies of the western concert-music tradition. Teleology is an underlying concept of particular importance to baroque and classical music. The motivation for human moral objectives in accordance with a divine source is analogous to the goal-orientation of the tonal system.

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[3] For the present section of this discussion, the generic meaning of the term "linear" will suffice, as in "linear progression" or "linear development." A more specific definition is given in section 2.1.

Developments in physics and biology from the mid-19th century to the early 20th century offered alternative explanations for phenomena previously understood only as parts of a divine plan. Composers of the twentieth century devised a variety of alternatives to organizational principles which no longer seemed compatible with new beliefs. At first, faith in divine plans was somewhat replaced by optimism regarding social progress stemming from technological development and its economic consequences. While atonal music of the early twentieth century does not rely on a single long-term harmonic goal, it often preserves short-term syntactical elements of goal-direction, such as implied motion towards cadential gestures.[4]

The desire to seek alternatives to linear organization in music is not a new objective. There are numerous ways of doing so, and I am proposing just one way. In contrast to the optimism towards social and technological progress mentioned above, my approach reflects a skeptical outlook towards humanity taking faith in itself or viewing itself without criticism. Thus, the objective of *Apparent Motions* is not to avoid goal-direction so much as it is to reject the glorification of progress, as suggested at the beginning of this section. Rejecting the glorification of progress indicates something different than avoiding a sense of progress. Indeed, *Apparent Motions* adopts an antagonistic stance towards progress, through the interaction of conflicting materials and the perceived inability of materials to develop in a satisfying way. Narrative is not avoided as it might be in an extremely static piece. Instead, the growth of material tends to be interrupted and postponed, upsetting rather than avoiding impressions of progress.

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[4] For a discussion of short-term goal-direction in early 20th-century music, see Kramer 32-40.

In the broadest sense, that in which all music presents events in time, the exaggeration of either the linear or the circular can seem artificial or contrived. In other words, one objective was to create a time-sense which was "realistic," as nature, history, and human experience tend to combine elements of repetition and change. This temporal dichotomy is no doubt a theme in much literature of the last hundred years, but one work, Gabriel García Márquez' *One Hundred Years of Solitude*[5] (1967), is particularly relevant as an analogy to the objectives of *Apparent Motions.* García Márquez seems to superimpose the finite limits of a novel on the possibility of an infinite book as suggested by Jorge Luis Borges.[6] We are told of the founding, development, and eventual destruction of a town named Macondo. Alongside the gradual changes in Macondo, we follow the story of one family, the Buendías. The circular aspect of time is particularly evident in generations of Buendías, who inherit similar names as well as similar traits from their predecessors. The linearity of the whole story is cast in doubt at the conclusion, when we learn of a prophecy which states that the town's fate was part of a pre-ordained cycle. Although *One Hundred Years of Solitude* is evidently indebted to certain ideas of Borges, the particular duality of circular and linear history is distinctive. This duality can be understood as a direct precedent to the objectives of *Apparent Motions.*[7]

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[5] Gabriel García Márquez, *One Hundred Years of Solitude,* trans. Gregory Rabassa (New York: Harper and Row, 1970).

[6] In fact, Borges suggests several possible structures for infinite books. See "The Garden of Forking Paths" in *Labyrinths, Selected Stories and Other Writings,* trans. Donald A. Yates et al (New York: New Directions Books, 1962) 25-26. Particularly relevant is the suggestion of "a Platonic, hereditary work, transmitted from father to son [...]."

[7] Beyond this, *One Hundred Years of Solitude* should not been seen as having a programmatic meaning in *Apparent Motions.* In particular, the idea of a predetermined fate, revealed at the end of *One Hundred Years of Solitude,* has no parallel in *Apparent Motions.*

The title of the work refers to ancient astronomers' study of the movement of celestial bodies through the sky. In discussing ancient astronomy it is customary to speak of these movements as "apparent motions." The ideas of orbits and the perception of large-scale movement are apt associations for the objectives described above.

CHAPTER TWO

MUSICAL TIME: DEFINITIONS AND MODELS

In *The Time of Music* (1988), Jonathan Kramer introduces terminology which facilitates a discussion of the relationship between music and time. A number of these terms will be used in the analysis of *Apparent Motions.* In particular, *multiply-directed linear time* is a crucial concept. A basic terminology must first be introduced in order to explain multiply-directed linear time. This chapter is a summary of the relevant terminology proposed by Kramer. In his explanations, Kramer often makes reference to specific music literature. For the sake of brevity in the discussion below, I have created several original examples to illustrate concepts in the most straightforward way possible.

2.1 Linearity and Nonlinearity

Linearity is "...the determination of some characteristic(s) of music in accordance with implications that arise from earlier events of the piece." Nonlinearity is "...the determination of some characteristic(s) of music in accordance with implications that arise from principles or tendencies governing an entire piece or section."[8] Both linearity and nonlinearity relate to the expectations of the listener. In linear time, one's expectations are constantly changing as the music unfolds: in tonal music, for instance, every new pitch is heard in relation to prior expectations and in turn influences our expectations for what will follow. In nonlinear time, our expectations are unchanging.

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[8] Kramer, 20.

After spending a short time listening to a piece whose pitches had been chosen entirely at random, we would cease to develop expectations about upcoming pitches.

2.2 Combinations of Linearity and Nonlinearity: Basic Principles

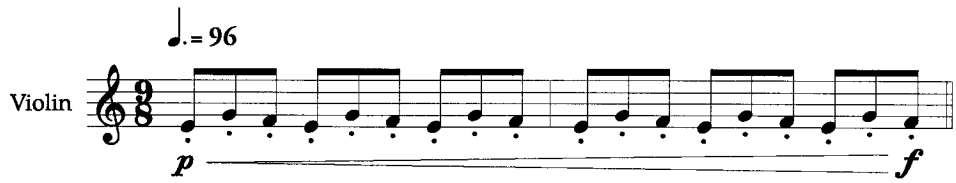

Figure 2-1. A short gesture in linear time

Although linearity and nonlinearity may be quite clear as concepts, the task of applying these concepts to music analysis proves quite complicated. As Kramer points out, "Virtually all music uses a mixture of linearity and nonlinearity."[9] The possible ways of combining linear and nonlinear elements in creative applications are numerous, as are the possibilities for resulting effects. Indeed, a distinctive combination of linear and nonlinear elements is a crucial factor in the temporal effect of most music. Even a simple musical gesture such as Figure 2-1 combines linearity and nonlinearity. The repetition of pitch and duration are nonlinear elements, unchanging throughout the passage, while the crescendo is a linear element. It should not be concluded, however, that the nonlinear components weaken or obscure the linearity of this passage. In fact, the nonlinearity of pitch and rhythm in this case provide a background which helps to set in relief the linearity of the progression in dynamics: linearity is placed on the surface. As a

[9] Kramer, 20.

consequence, a listener familiar with the developmental cues of western musical language would hear the passage in linear time.

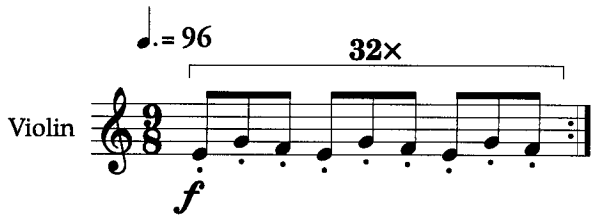

Figure 2-2. Nonlinear use of ostinato

Figure 2-2 is an instance of nonlinear time. The comparison of Figure 2-1 to Figure 2-2 demonstrates that a compositional technique cannot be categorically equated with a linear or a nonlinear result. The ostinato, itself a nonlinear element, is combined with a linear element (the gradual crescendo) in Figure 2-1, and its nonlinearity is subordinated in our listening, the result being an event whose time is predominantly linear. In Figure 2-2, the ostinato is not combined with any linear factor, and a listener would eventually shed expectations of linear development. This comparison shows us something basic but very important about techniques used in combination: *a single technique does not determine the linearity or nonlinearity of a musical event.*[10]

Figure 2-1 is a somewhat artificial example in that its duration, about four seconds, would not normally constitute a piece of music or even a self-contained section of a piece. If we imagine, then, just a few ways of treating Figure 2-1 as an event incorporated into a larger piece, we begin to understand the complexity involved when linearity and nonlinearity are considered in complete works of music. A short piece

[10] Kramer 58-62 deals with this and other difficulties in categorizing musical time.

could consist of many ostinato events, following one another in a rhythmically coherent way, outlining tonal harmonic progressions, and continuously shaped with smooth transitions from soft to loud and from loud to soft dynamics. Such a piece essentially combines linear passages (ostinati shaped with dynamics) by means of linear construction (especially harmonic progression), and would be heard in linear time. Now let us propose a second piece: suppose the ostinato-crescendo gesture of Figure 2-1 is surrounded by a bewildering array of contrasting events, belonging to seemingly unrelated styles, and separated from each other by silences of twelve to twenty seconds. At first, listeners might attempt to project linear expectations on this music, but would eventually give up these initial expectations as it became apparent that global phenomena, namely contrasting events separated by silences, were the most predictable features of the music. This second piece would be heard in nonlinear time.[11]

A comparison of the two different pieces incorporating the same ostinato-crescendo gesture proposed above shows us something important about musical events in a larger context: *a single event does not determine the linearity or nonlinearity of a larger section or of a whole piece.* A linear gesture can be a component of a nonlinear piece, or vice versa. Thus, in determining temporal mode, one must consider the interaction between all events above the effects of individual events, as one most consider the combined effect of all technical aspects rather than simply interpreting the presence of specific techniques as indicators of temporal mode.

It is important to distinguish between the way Kramer treats music's organization and the way he treats music's perception. We may identify, rather objectively, a specific

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[11] The relationship of discontinuity to nonlinear time is discussed in Kramer 50-52.

technique as participating in either linear or nonlinear organization, and as such linearity and nonlinearity can coexist equally. But when considering their perceptual aspect, Kramer tends to rank different features in a hierarchy, referring for instance to a linear surface or a nonlinear background.[12] Thus it is generally possible to identify a single temporal mode of perception which predominates a piece when taken as a whole, despite the presence of both linear and nonlinear features.

2.3 Nonlinear Time: Specific Temporal Modes

In the above discussion, we saw that highly repetitive music as well as music with a high degree of randomness can both arrive at nonlinearity through different means. A repetitive piece of music like Figure 2-2 is a straightforward realization of nonlinear time's use of "tendencies governing an entire piece," in that it is uniform. Kramer refers to this type of uniformity, especially when carried out over extreme lengths of time, as "vertical" time.[13] A piece like the one we proposed which combined the ostinato with a barrage of seemingly unrelated material does not have a musically uniform surface, but at the highest hierarchical level of organization, it is governed by a unified set of principles: sections contrast with each other, and are separated by periods of silence. In such a case, where discontinuity (implemented here by contrast and interrupting silences) leads to nonlinear time, the result is considered "moment" time.[14] It will be shown in the

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[12] Kramer 58 (Section 2.14) is a good example of the use of hierarchical terminology. His theory does not (and perhaps could not) include a formalization of methods for ranking coexistent temporal modes.
[13] Kramer 54-57.
[14] Kramer 50-52.

following section, however, that discontinuity plays an important role in linear time as well.

2.4 Linear Time: Discontinuity and Specific Temporal Modes

A certain degree of discontinuity is essential to the linear hearing of music.[15] Cadences, for example, are meaningful interruptions of the linear flow of tonal music in that they contribute to formal delineation. Music whose information is not divided into understandable segments becomes hypnotic and thus tends towards vertical time. However, certain types of discontinuity contribute to temporal modes in which linearity is still present, but not as standard *goal-directed* linearity.

Kramer identifies several temporal modes which arise from specific interactions between linearity and discontinuity. Two of these are relevant to the analysis of *Apparent Motions;* they are *multiply-directed linear time* and *nondirected linear time.* Kramer writes:

> "If the implication in every section is continually frustrated by the subsequent section but is often realized elsewhere, then the musical time is multiply-directed. [...] If the implied progression from one section to another is continually realized but the deeper-level implications arising from these middleground progressions fail to be fulfilled, then there is nonlinearity on the background level while the middleground linearity is nondirected."[16]

Multiply-directed linearity proves to be the predominant temporal mode when considering *Apparent Motions* as a whole. Nondirected linearity is a concept which is important in understanding certain middleground features of the work. It is particularly

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[15] Kramer 58.
[16] Kramer 58.

pertinent to types of atonal harmony with certain linear attributes such as voice leading and short-term tension-resolution, but no long-term implication of a tonal goal.

2.5 Re-evaluation of Terminology

It was stated in Chapter One that *Apparent Motions* combines linear and circular elements. The term "linear" has subsequently been given a highly specific definition, while the term "circular" has not. Circularity is not a temporal mode: within Kramer's theory, it is considered a type of musical organization which would contribute to nonlinear time.[17] However, cyclical features are significant to the forthcoming analysis, and it is often useful to identify them specifically, in the understanding that they fall into the broader category of nonlinearity.

[17] Kramer 24.

CHAPTER THREE

FORMAL DESIGN I

The main objective of this chapter is to familiarize the reader with the overall formal structure of *Apparent Motions* before embarking on a detailed investigation of specific aspects of musical language. It was stated in Chapter One that the work is comprised of nine sections, and that as the piece unfolds, material from previous sections returns and is further developed, producing several sets of variations interspersed with each other. While the form is sectional, these sections are not presented as independent movements. It is possible that different listeners would construe sectional divisions at different points in the work. Since the sectional divisions proposed in the present analysis are deemed to be the most important ones, it seems appropriate to explain the rationale for this judgment.

One encounters a number of difficulties in the analysis of sectional structure in *Apparent Motions.* The grounds for identifying the most important formal divisions may be better understood once these difficulties have been identified.

3.1 Basis for Sectional Analysis

Several analytical difficulties arise from the conception of the work as a single movement comprised of multiple sections. The very premise implies and even necessitates a certain degree of contrast between different sections. When the contrast is sufficient to the degree that the listener may be expected to recognize two sections as being thematically related while separated by at least one distinct intervening section,

then sections begin to invoke the function of virtual movements, or perhaps more traditionally they would be perceived as movements which are played *attacca.* Meanwhile, the sections of *Apparent Motions* are not movements in the literal sense. The rhythmic language used often does not embody a tempo with the clarity that one would find, for example, in a baroque dance suite. Furthermore, certain tempo changes (such as that at m. 387) do not break the continuity of a section. The use of silence can be misleading in a similar way, for example, silence may help demarcate a section break (as at m. 92), but sometimes it interrupts a section (as at m. 166). Elsewhere, sections are not separated by silence (for example m. 335-336). Closer investigation in Chapter Six will show that misleading formal cues are used deliberately. They help to build a musical language in which interruptions seem to belong, but can still be heard as interruptions. Multiply-directed time relies on the disruption and postponed resumption of musical trains of thought at the highest level of the formal hierarchy. Given this intention, the use of discontinuities at a lower level of the hierarchy paradoxically contributes to musical coherence by making interruption a basic part of the compositional language.

Thematic unity within sections is ultimately the most important factor in articulating the overall form. Each section contains a clearly defined body of thematic material. One final difficulty in our analysis of form is identifying what constitutes a theme. While melodic motives are the most important thematic elements in some sections, other sections are defined by features such as a gesture shaped by dynamics, or a specific type of texture. The problem, then, is merely one of terminology, since the term "theme" indicates something melodic in nature. A solution may be to refer to thematically-defining elements as "characteristic" features. A section may be

characterized by a single feature or by the interaction of several features, as will be shown below.

3.2 Thematic Content, Variations, and Sectional Design

Section Number	Section Name	First measure-last measure	Initial tempo	Duration
1a	**Voices Obscured**	1-53	♩=69	1:32
1b	**Folk 1** (as interruption)	54-72	(♪=♪=138)	0:22
1c	**Voices Obscured** (continuation)	73-92	(♩=69)	0:42
2	**Blocks 1**	93-147	♩=96	1:10
3a	**Voices 2**	148-206	♩=84	1:38
3b	**Round/Canon 1** (as coda)	207-240	♩=72	0:58
4a	**Blocks 2**	241-314	♩=96	1:33
4b	**Round/Canon 2**	315-335	♩=76	0:33
5	**Folk 2**	336-414	♩=80	2:10
6	**Stifle**	415-454	♩=56	1:25
7a	**Hustle and Bustle**	455-502	♩=144	1:18
7b	**Contraptions**	503-564	(♩=144)	1:28
8	**Round/Canon 3**	565-605	♩=72	1:12
9	**Final Meltdown**	606-691	♩=144	2:05

Figure 3-1. Outline of sectional design. Parentheses indicate the continuation of a tempo from the preceding section.

Section 1 (please refer to Fig. 3-1) is characterized by a dialog between two musical layers. One of these layers is essentially melodic, and is present intermittently. The other layer is comprised of sustained harmonies is almost always present, sometimes

quietly in the background and at other times growing louder and intruding on the melodic layer (Fig. 3-2). The melodic layer is rhythmically more active and often includes ostinati of varied repetitions of short melodic cells. In the sustained layer, the crescendo is the defining gesture. The name "Voices Obscured" signifies the frequent intrusion of the sustained/crescendo layer on the active/melodic layer. The phrases in the melodic layer often end abruptly, with no long durations serving as cadential goals, and with no harmonic movement (in the melody's pitch content and in the sustained layer) that might signify a phrase ending. Thus the voices in Section 1 are also obscured by their own fragmentary nature.

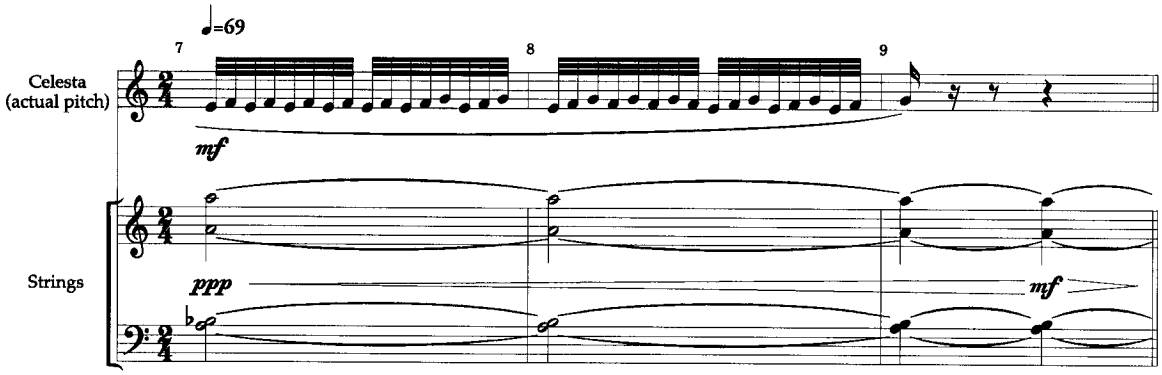

Figure 3-2. Sustained layer in the strings intrudes upon active/melodic layer in the celesta, a characteristic dialog of Subsection 1a

As the first section proceeds, there is a transition from melody in solo instruments (as in Fig. 3-2) to heterophonic doubling of melodic lines (e.g. violin I and viola I, mm. 22-25), bringing us to a state beyond heterophonic doubling in which two similar but distinct melodies are present at once. An example is shown in Figure 3-3: the two melodies have similar pitch content, but their conflicting rhythms are emphasized by independence of melodic contours and articulation.

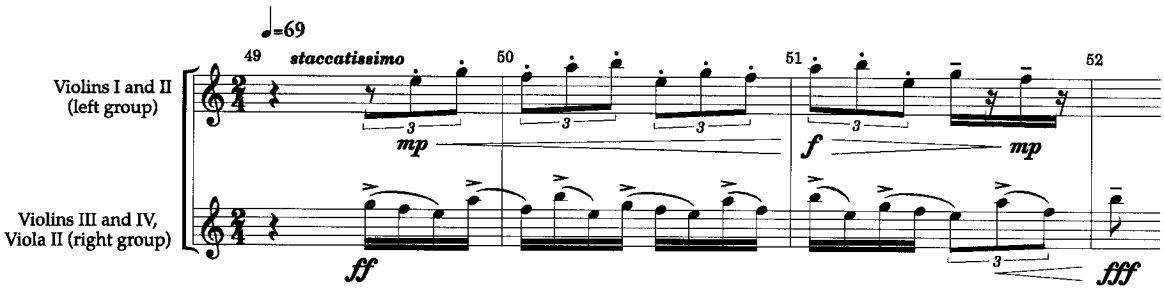

Figure 3-3. Extension of heterophony to similar but distinct melodies in Subsection 1a

Subsection 1b is a brief interruption of the "Voices Obscured" dialog. It features a solo in Violin I and a countermelody in the other string parts. The subsection evokes folk music, largely due to the fiddle-music-like détaché motives which permeate the countermelody (Fig. 3-4). The violin solo is quasi-improvisatory, not conforming to the motivic consistency of the ensemble. The material in the wood blocks, temple blocks, and pianos is accompanimental, except where the pianos double the countermelody. Although Subsection 1b is distinct from the surrounding parts of Section 1 on the thematic level, it does not stand alone as a section. Its brevity and the abruptness with which it enters and exits cause Subsection 1b to serve as an interruption of the surrounding music.

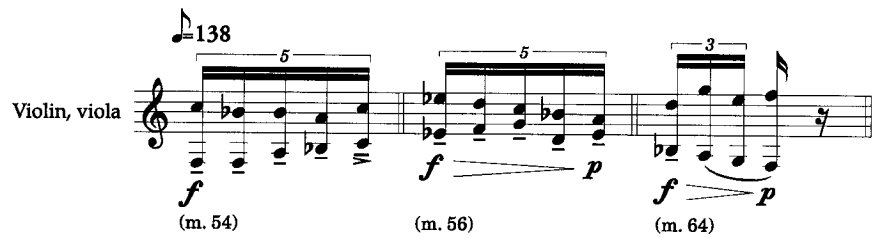

Figure 3-4. Fiddle-music-like détaché motives characteristic of Subsection 1b

Section 2 features two hocketing isorhythmic pairs of contrapuntal voices, with one pair in the upper strings and one pair in the lower strings (Fig. 3-5). Durations in both isorhythmic layers are lengthened throughout the section by means of a gradual (almost

imperceptible) additive process. The shape of the section is primarily defined by changes in harmony (e.g. on the second beat of m. 104), which abruptly bring about new patterns of melodic pitches (colores) over the continuous rhythmic patterns (taleae). The section is called "Blocks" because it is a relentless and dense "wall" of music, segmented discreetly by changes in harmony.

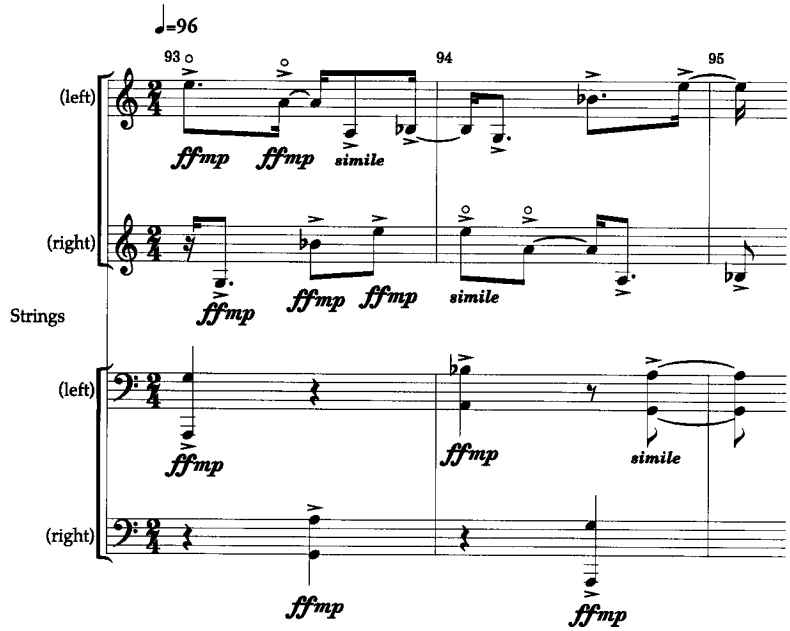

Figure 3-5. Two isorhythmic hocketing pairs from the beginning of Section 2

Section 3 brings the return of the "Voices" dialog. The material of the active/melodic layer becomes considerably more developed. Short repeated melodic cells such as those in the pianos at mm. 149-155 soon grow into patterns which are more complex. The repeated pattern shown in Figure 3-6 is longer (eleven notes) than any in Section 1. Its contour is more disjunct, giving an added dimension to the four pitch classes present (E, F, G, B♭) by using them in several octaves. A melody which changes pitch on every sixteenth note results from the heterophonic union of both piano parts.

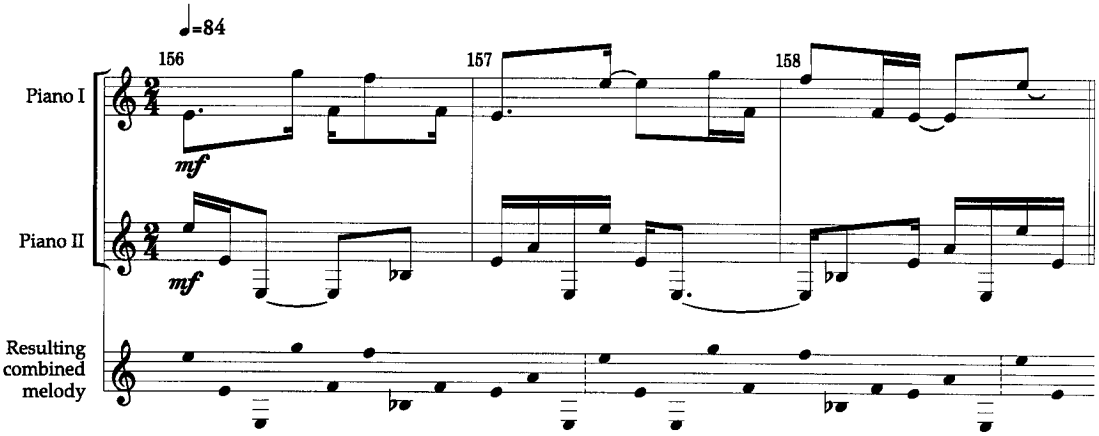

Figure 3-6. Development of the active/melodic layer characteristic of the "Voices" dialog in Section 3. The staff labeled "Result" shows the melody produced heterophonically by the combination of both piano parts.

While the development in Section 3 focuses primarily on the active/melodic layer, there are occasional expansions of the crescendo motive in the sustained layer. In Figure 3-7, a crescendo emerging from sustained harmony is underscored by a combination of filigree melodies which form a clearly-shaped expansion of register.

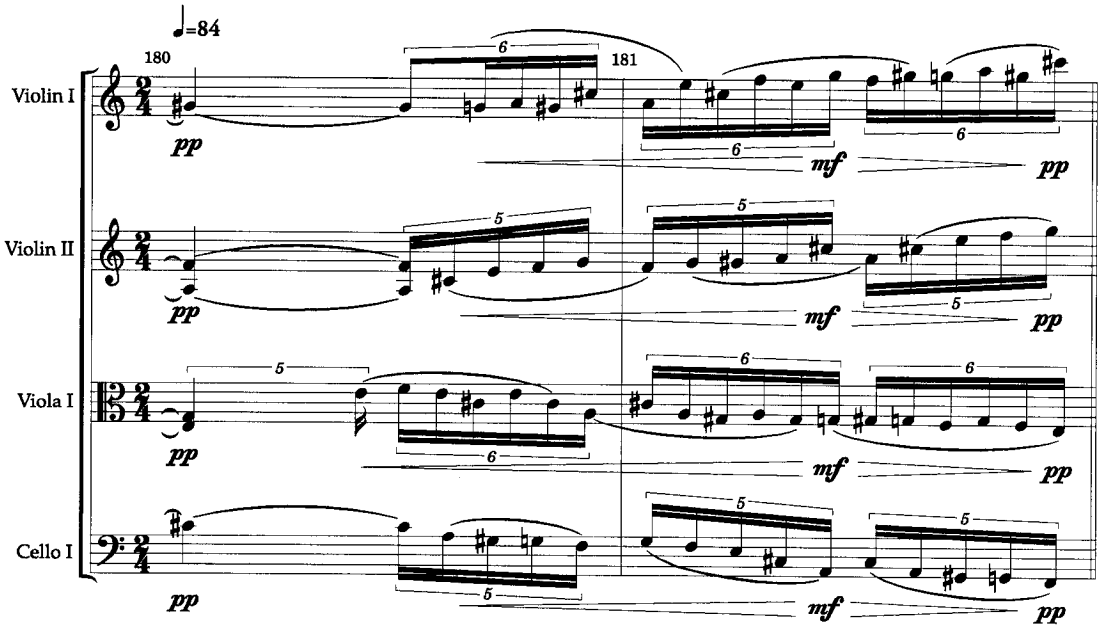

Figure 3-7. Development of the crescendo motive in "Voices" dialog

In measures 194-199, melodic material is momentarily allowed to grow into a resonant and finely detailed texture. We are left with only a fleeting glimpse as an elaborated crescendo gesture beginning in measure 199 in viola I, harp, piano II and violin IV spreads to the whole ensemble in measure 200.

Subsection 3b is motivically quite independent from the rest of Section 3, but is best interpreted as a coda to the section. Its beginning is elided with the main part of the section via the sustained A in violin I from measure 206 to 207, and its durational proportion does not seem substantial enough to constitute a section.[18] Two violins on opposite sides of the performance space make up a canon (Fig. 3-8), or actually a *round* as the parts eventually repeat. Long durations and soft dynamics lend to the tranquility of this passage.

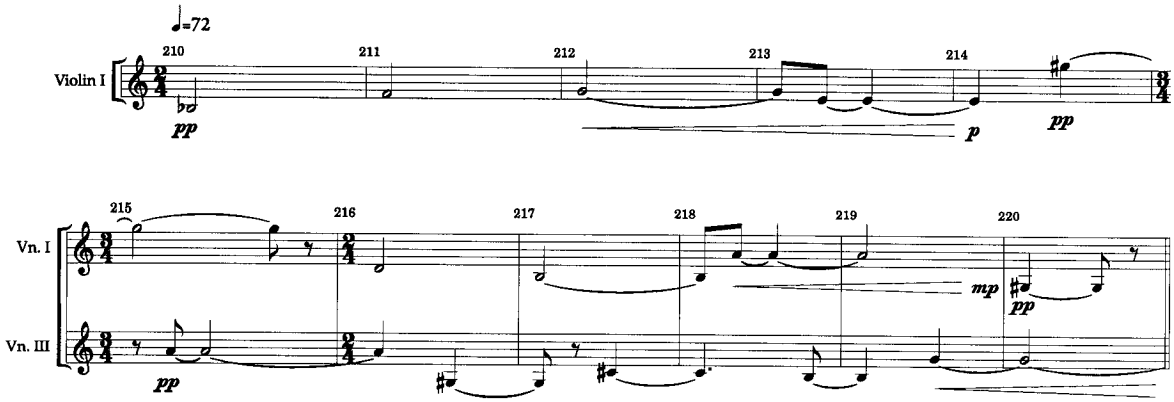

Figure 3-8. Characteristic passage from Subsection 3b, "Round/Canon I"

[18] In terms of "absolute" time (i.e. clock time), Subsection 3b is not tremendously shorter than most sections, but Kramer 331-332 suggests that relatively low information content results in the perception of time passing more quickly, as the mind is less occupied than it would be by music with a more rapid flow of information. Moreover, the decrease in amount of activity, textural density, and dynamic level are factors which make the *content* of Subsection 3a seem to have less weight, while also influencing our perception of time in a similar way. The subsection is a sort of "structural resonance."

Section 4 develops the "Blocks" texture with changes in harmony and melodic patterns. Instead of two hocketing isorhythmic patterns, the whole ensemble now takes the rhythmic pattern from the upper strings in the earlier "Blocks" section. The rhythmic pattern is applied to chords rather than individual lines; these chords are distributed throughout the string ensemble (Fig. 3-9).

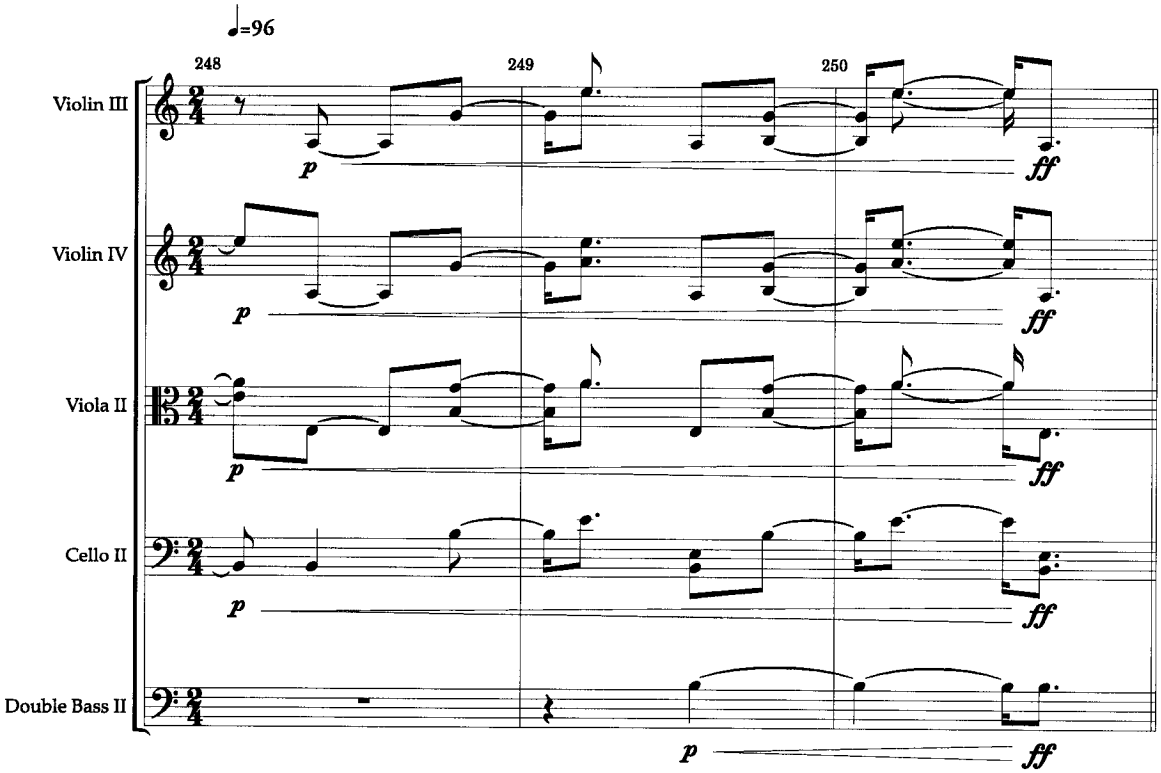

Figure 3-9. Orchestrated crescendo in the right group in Section 4, "Blocks 2." The rhythmic pattern from Section 2 is applied to a chordal texture in each group.

The additive rhythmic process from Section 2 is also used in Section 4, but beginning further into that process and continuing it longer, so that by the end of the section durations are considerably lengthened in comparison to Section 2. The most important variation in Section 4 is the addition of crescendos. At first, cresecendi are applied to the entire texture, as in measures 241-245. Next, the crescendi on opposite sides of the ensemble become desynchronized (mm. 260-262) and increasingly

independent (270-275). In measures 284-287, individual instruments (violins I and III) break away from their groups' dynamics and crescendo alone. By the end of the section, short crescendos are scattered throughout the ensemble, quite different from the long unified crescendos at the beginning of the section.

Like Section 3, Section 4 uses a "Round/Canon" as a coda. Subsection 4b unfolds in a more linear way than the previous "Round/Canon" for a number of reasons. It expands from one to four voices and there is a corresponding expansion in register. While Subsection 3b is a *round,* Subsection 4b is a canon with no "looping" repetition.

Section 5 is a substantial development of the "Folk" material which had briefly appeared as an intruder in the first section. The solo in Violin I (Fig. 3-10) has greater motivic consistency than it did in the first "Folk" section, interspersing accented quintuplets like those in Figure 3-3 with eighth notes and grace notes. The ensemble's relationship to the solo is more cooperative, often responding at the end of phrases in the solo rather than competing against it in a simultaneous way. The motivic contents of the violin solo are continuously modified over the course of the section, and by the end the relationship to the "Folk 1" subsection is rather distant.

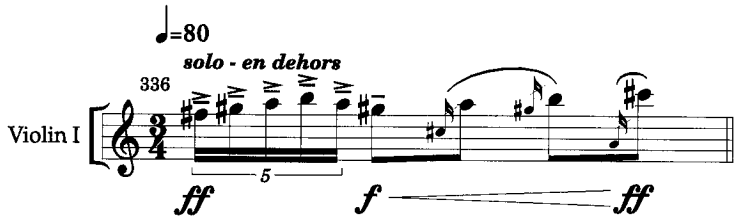

Figure 3-10. Beginning of the violin solo from Section 5, "Folk 2"

Section 6 extends the concept of stifled melodic development which was first introduced in Section 1. It features a short refrain (Fig. 3-11) which alternates with a

variety of fragmentary duos (e.g. Fig. 3-12). Melodic growth in the section is severely impeded. Phrases in the duos are made up entirely of three-note cells. Not only are phrases quite short, but they themselves are broken up by rests which often separate each individual note. Figure 3-12 is also a good example of the failure of melodies to grow in terms of how they interact with each other. The two parts remain desynchronized, and while the first few notes suggest the possibility for a consonant relationship, a pair of clashing diatonic areas is revealed when we hear the complete statement of both three-note cells.

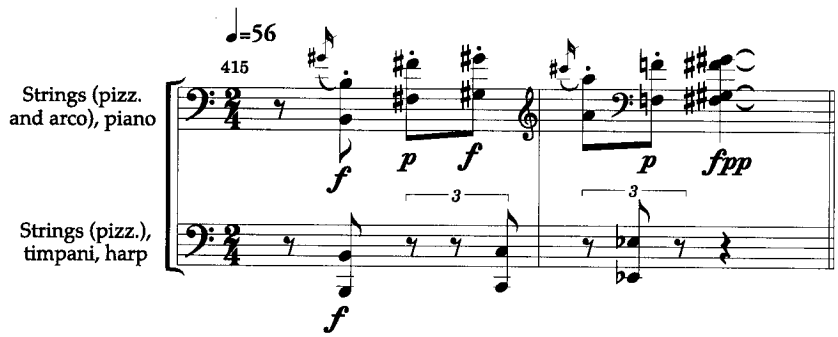

Figure 3-11. Refrain from Section 6

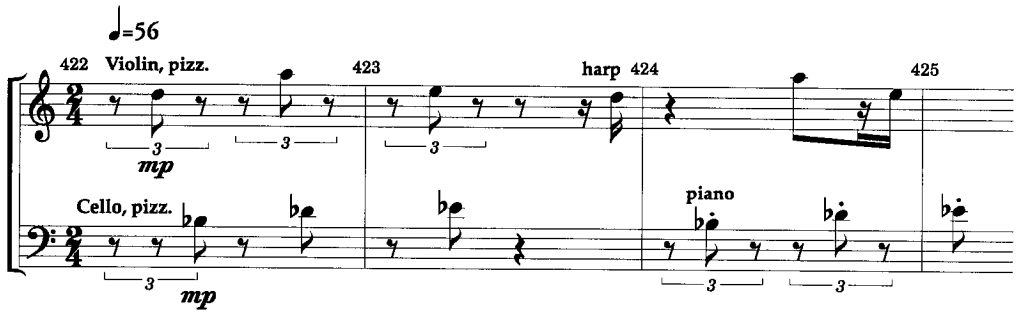

Figure 3-12. Example of a duo from Section 6

Section 7 is the last section to introduce new thematic content. Two distinct characters are present. "Hustle and Bustle" material consists of arpeggiated bitonal triadic

combinations and "motoric" use of steady eighth-note rhythms, in pizzicato strings. Following a brief introduction (mm. 455-464), we hear a passage which is representative of "Hustle and Bustle" (Fig. 3-13). The name is meant to suggest a Hollywood-like depiction of prosperous urban activity. An element of parody is likely to be sensed in light of the more "serious" music which has preceded.

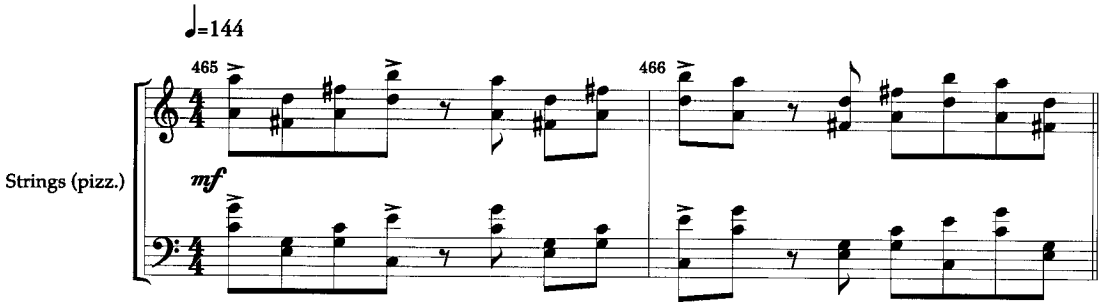

Figure 3-13. A representative passage from Subsection 7a, "Hustle and Bustle"

The "Hustle and Bustle" idea is elaborated in measures 484-502 with a gradual increase in sixteenth-note activity. This elaboration culminates in the arrival of new thematic material which marks the beginning of "Contraptions" at measure 503. The most important feature of "Contraptions" is its looping – the repetition of figures which are usually several measures long – evoking the repetitious action of a machine. There is also a motive (Fig. 3-14) which was inspired by Paul Klee's *Twittering Machine* (1922),[19] which depicts bird-like figures on what seems to be a hand-turned wire contraption

[19] Paul Klee, *Twittering Machine,* watercolour and ink on oil transfer drawing on paper, mounted on cardboard, 1922, The Museum of Modern Art, New York. Published in José María Færna, ed., *Klee,* trans. Alberto Curotto (New York: Abrams, 1995) 22.

similar to something from the Calder Circus.[20] Related depictions can be found in music of the early twentieth century. Arthur Honegger's *Pacific 231*[21] and George Antheil's *Ballet mécanique*[22] are two of the most famous examples of music devoted to machines. Of particular importance to *Apparent Motions* is *The Iron Foundry* (1928) for orchestra by Alexander Mossolov.[23] A high-pitched turning figure in the ostinato at the beginning (Fig. 3-15) appears to be wheel-like, encircling the G on which it begins. If it is a wheel, then the timbre of *sul ponticello* violas suggests a squeaky wheel. Mossolov's piece suggested a translation of Klee's twittering character in *Apparent Motions.*

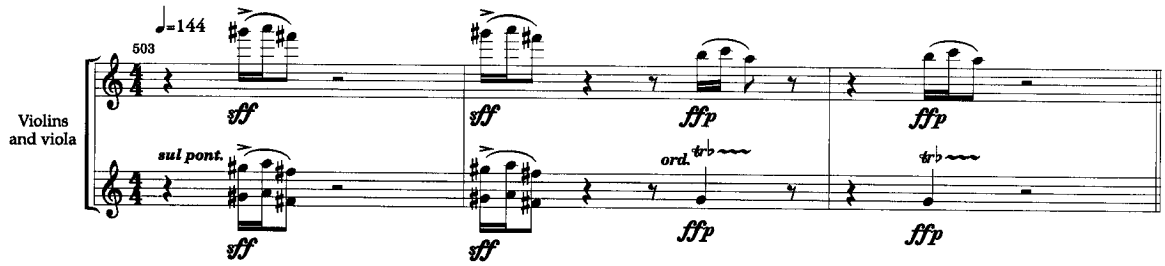

Figure 3-14. "Twittering Machine" motive from Subsection 7b, "Contraptions"

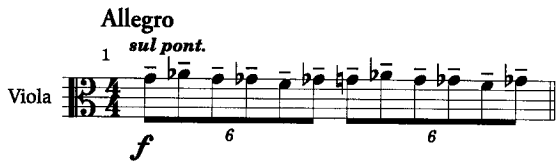

Figure 3-15. Viola part from the beginning of Mossolov's *The Iron Foundry*

[20] Alexander Calder, *Calder Circus,* mixed media, overall: 137.2 x 239.2 x 239.2 cm, with accessories: 194.3 x 248.3 x 245.7 cm, Whitney Museum of American Art, New York. Published in Philippe Monsel, ed., *Calder*, (Paris: Éditions Cercle d'art, 1998).

[21] Arthur Honegger, *Pacific 231* (Paris: Editions Salabert, c1924).

[22] George Antheil, *Ballet mécanique* (Pennsylvania: Templeton Publ. Co., c1954).

[23] Alexander Mossolov, *The Iron Foundry* (Hamburg: Musikverlag Hans Sikorski, 1958).

Features of "Hustle and Bustle" continue to resurface in Subsection 7b, mixed with elements of "Contraptions," for instance in the xylophone and celesta in measures 511-518 and in pizzicato figures from measure 519 to measure 533.

Section 8 is comprised mostly of a slow canon. Its five-part counterpoint represents a further development in relation to the previous "Round/Canon" sections. However, the internal construction of the section is rather static at first, beginning immediately in five voices and maintaining that texture in a limited register. Growth occurs in the form of several intrusions of faster material related to the melody from measures 490-502 of "Hustle and Bustle." There are three successive intrusions, in measures 587-589 in the two cellos, in three parts in measures 594-597 (Fig. 3-16), and then in six parts in measures 599-605.

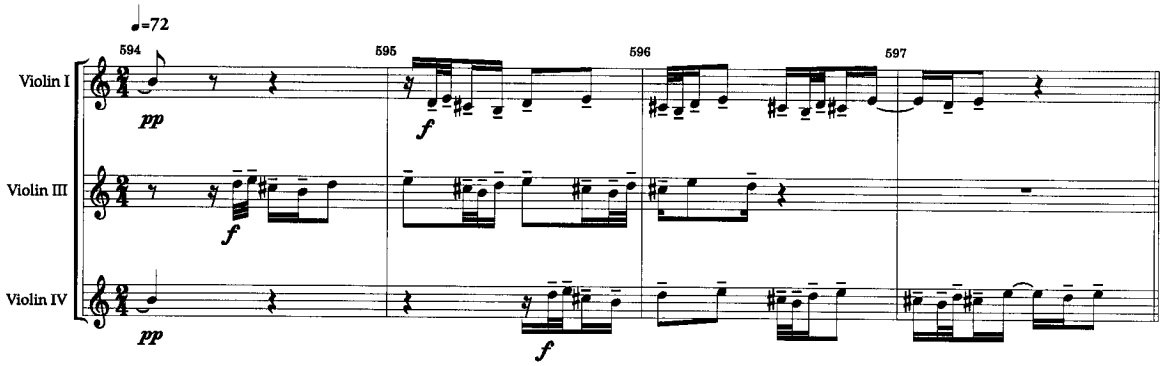

Figure 3-16. Polyphonic treatment of melodic material originally from "Hustle and Bustle" which intrudes on the slow canon in Section 8

Section 9, "The Final Meltdown," begins with a development of the "Hustle and Bustle" character (mm. 608-626), then returns to more "Contraptions" (mm. 627-629). The section eventually incorporates numerous themes from earlier sections ("Blocks" in mm. 673-676, "Round/Canon" in mm. 678-681), juxtaposed with considerable contrast to the "Twittering Machine" motive, which grows to be continuous (mm. 641-650) and

highly motoric (mm. 661-678). At other points, themes from earlier sections are made into mechanisms by subjecting them to machine-like repetition ("Hustle and Bustle" in mm. 632-635, "Stifle" in mm. 651-655, and "Folk" in mm. 656-660). At the end, the "Twittering Machine" motive is isolated and returned to its original fragmentary state of only three notes.

CHAPTER FOUR

PITCH ORGANIZATION

The harmonic language of *Apparent Motions* uses polytonality as its basis. This chapter examines techniques employed which relate to the polytonal conception of pitch organization. It also explains a more generalized set of principles which govern the temporal aspect of pitch usage.

4.1 Temporal Organization of Structural Pitch Collections

A cyclical system guides the use of pitch at the highest structural level in *Apparent Motions*. Several principles employed in the piece specifically address the use of pitch in time, principles which could conceivably be applied to music with different types of harmonic conceptions, not necessarily polytonal. These principles are nonetheless meant to have a perceptual effect, as will be discussed further in Chapter Six.

The system behind the temporal aspect of pitch organization deals with *structural* pitch collections, those which comprise a harmonic background which may be elaborated in numerous ways to produce the musical surface. In *Apparent Motions,* all structural pitch collections may be expressed as chords. Even in scalar passages, chords always form the harmonic background.

The principles governing the temporal use of structural pitch collections are quite simple. Groups of chords make up *cycles.* The following principles apply to cycles:

(1) to be considered a cycle, a group of chords must be used more than once;

(2) members of a cycle must be used in order, not unlike the pitches of a twelve-tone series.[24]

A third principle governs the relationship of cycles to one another:

(3) new cycles follow the first one, but each subsequent cycle must preserve elements from the preceding one.

Figure 4-1 illustrates the implementation of the third principle in the six harmonic cycles used in *Apparent Motions.* Solid arrows connect identical chords in adjacent cycles; dotted arrows connect chords in adjacent cycles which are similar but not identical. Members of cycles whose relationships are indicated by dotted arrows always share several common tones. Modifications involve revoicing (e.g. chord 3d to chord 4e) and changes to pitches other than common tones (chords 1d-2d-3d), sometimes in combination with a change to a chord's order within the cycle.

While the principles of the cyclical system are simple, they impact the work in a subtle way by combining linear and nonlinear organization. As a result of the first two principles, the listener first hears a fixed number of harmonies being used in circulation, an apparent nonlinearity. As the work proceeds, the pool of harmonies gradually evolves, mitigated by the third principle, revealing a slowly-advancing background linearity. The transferal of certain elements from one cycle to the next ensures a limited rate of growth in harmonic content and the periodic recurrence of recognizable features. This recognizability, though a repetitive aspect, contributes to a linear hearing by giving the impression of a single cycle evolving over time, rather than six related cycles. Thus, the six cycles are actually six phases in the development of a single musical object.

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[24] Local repetitions of fragments of a cycle are not used as they would be in serial music, as cycles here only govern background harmonic change, not localized details.

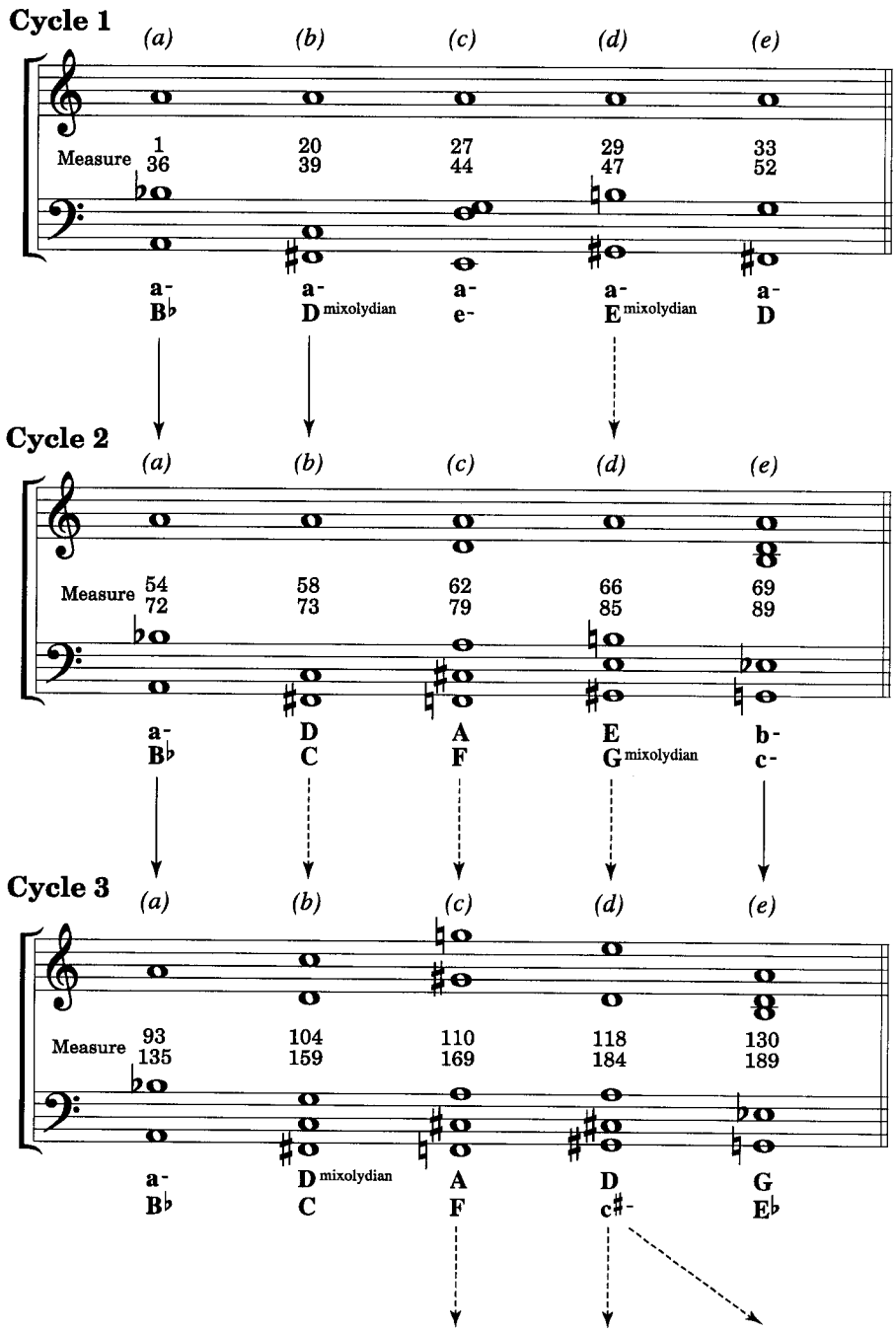

Figure 4-1 (continued on next page)

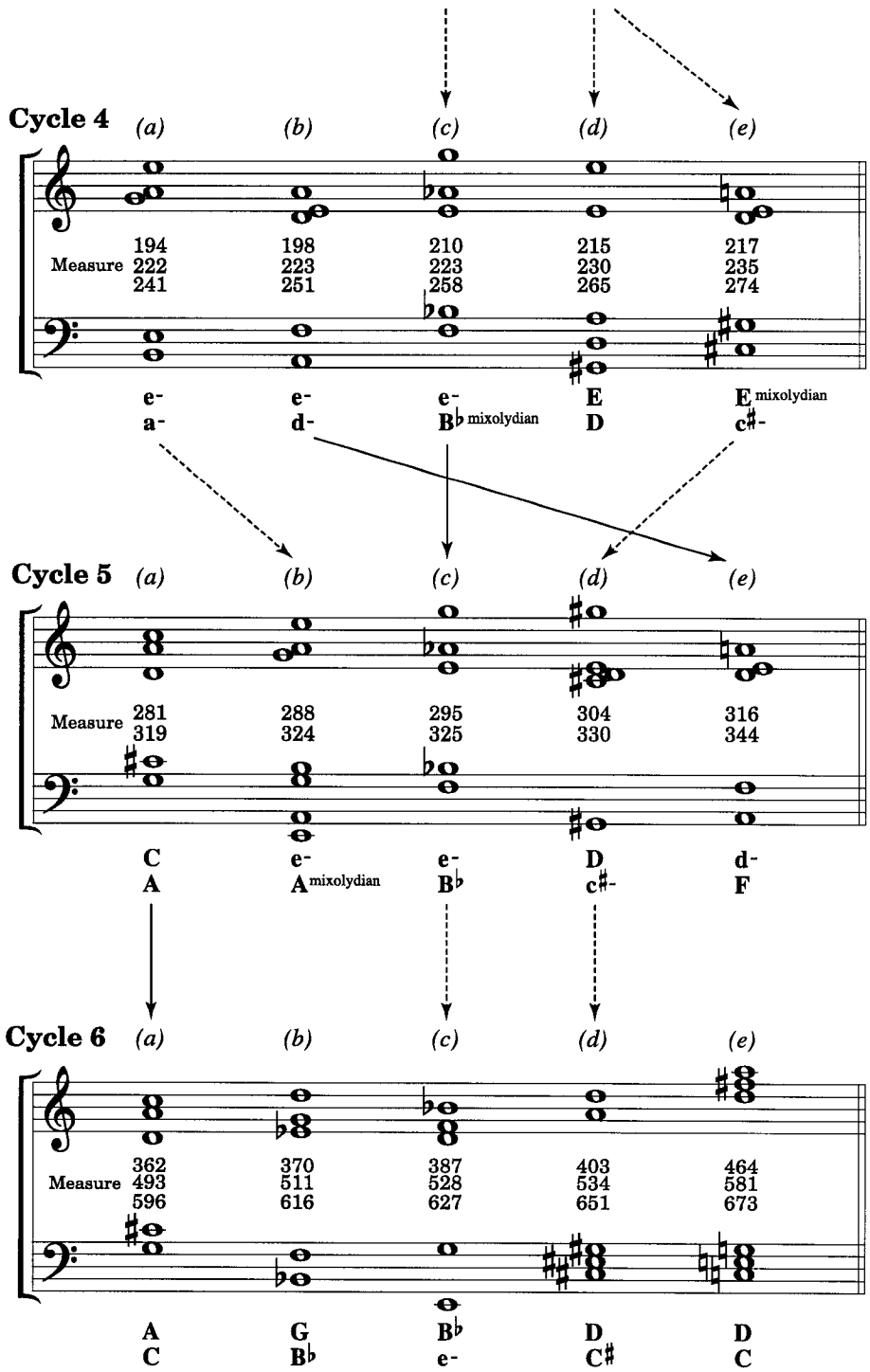

Figure 4-1 (continued from previous page). Complete set of harmonic cycles. Solid arrows connect identical chords in adjacent cycles; dotted arrows connect chords which are similar but not identical.

4.2 Polytonal Conception of Harmony

The harmonic language of *Apparent Motions* is based on the constant potential for polytonality. This does not mean that the presence of more than one key is explicit in every bar of music, but rather that all harmonies have a theoretical potential for polytonal implications. The extent to which the polytonal implications of a harmony are realized is flexible; this flexibility is an important expressive tool. Different methods of treating relationships between keys are suited to different musical situations. In order to understand the realization of polytonality in the piece, one must first look at the principles for determining the polytonal implications of structural chords.

4.3 Polytonal Implications of Structural Pitch Collections

In theory, polytonality offers a way of understanding any sonority which implies a relationship to more than one root. Some sonorities such as chord 6e (Fig. 4-2) lend themselves quite well to analysis and perception of derivation from two keys.

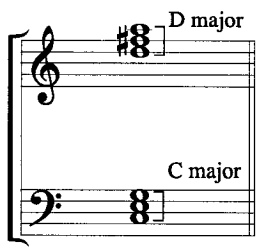

Figure 4-2. Chord 6e

Polytonality is by definition the blurring of a single tonal centre. A great degree of tonal blurring results in atonality, not polytonality. On the other hand, sonorities with very few

pitches, such as chord 1a (Fig. 4-3) can be unstable enough to serve as a catalyst for tension between two tonal centres.

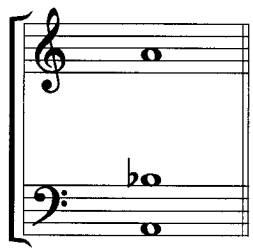

Figure 4-3. Chord 1a

True polytonality leads a delicate existence, floating between tonality and atonality, relying on a rather small margin of ambiguity.

It is interesting to note that chords 1a and 6e can each be derived from a single diatonic source. The diatonic derivation of chord 1a actually contributes to its polytonal potential. If we consider major-key derivations, then the pitches of chord 1a would most readily originate from B♭ major. B♭ undermines the stability of A in the bass, which cannot be considered a diatonic root unless we use the Phrygian mode, a mode with a built-in tension between its tonic (or *final*) and its low second degree. Of course this type of tension on its own does not cause polytonality, but it creates an ambiguity which can be exploited. Due to potential ambiguities, the modes themselves are generally not used as tonic areas in the polytonal relationships of the harmonic cycles shown in Figure 4-1. The exception is the mixolydian mode, whose lowered seventh degree is a significant identity with the harmonic series, and may thus be quite helpful in reinforcing a chordal root (see for example chord 4c).

Chord 6e demonstrates other factors important in the polytonal interpretation of diatonic chords. All of the pitches of chord 6e are contained in G major, yet its construction (a voicing of a D major triad above a C major triad) does not involve G major in any direct way, nor does its perception necessarily lead us to "interpolate" G as point of resolution on account of its being a tonal common ground between two strata. Chord 6e shows us that polytonality is defined more by chord voicing than by the simple accumulation of pitches in a sonority. A scalar presentation (Fig. 4-4) of the six pitches of chord 6e would have little chance of defining a D major/C major relationship, especially with G as the lowest pitch. D major and C major are defined in chord 6e mostly by the root-like positioning of D and C at the bottom of consonant structures (especially perfect fifths), as well as the stratification of the chord, separating the D major layer from the C major layer by a twelfth.

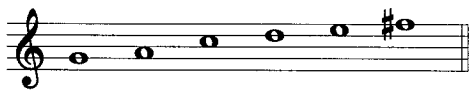

Figure 4-4. Scalar presentation of the pitches of chord 6e

In the case of chromatic chords, principles of voicing similar to those shown above continue to apply. In chord 3e (Fig. 4-5), E♭ asserts itself as a possible root, even though the other four pitches of the chord are diatonic to G Major, and G is in the bass. The voicing places E♭ in a consonant relationship with the bass, and separates this consonance from the other parts of the chord which stabilize G.

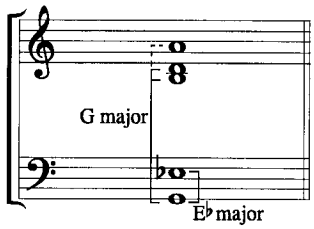

Figure 4-5. Chord 3e

An argument has been made in support of interpreting chord 3e as portraying G Major against E♭ major, yet the chord is sufficiently ambiguous to support other interpretations as well. The same sonority is used in the second cycle (chord 2e), where it is given an extended diatonic reading as being from C melodic minor (ascending form), and is thus used to support the superimposition of C minor and B minor in measures 69-71. The purpose of identifying the polytonal implications of structural sonorities is not to find the definitive type of polytonality inherent in each chord. The purpose is to identify potential avenues of development which may be pursued in the elaboration of the musical surface, elaborations which are musically appropriate because of their justification in the chordal construction of the harmonic background. The pairs of keys shown in Figure 4-1 are therefore not the only possible interpretations, but are simply those which have been realized.

4.4 Elaboration of Harmonic Background

We have seen how structural pitch collections present tonal ambiguities. These ambiguities may or may not be extended to yield full-fledged polytonality. Highly stratified textures may successfully assert the coexistence of two keys, but this sort of texture is only used from time to time. The opposite extreme is when two tonal senses are

completely blended together. Blending and stratification often coexist simultaneously in *Apparent Motions,* with both factors contributing to the texture in varying degrees.

An example of a harmonically-stratified passage is Subsection 1b, "Folk 1." This passage early in the work actually involves one of the greatest amounts of extrapolation of harmonic material from structural pitch collections. The chords of the harmonic cycle, cycle number two, are very much in the background, while the musical surface contains two prominent layers corresponding to the two keys inferred from each structural sonority. Each layer uses an independent scale, greatly extending the overall pool of pitches. Figure 4-6 illustrates part of the subsection, showing the two prominent melodic layers on two staves, as well as the piano parts which outline the original structural harmonies. The chords in the pianos serve to fuse the harmonically-diverse melodic layers.

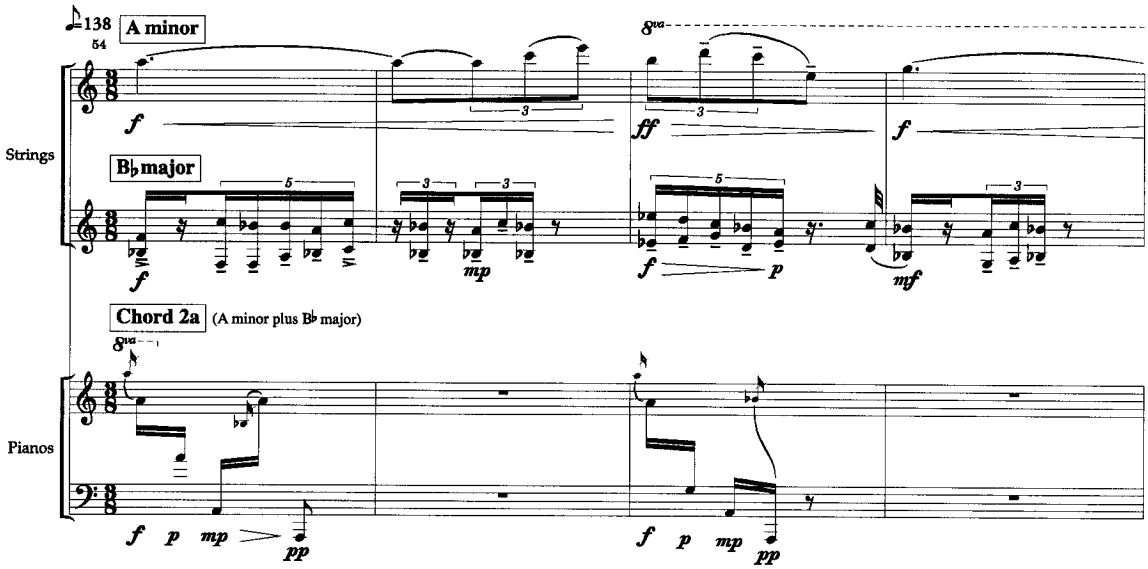

Figure 4-6 (continued on next page)

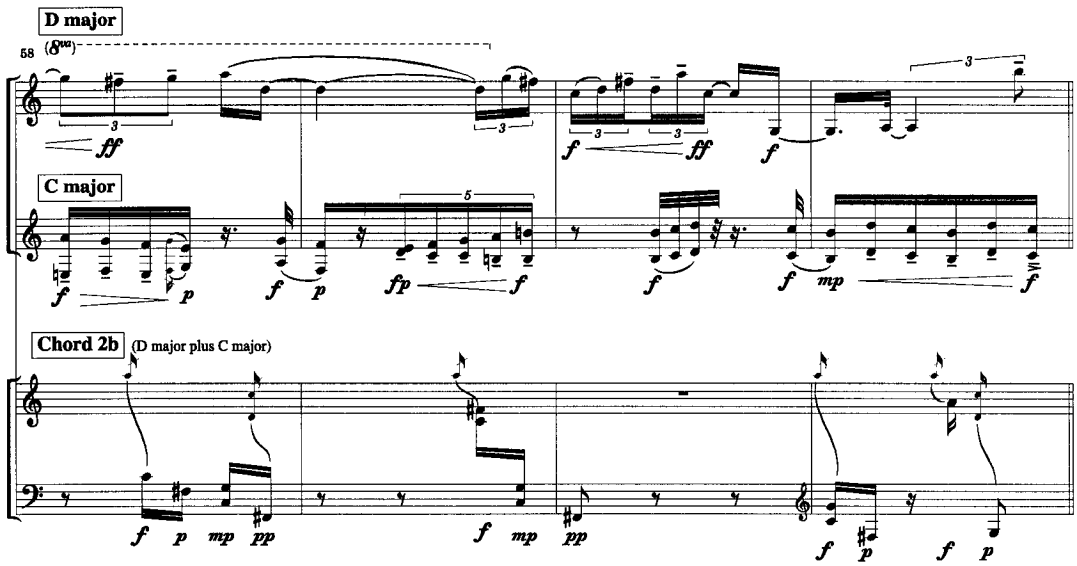

Figure 4-6 (continued from previous page). Stratification of tonal areas in Subsection 1b

Textures with absolutely no harmonic stratification are uncommon. The clearest example is Subsection 4a, "Blocks 2," in which all instruments combine to form a single pattern (please refer to Fig. 3-9 in the previous chapter) outlining the sonorities of the harmonic cycle with no additional pitches. Even here, some stratification is inherent in the sonorities themselves.

Most often, blended polytonal sonorities are combined with a melodic layer with a specific tonal centre. Figure 4-7 shows a melodic layer which remains in A minor while a polytonal chordal layer moves from A minor/E mixolydian to A minor/D major. Of course, melodies themselves may blend more than one tonality (Fig. 4-8).

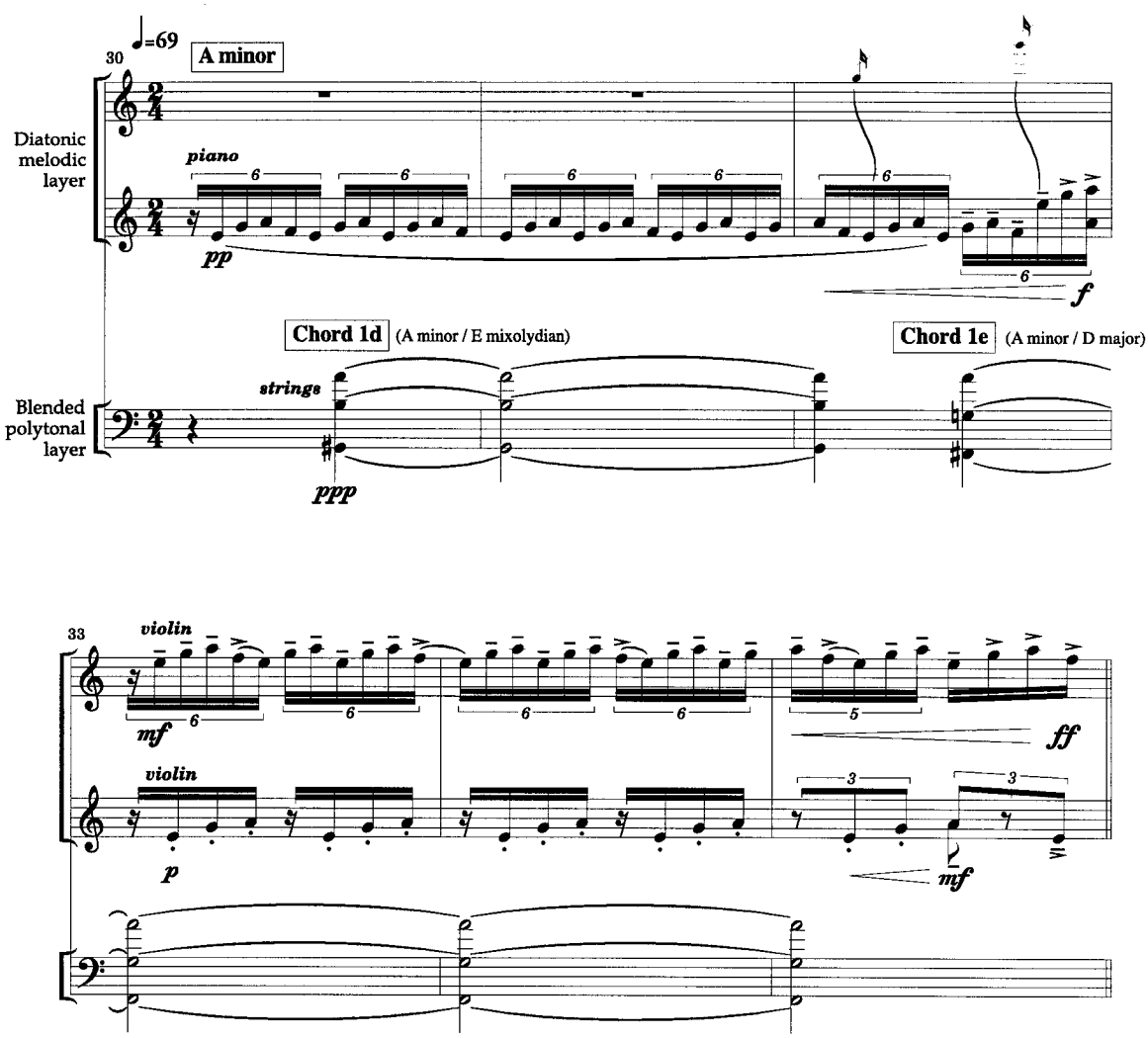

Figure 4-7. Diatonic melodic layer and blended polytonal chordal layer

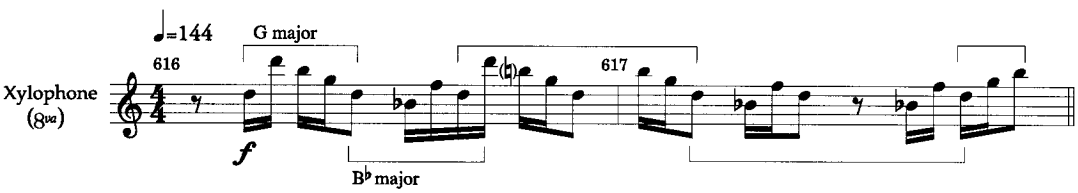

Figure 4-8. Polytonal melody

4.5 Harmonic Expansion

At certain points, a structural pitch collection is expanded into a series of related harmonies, each of which is in turn elaborated in the ways described above to form the musical surface. The polytonal analysis of structural pitch collections provides a basis for the expansion process. All new chords formed in the expansion process are built strictly from the pair of diatonic collections pertaining to their "parent" chord. In theory, any number of new chords could be created from the pair of diatonic pitch collections asserted in the analysis of each chord. The expansions in *Apparent Motions* aim to reinforce the polytonal duality of their originating harmonies, and thus the new sets of harmonies are often clearly-stratified polychords built from triads representative of each key. Figure 4-9 shows one such harmonic expansion. Each layer behaves like a key, restricted to a limited area on the circle of fifths.

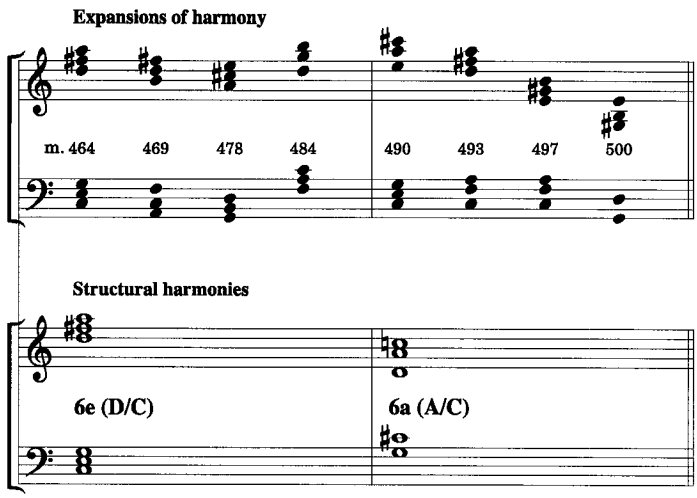

Figure 4-9. Harmonic expansion in measures 464-500

Harmonic expansion is useful when accelerated harmonic motion is required, and movement through a short cycle of structural pitch collections would result in more repetition than desired. According to the cyclical system, it would be quite possible to create a new cycle simply by adding chords to the previous one, without concern for whether these additional chords had diatonic relationships with the surrounding harmonies. The advantage of the derivative method of harmonic expansion outlined in this section is that it offers an organizational hierarchy. New chords maintain a subordinate relationship to their parent harmonies. The underlying support of the original cycle provides a theoretical basis for the possibility of closing the door on subordinate harmonies at any point, should one wish to return to the harmonic rhythm of the original cycle. Furthermore, the derivative method of harmonic expansion can intensify the polytonal duality suggested by the originating sonorities.

CHAPTER FIVE

MELODY AND COUNTERPOINT

Apparent Motions makes use of a number of traditional polyphonic techniques such as canon and hocketing. Techniques are explained in terms of how they deviate from standards, how they function in combination, and how they are significant to other facets of the work. The concept of "microvariation" is shown to be an important feature which is shared by several techniques discussed in this chapter.

5.1 Microvariation

Many of the techniques to be discussed in this chapter relate to the overall strategies of repetition and variation in the work. On the large-scale formal level, we have seen a combination of returning/cyclical thematic elements and gradual variation of those elements. These large-scale formal principles are reinforced on a smaller scale by specific methods of melodic variation and development. A concept which we will call "microvariation" is often present in melodic treatment. Microvariation may be defined as the varied repetition of a small motivic unit, in which variations are minute. Many examples of microvariation can be found in music of the twentieth century. Figure 5-1, an excerpt of the piano part from Morton Feldman's *Piano and String Quartet,*[25] uses four chromatically-adjacent pitch classes in two different octave registers to create figures with subtle variations in contour and harmony.

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[25] Morton Feldman, *Piano and string quartet* (London: Universal Edition, 1985).

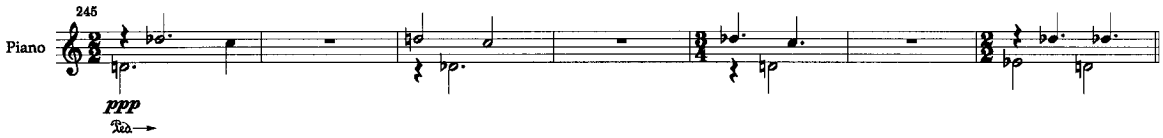

Figure 5-1. Microvariation in Feldman's *Piano and String Quartet*

In an example from *L'histoire du soldat*[26] (Fig. 5-2), Stravinsky uses varied arrangements of a limited pool of one-beat melodic cells, much like the varied arrangements of individual notes in Figure 5-1.

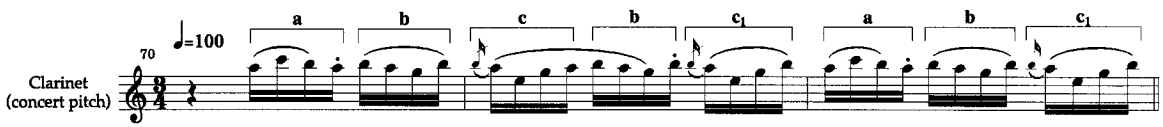

Figure 5-2. Varied arrangements of short cells as microvariation in *L'histoire du soldat*

Microvariation may be linear or nonlinear. Nonlinear microvariation provides temporary musical interest without leading towards any cumulative transformation of motivic material. If microvariation does lead to a lasting transformation on thematic material then it is linear and would more properly be considered "microdevelopment."

Three examples of microvariation in *Apparent Motions* are given below. Figure 5-3 shows the creation of a melody with very limited means: only one duration (the eighth note), four pitches, and rests.

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[26] Igor Stravinsky, *L'histoire du soldat* (New York: Edwin F. Kalmus,1924).

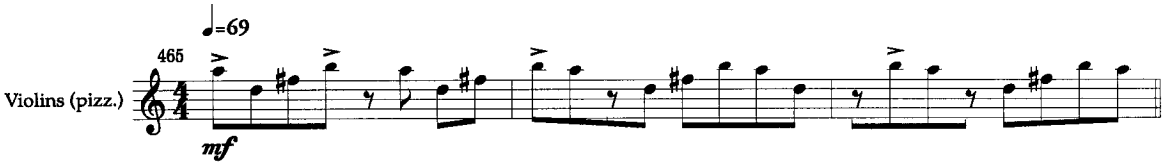

Figure 5-3. Melody using four pitches, rests, and one duration

The viola solo in measures 370-385 uses varied arrangements one-beat cells, much like the example from *L'histoire.* Figure 5-4 shows the first part of the viola solo. Unequal emphasis is given to certain cells. Those labeled *a* and *b* are the primary units, while *c, c*$_1$ and *d* form occasional responses.

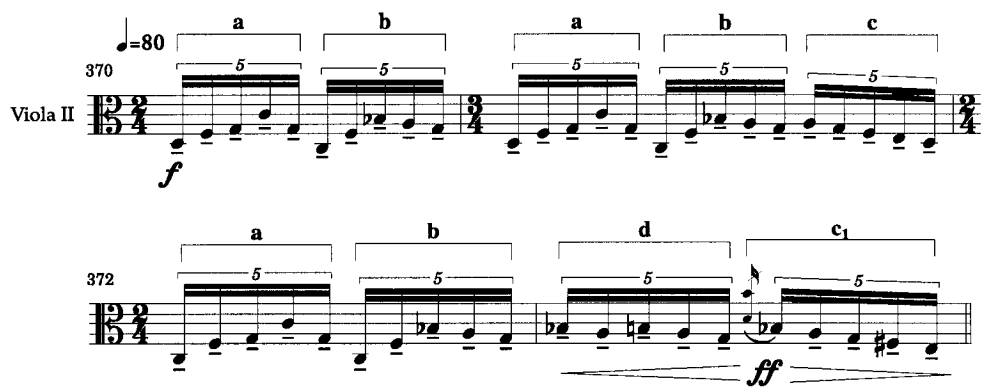

Figure 5-4.Varied arrangements of one-beat cells

Figure 5-5 illustrates a combination of microvariation techniques. A variety of ornaments are added to the two main pitches, C and B. Shown in the staff below the original is the melody with grace notes and other embellishments removed, and with no octave transfer. The skeletal version of the melody demonstrates how syncopations are created through various groupings of the two main pitches.

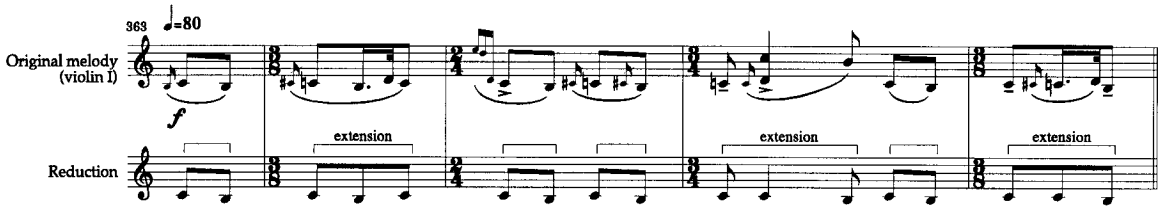

Figure 5-5. Combination of techniques: ornamentation as microvariation and syncopation resulting from cell manipulation

5.2 Ostinato and Polyrhythm

An extra dimension is sometimes added to the simple technique of ostinato. Figure 5-6 shows two extensions of the basic principle of ostinato. One extension is immediately apparent: the simultaneous use of two ostinati, one in each staff. The periods of the two ostinati differ in length (as they must in order to form two independent ostinati). The period of the ostinato in violins I and II is seven sixteenth-note sextuplets; that of the ostinato in violin III is one quarter note, which is equivalent to six sixteenth-note sextuplets. The result is a polyrhythm discernable in the melodic contours of the two parts. This large-level 6:7 polyrhythm is combined with a 3:2 polyrhythm in the durations of individual notes (sextuplets against regular sixteenth notes).

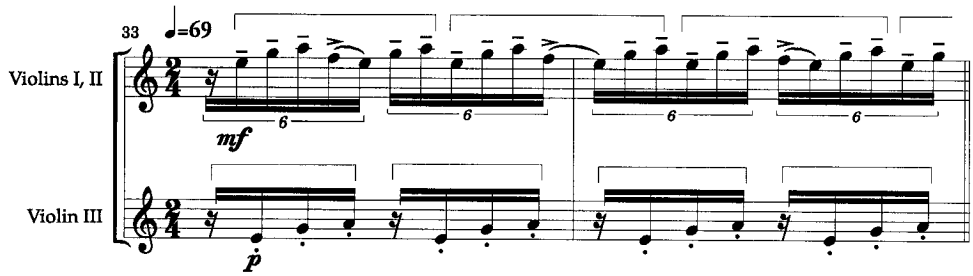

Figure 5-6. Polyrhythm formed by periods of two simultaneous ostinati

There is a second noteworthy feature in the musical passage discussed above. The ostinato in violin I contains internal motivic repetition (Fig. 5-7) which suggests a sort of "double ostinato." The internal construction of the ostinato uses microvariation, so that each period contains the motive E-G-A twice, once with an added F. The impression of "an ostinato within an ostinato" is especially apparent upon repetition, when we hear back-to-back iterations of E-G-A with no intervening F.

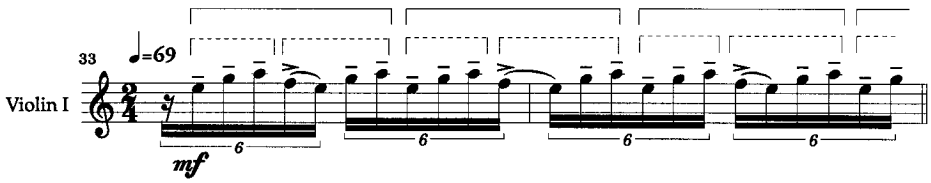

Figure 5-7. Internal repetition within an ostinato

Internal repetitions can be found within the longer ostinati or "loops" of Subsection 7b and Section 9, e.g. in measures 503-509.

The extensions of ostinati discussed above – simultaneous ostinati and ostinati with internal repetitions – have the same aims as microvariation. They temporarily vary limited amounts of material, without bringing about a long-term transformation.

5.3 Isorhythm, Hocketing, and Additive Rhythmic Procedure

Isorhythm can be understood as a highly structured type of microvariation. It is an abstraction of ostinato, superimposing a cycle of pitches (color) on a cycle of durations (talea), with a different number of members in each cycle. If allowed enough repetitions, color and talea will return to their original relationship, technically forming a large

ostinato. Figure 5-8 shows a short isorhythmic passage from Section 3b. Its color contains six pitches and its talea contains ten impulses. After sixty notes (at the beginning of m. 192) the color and talea come into phase with one another and the whole pattern begins to repeat.

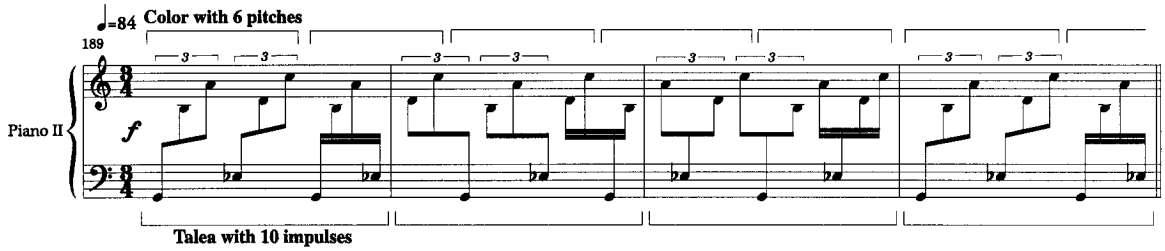

Figure 5-8. Complete cycle of an isorhythm and beginning of the second cycle

Isorhythmic technique is used throughout the "Blocks" sections, in combination with hocketing and an additive rhythmic process. Figure 5-9 shows the first three talea used in upper parts in Section 2 (mm. 93-98). Each talea is repeated three times, and is then modified to form the next talea. Modification always consists of the lengthening of one duration.

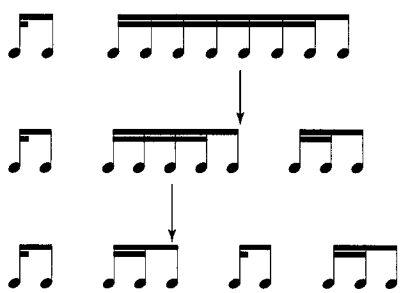

Figure 5-9. Additive rhythmic process in the first three taleae of Section 2

The first color used in the upper-voice pattern in Section 2 is shown in Figure 5-10. It has seven members, shown in the lower staff. With the addition of hocketing,

shown in the upper staff, each instrumental part only takes every second note of the color. An instrument starting on the first pitch and playing every second note will play four notes the first time through the color, and will play the remaining three pitches when the color is repeated. In other words, because the color contains an odd number of pitches, individual instrumental parts repeat half as often as the color repeats, in order to produce the hocketing pattern. Hocketing patterns for *colores* with even numbers of pitches repeat with every reiteration of the color, but neither part plays all the members of the color; the parts do not trade material as they do in Figure 5-10. Hocketing affects rhythm in a similar way. Instruments do not play every onset shown in Figure 5-9; they play every second one, sustaining through till their next change of pitch.

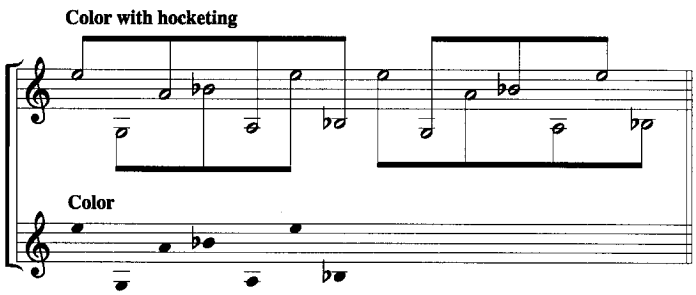

Figure 5-10. First color from the upper parts in Section 2, and its realization in a hocketing pair of voices.

The isorhythmic technique in the passage for piano shown in Figure 5-8 has a clear enough melodic shape to suggest that a pattern is at work, even without the listener identifying exactly what that pattern is. The isorhythms in the "Blocks" sections are less clear; their effect is predominantly that of microvariation. The complexity of the texture may however lead the listener to suspect that some sort of detailed pattern controls the microvariation. Additive rhythmic processes result in a gradual lengthening of durations,

and thus add a subtle background linearity to the nonlinearity of the isorhythmic procedure.

5.4 Canon and Round

When a canon is repeated so that its ending overlaps with its beginning, it is a round. The nonlinearity of the round form which comprises Subsection 3b contributes to a static sense at this point of repose in the work.

Figure 5-11 illustrates disguised imitation in Subsection 3b. The potential for an eternal structure inherent in a round suggests a permanent relationship between the two parts, as opposed to one part beginning first and the other imitating it. It thus seems quite natural to view both parts as being equally available to the composer at all points, which in this example allows Violin III to join the round in measure 215, with material which Violin I (already present) has not yet played. When Violin I begins to imitate Violin III in measure 218, it does so in the middle of a phrase. The effect of imitation is thus not emphasized by the entrance of a new instrumental part.

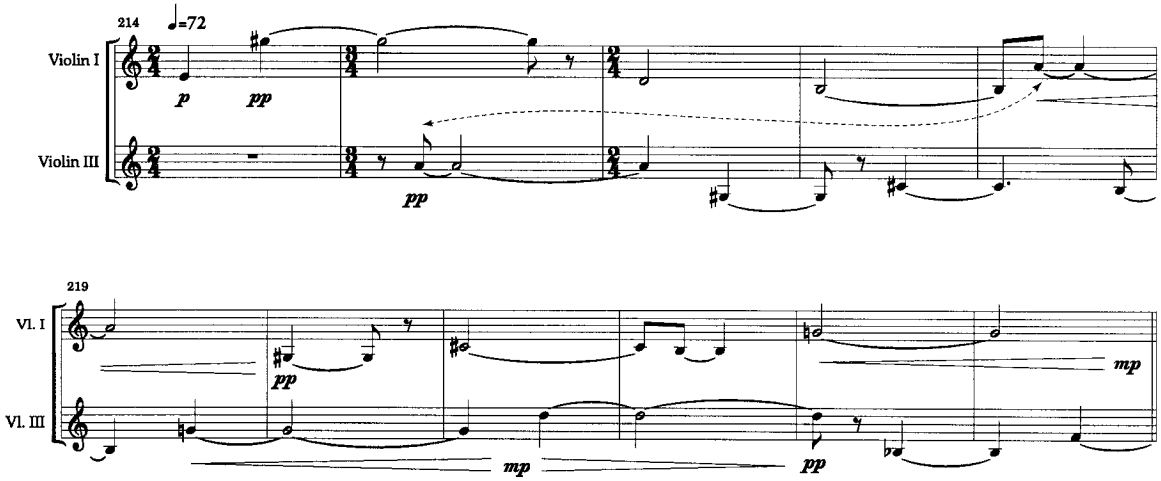

Figure 5-11. "Preview" rather than imitation in "Round/Canon I"

"Preview" and other means of disguising imitation are important in all of the rounds and canons in the work. Rounds and canons are used in order to produce a polyphonic texture permeated by a fixed body of melodic material; the traditional effect of a mannerized echo is somewhat avoided. The main part of Section 8 is a canon (there is no looping to form a round). All voices begin at once (Fig. 5-12), already in a canonic/ desynchronized state, the theoretical beginning of the canon having been truncated. The counterpoint here is not actually one five-part canon but rather two simultaneous canons, one in the top three voices, and one in the lowest two voices. The stratification of the counterpoint corresponds to the polytonal stratification of the structural pitch collections in use, as previously indicated in Figure 4-1. In the excerpt below, the upper layer derives from D major and the lower layer derives from D♭ major.

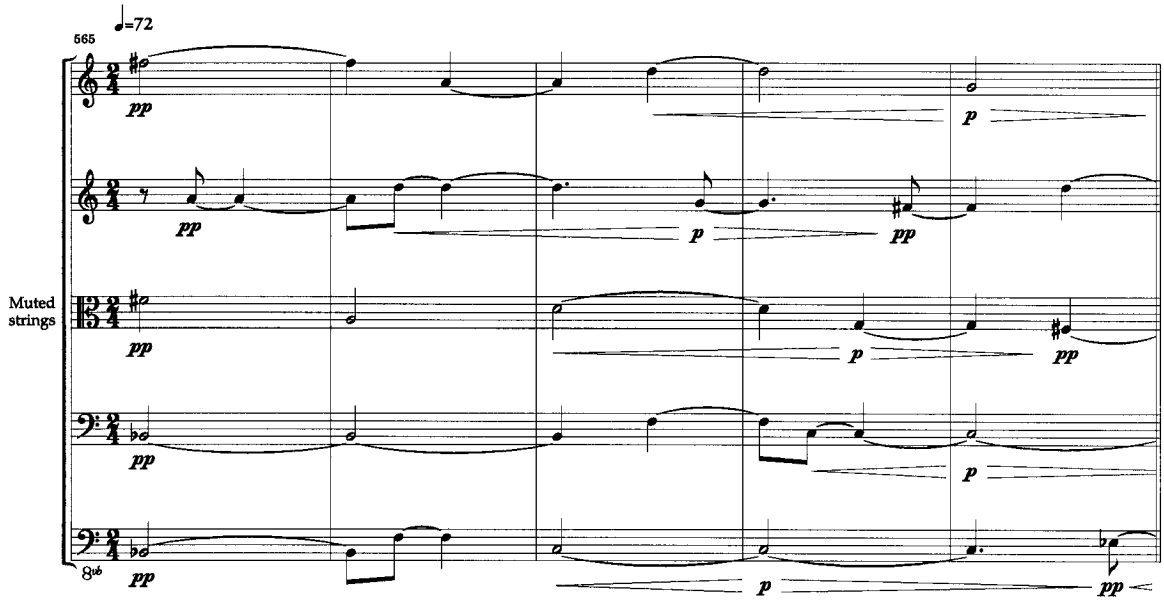

Figure 5-12. Five-part counterpoint from the beginning of Section 8

The canon in Section 8 is interrupted three times (mm. 587-589, 594-597, and 599-605) by faster material which is also given an imitative setting. These intrusions are

independent of the main canon in the section, with their own points of imitation. The first two are miniature canons. The last intrusion is longer and its parts loop to form a round.

CHAPTER SIX

FORMAL DESIGN II

Chapter Three presented a general description of the form in *Apparent Motions.* The chapters which followed explained a number of specific techniques which now enable us to address several advanced issues relating to musical form.

6.1 Multiply-Directed Linear Time: Preliminary Observations

Multiply-directed linearity exists at the highest level of formal hierarchy in *Apparent Motions,* that is to say the level at which sections are related to one another. The characteristic thematic traits outlined in Chapter Three allow us to identify distinctive elements as they return over the course of the work. The modifications which we hear when thematic material returns produce separate developmental paths for each evolving element, as shown in Figure 6-1.

Figure 6-1 traces the trajectories of important themes in the work. Direct relationships are shown by solid lines. Dotted lines connect the "Voices" sections to "Stifle" because the minute melodic cells in "Stifle" amount to a rather indirect connection to preceding material. As was explained above, most of "The Final Meltdown" is comprised of material clearly linked to "Hustle and Bustle" and "Contraptions," so solid lines show these links. The other references in "The Final Meltdown," though quite clear, are very brief, so these secondary links are shown with dotted lines.

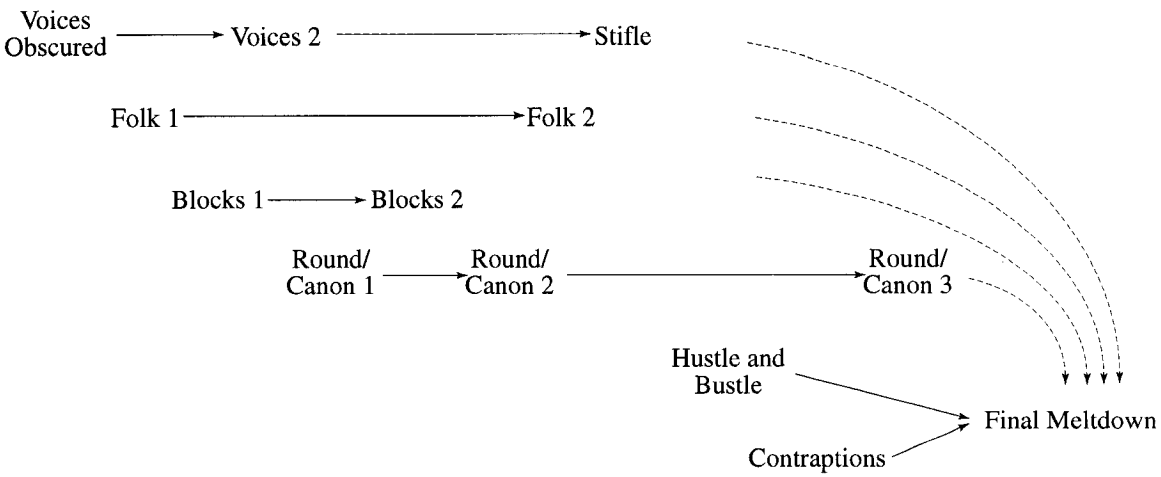

Figure 6-1. Multiply-directed linearity at the highest level of formal hierarchy

Most sections of the work have linear features in their internal construction. Some of the sources of linear progression have been identified. The "Voices," "Folk," "Hustle and Bustle," "Contraptions" and "Final Meltdown" sections all feature motivic growth using techniques which have been outlined. An additive rhythmic process provides gradual change in both of the "Blocks" sections, and in the second one there is also a progression from long crescendi in the whole ensemble to short crescendi scattered amongst different instruments. The only section which is nonlinear is the "Round/Canon 1" subsection. It serves as a temporary suspension of musical growth, without permanently halting the unfolding of the piece. As the first of three slow polyphonic sections, it is also a static starting point from which the others evolve. "Round/Canon 2" has a clear textural and registral expansion. "Round/Canon 3" has a slow quiet layer whose evolution is mostly harmonic; this layer is overtaken by the more active material which intrudes upon it.

The internal linearity of the sections which make up *Apparent Motions* is important in the perception of multiply-directed linearity at a higher level. When a section shows a tendency to grow, its interruption by another section frustrates that growth. This helps to realize an objective stated in Chapter One, "the perceived inability of materials to develop in a satisfying way." However, linear developments within sections often take place slowly. Microvariation and microdevelopment result in motivic transformation of a gradual nature. Cyclical harmonic organization can also form internal nonlinearity of pitch within sections, as will be discussed more below. Overall, a slow rate of local development is ideally suited to the large-scale formal objective of multiply-directed linearity. Sections exhibit a "desire" to grow, yet to the extent that this desire is realized, it is only done over the course of the whole. Chapter One refers to a terraced rather than arched developmental shape; the most significant implementation of this shape is in the discourse between sections. Often when a recognizable theme returns, it exhibits newly varied traits immediately upon its return, as if it had continued to develop even in sections where it was not heard, perhaps influenced by the musical events which transpired in its absence.

6.2 Relation of Harmonic Cycles to Form

The system of harmonic cycles is neither purely linear nor purely nonlinear. It is not completely nonlinear because it is not completely cyclical. The cycle does not repeat endlessly; its contents gradually change. The change in the contents of the harmonic cycle amounts to a slow linear transformation throughout the work. Meanwhile, some

members of the cycle are preserved. Their reappearances send clues indicative of a circular structure. Neither circularity nor linearity alone presents the whole picture.

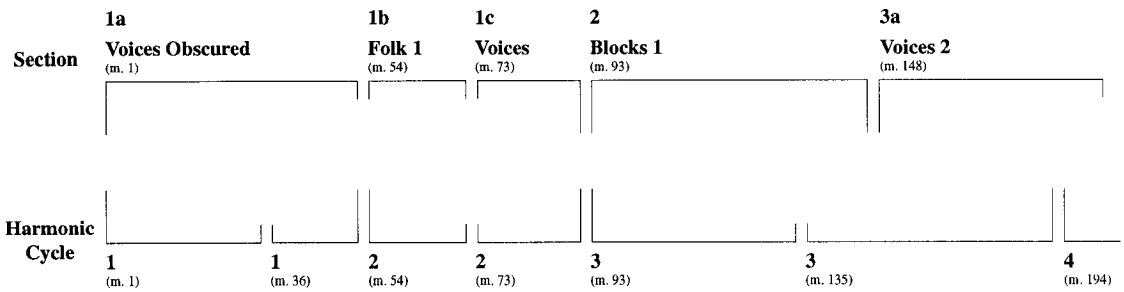

Figure 6-2. Relationship between harmonic cycles and sectional structure in the first part of the piece

The recurrence of structural pitch collections is particularly evident in the first few sections of the work. One reason for this is recognizability of the first chord. It occupies a special place in our memory due to its position in the piece. It also has particular harmonic significance because A is its bass note. A is a significant pitch in the first cycle: all of the chords have A in the soprano, and A minor is the implied tonality of the melodic layer throughout Subsection 1a. The potential of the first chord to act as a referential sonority is repeatedly exploited until the appearance of the fourth harmonic cycle, when the first member of the cycle is changed. Crescendi in the chordal layer remind us of the first sonority several times (mm. 2, 7-11, 18-20) prior to the first change of harmony. Recurrences of the first sonority are also coordinated with several important sectional divisions (Fig. 6-2). The reinforcement of form by referential sonority is particularly clear at the beginning of Subsection 1c (m. 73). Recurrences of the first chord operate in a more subtle way at the beginnings of Subsection 1b and Section 2 by placing the harmony in new textural contexts. On the other hand, the texture introduced at the

beginning of Section 2 returns along with the same harmony in measures 135-143, creating a strong cue for the conclusion of that section. The referential harmony then persists into the beginning of Section 3, thus contributing to a blurring of gestural cues as to beginnings and endings. Following the change of the first member in the fourth cycle, the listener will probably no longer sense a specific beginning point of the remaining cycles, although recurrences of various members will still be apparent.

6.3 Interruption and Conflicting Materials

We have established that multiply-directed linearity arises through a discourse in which sections with well-differentiated musical material interrupt one another. Interruption also takes place at lower levels of formal hierarchy, helping to establish a musical language in which the large-scale interruptions belong. Subsection 1b, "Folk 1," is an important interruption in the work because it occurs near the beginning, establishing interruption as a significant formal factor early on. Subsection 1b operates at an intermediate structural level. It returns quickly to the type of material which preceded it, and thus it is not as long a suspension of developmental trajectories as others which occur later.

Prior to Subsection 1b, a discourse of conflicting musical elements is already present in the "Voices" idea, as has been described, with crescendi in the sustained chordal layer frequently intruding upon the active melodic layer. This conflict has further ramifications as the work continues. In measures 139-146, the crescendo motive from "Voices" intrudes on another section, "Blocks 1." The intrusion brings about the end of the section: the isorhythmic "Blocks" material cuts off at measure144, in the middle of

the crescendo. Following a silence, "Voices 2" begins. This sort of antagonism between thematic elements helps to portray them as having difficulty growing in a satisfying way. A related type of conflict is the failure of elements to coordinate with each other. At measure 156 the melodic layer in the pianos changes from one pattern to another, without the support of a change of harmony. When the chordal layer makes its own move in measure 159, it is with a "retaliatory" crescendo. Following another interruption of silence in measure 166, the pianos briefly resume their pattern before finding a new one in measure 169. Discontinuity here interferes with the musical flow, acting not to clarify the structure of the melodic material in the pianos but rather to segment it in a disruptive way. The fact that silence sometimes collaborates with the work's structure allows it to keep its potential potency for disruption at other points.

6.4 Multiply-Directed Linearity and Nondirected Linearity: Conclusions

The fact that many developmental trajectories illustrated in Figure 6-1 point towards the last section should not be misconstrued as evidence of linearity towards a single goal. Assuming for a moment that Section 9 actually does function as a goal, there would still be multiply-directed linear time in the work. Multiply-directed linearity results from the coexistence of more than one developmental vector, and the interruption of these vectors by one another. The intersection of developmental trajectories at the end of the work does not erase the multiple paths the listener has followed up until that point.

At any rate, Section 9 does not function as the goal of linear thematic development. There is no reason to believe that the themes as they appear in that section are the definitive or superior versions. There is no synthesis of the themes juxtaposed in

measures 651-683, no resolution to be found in the abrupt cutting from one to another. While the events of Section 9 reflect certain "goals" of compositional strategy; these "goals" are the composer's objectives, they are not the goals of a linear musical progression.

The implication of the above paragraph is that the developmental trajectories in Figure 6-1 are not goal-directed but nondirected. The consequence seems shocking at first, in that we would have to conclude that the piece as a whole actually exhibits multiply-*non*directed linearity. Kramer does not identify a temporal mode with that name, although he could have. The linguistic disincentive for such a term is obvious. Non-directed linearity alone may seem self-contradictory if not properly understood; the idea of a piece of music simultaneously moving in more than one "nondirection" is even worse. An examination of nondirected linearity may bring about some clarity.

Nondirected linearity lacks a clear goal. It may actually imply a sense of direction, so long as it never culminates in an unequivocal resolution; in that case we would have traditional goal-directed linearity. Goal-directed linearity really only applies to tonal music. No other musical phenomenon asserts an unequivocal goal at a high level of structural importance the way tonality does. Thematic transformation, for instance, can lead towards many possible conclusions.

If linearity in non-tonal music is always nondirected, then multiply-directed linearity in non-tonal music must also be nondirected, regardless of the difficulties which arise in terminology. It seems that Kramer wishes to avoid these difficulties, despite the

fact that many of the pieces he gives as examples of multiply-directed linear time are atonal.[27]

The fact that the end of *Apparent Motions* does not function as a linear goal is important to the objectives stated in Chapter One. Although thematic materials such as those characteristic of "Voices," "Folk," and "Blocks" have been shown to evolve during the work, there is no indication that their final state is an improvement over their original state. Interruptions and conflicts between various thematic elements during the work anticipate an ending that offers no reconciliation. The development of important themes along multiple linear paths may suggest a tendency towards musical progress, but these paths ultimately prove to be nondirected. In the final section, themes continue to interrupt each other and are presented in contrast to one another. The continued presence of multiple themes at the end portrays no theme as triumphant above the others.

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[27] Kramer 47-49.

SUMMARY

This paper has shown the realization of the objective to create a piece which demonstrates an individual approach to musical time. The coexistence of linear and circular principles of construction has been illustrated with regards to large-scale formal design and a motivic development. Coexistent circular and linear features have also been identified in the system of pitch organization. Constructive principles have been related to the conclusions of the analysis, which state that *Apparent Motions* unfolds in multiply-directed linear time. Conclusions also examine the relationship between multiply-directed linearity, nondirected linearity, and the idea of musical progress.

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Justin Mariner

Apparent Motions

for 15 musicians

Commissioned by the Société de musique contemporaine du Québec
with the assistance of the Canada Council for the Arts

INSTRUMENTATION

Left Group:

Percussion I:
- 3 tom-toms
- xylophone
- tubular bells

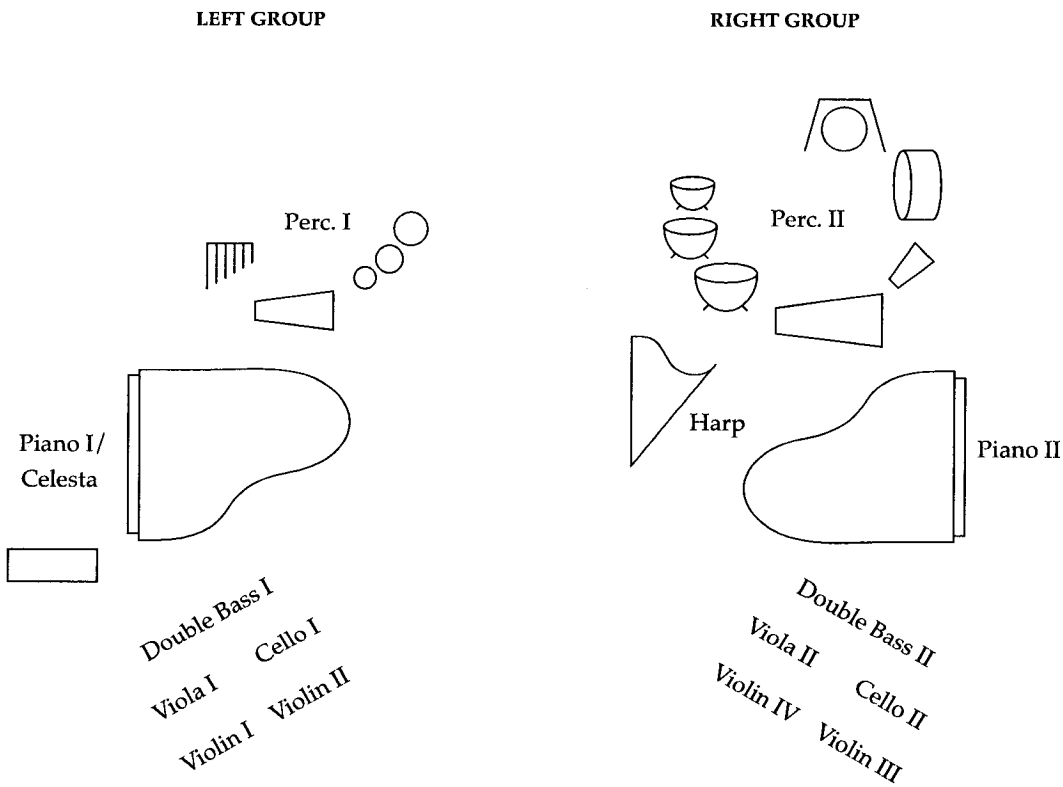
Celesta / Piano I
Violin I
Violin II
Viola I
Cello I
Double Bass I

Right Group:

Percussion II:
- 3 timpani
- tam-tam
- bass drum
- glockenspiel
- vibraphone
- tubular bells

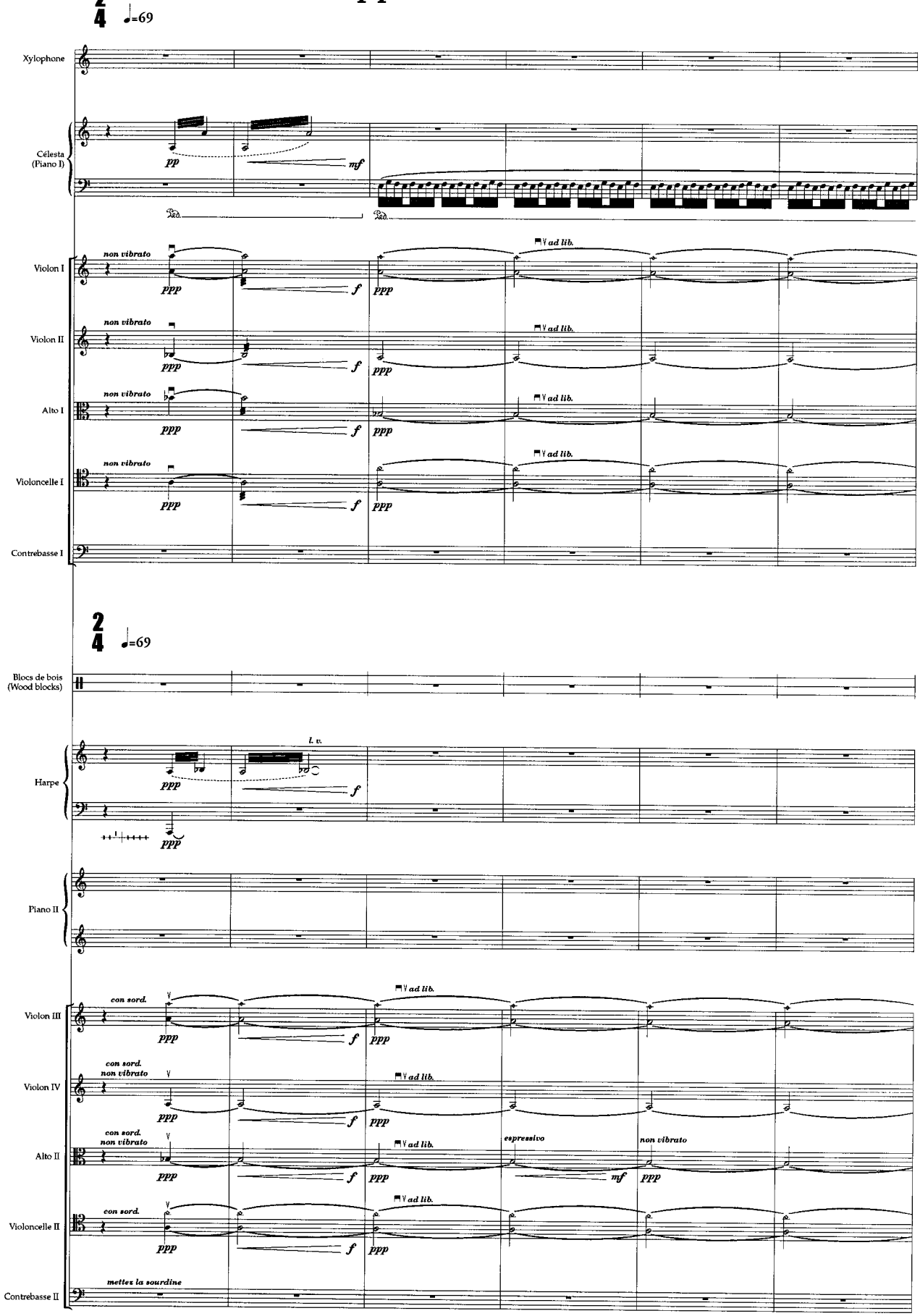
Harp
Piano II
Violin III
Violin IV
Viola II
Cello II
Double Bass II

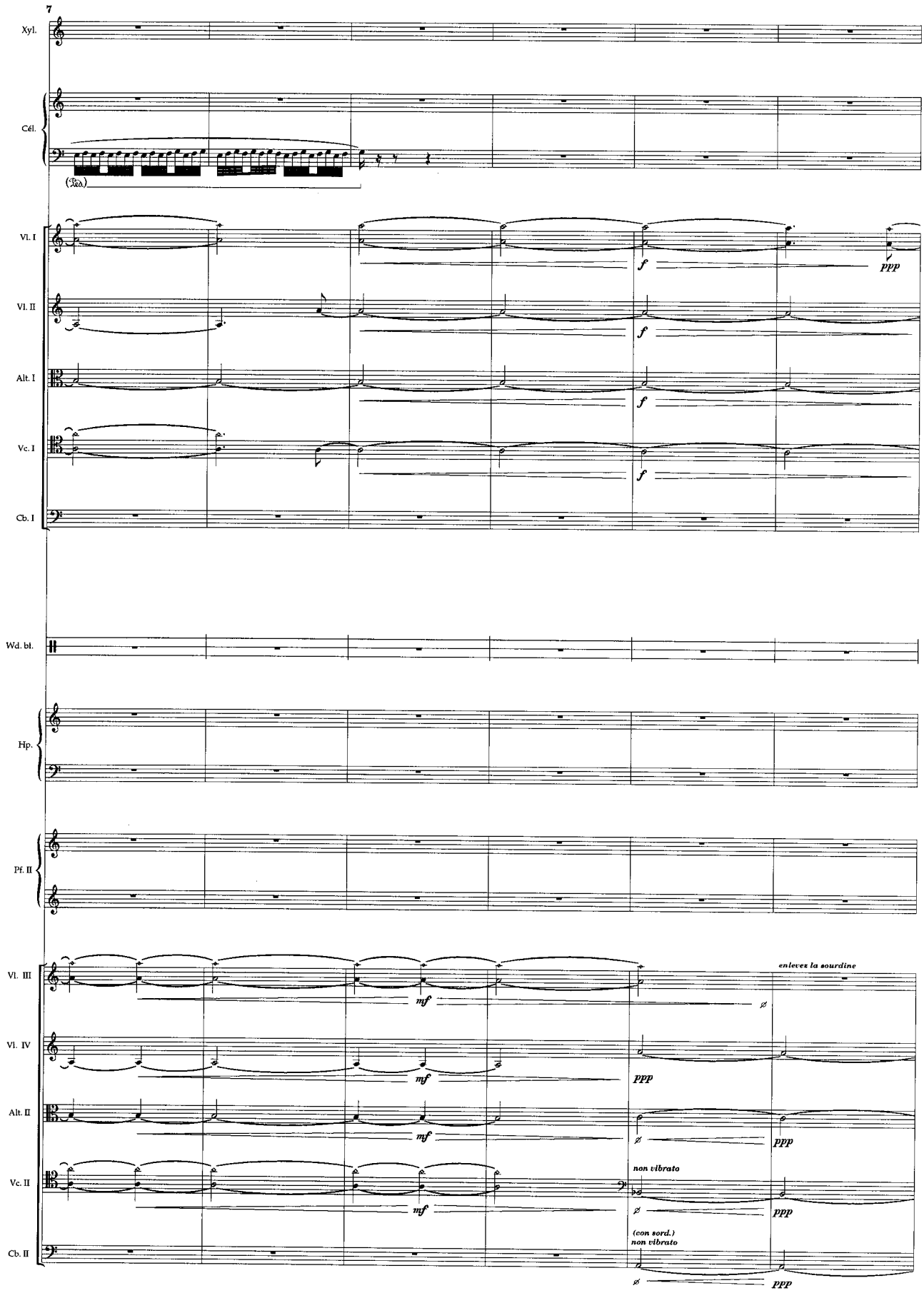
SETUP

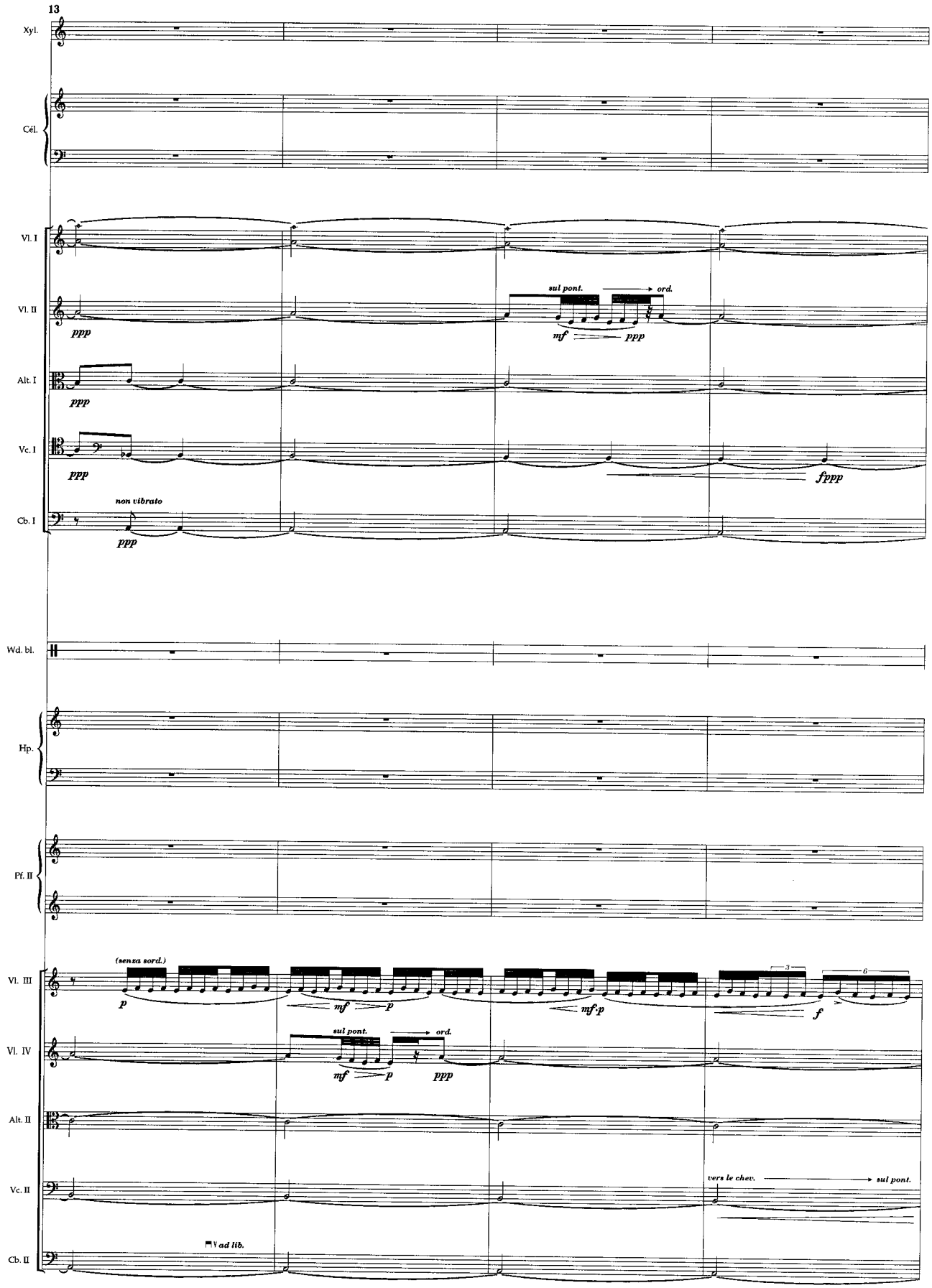


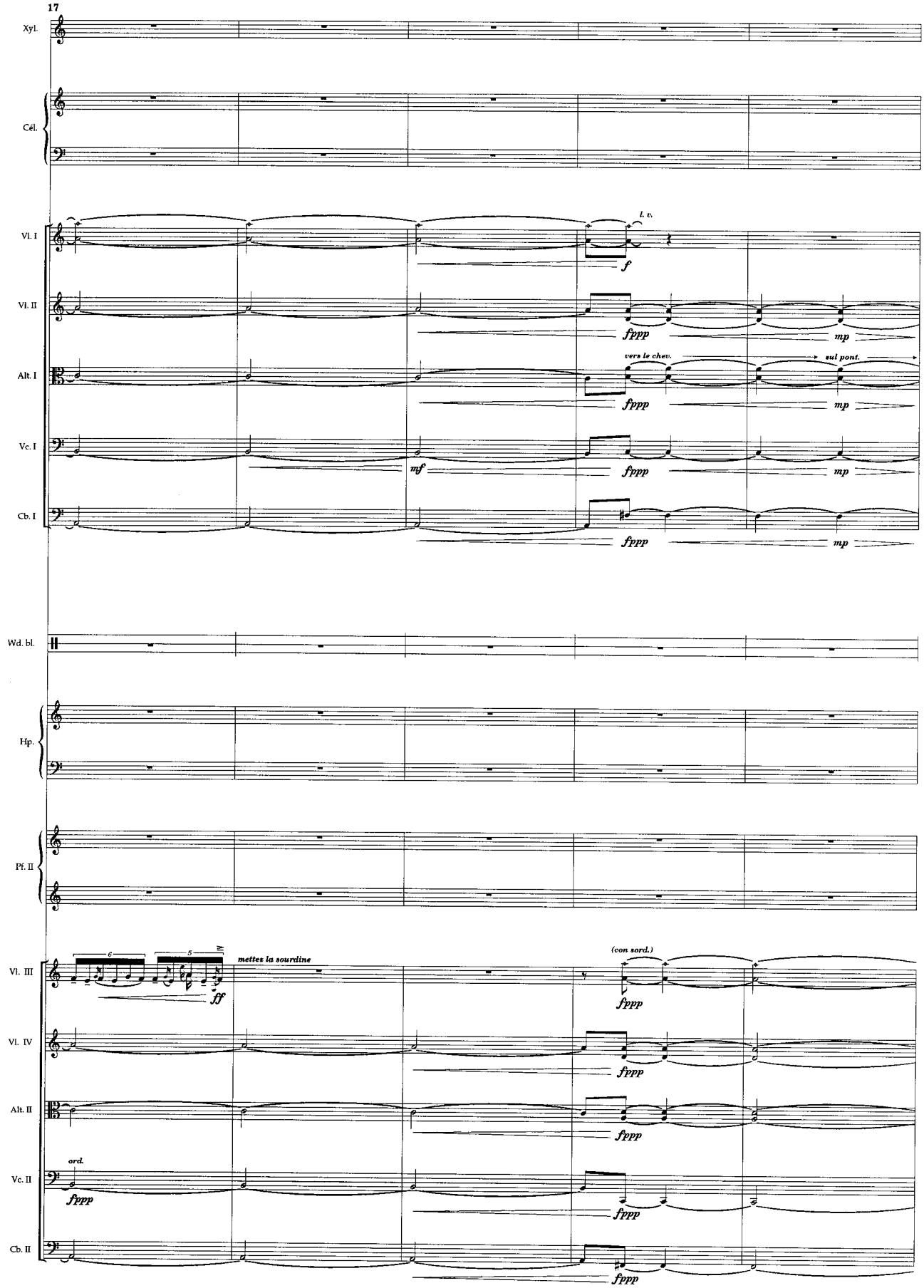
Apparent Motions

Justin Mariner




7
Xyl.
Cél.
(Ped.)
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
f
ppp
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
mf
enlevez la sourdine
non vibrato
(con sord.)
non vibrato


13
Xyl.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
ppp
sul pont.
ord.
mf
ppp
non vibrato
fppp
(senza sord.)
p
mf
p
mf:p
f
3
6
ad lib.
vers le chev.
sul pont.


17
Xyl.
Cél.
Vl. I
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Alt. I
Vc. I
Cb. I
l. v.
f
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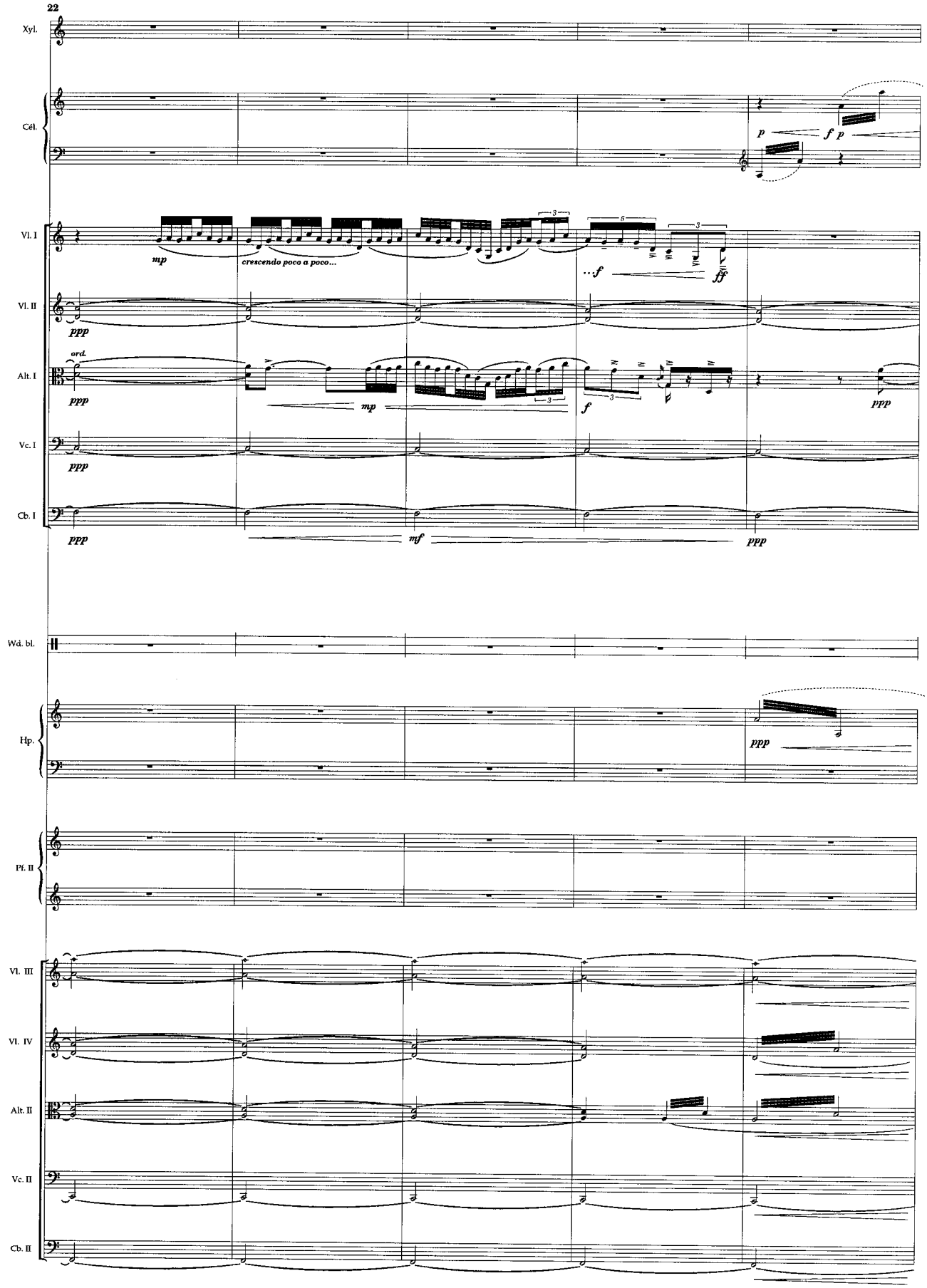
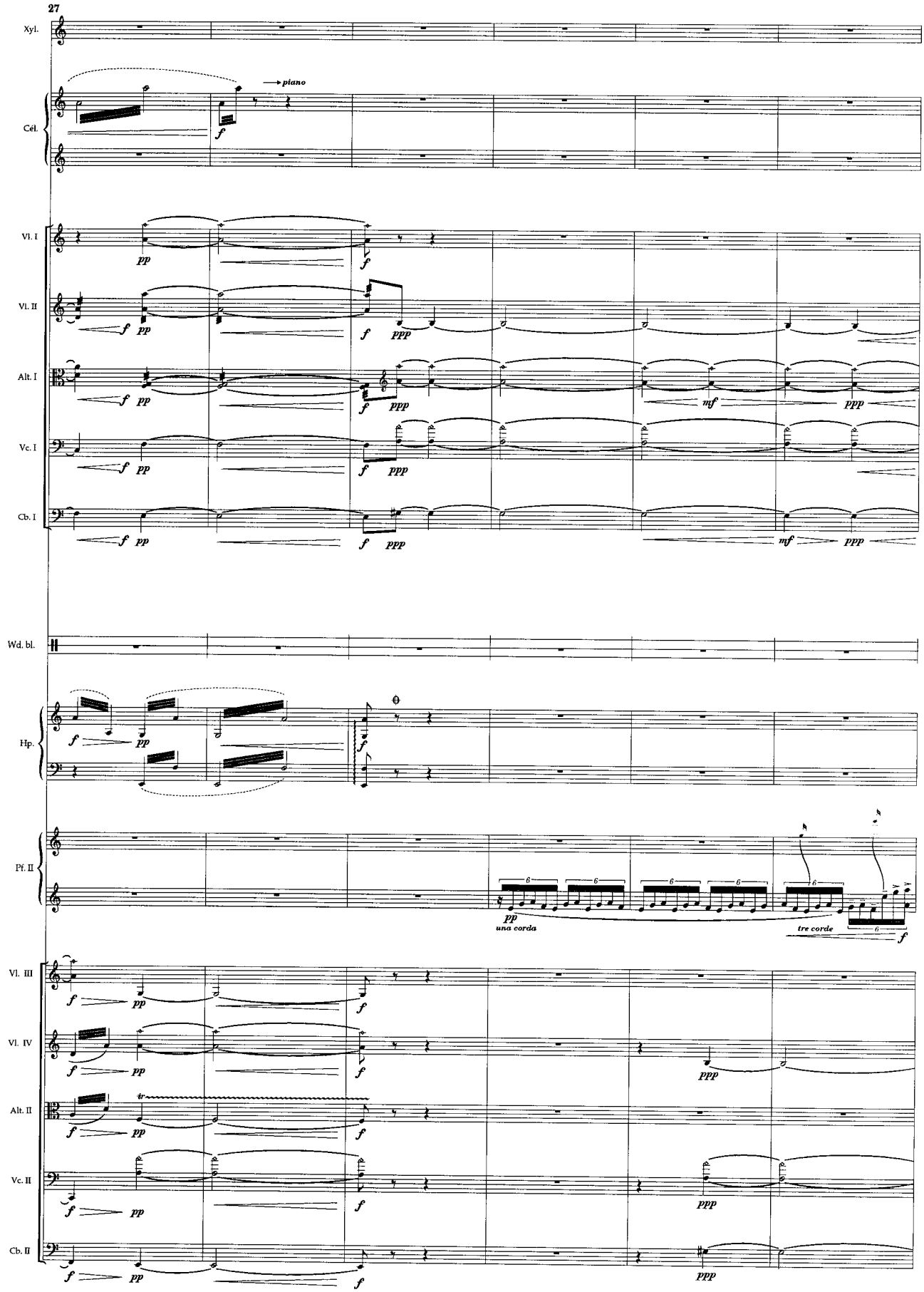
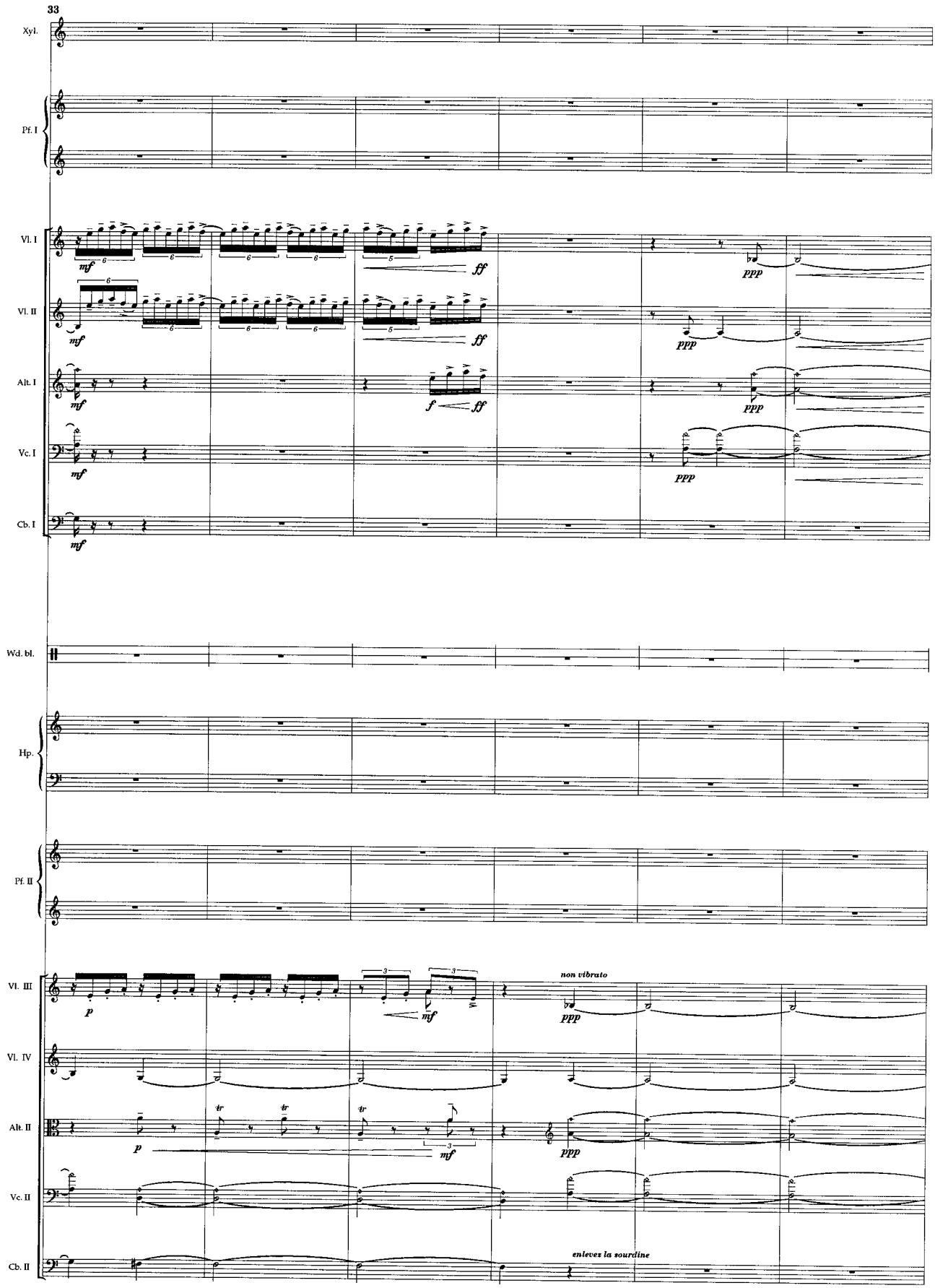
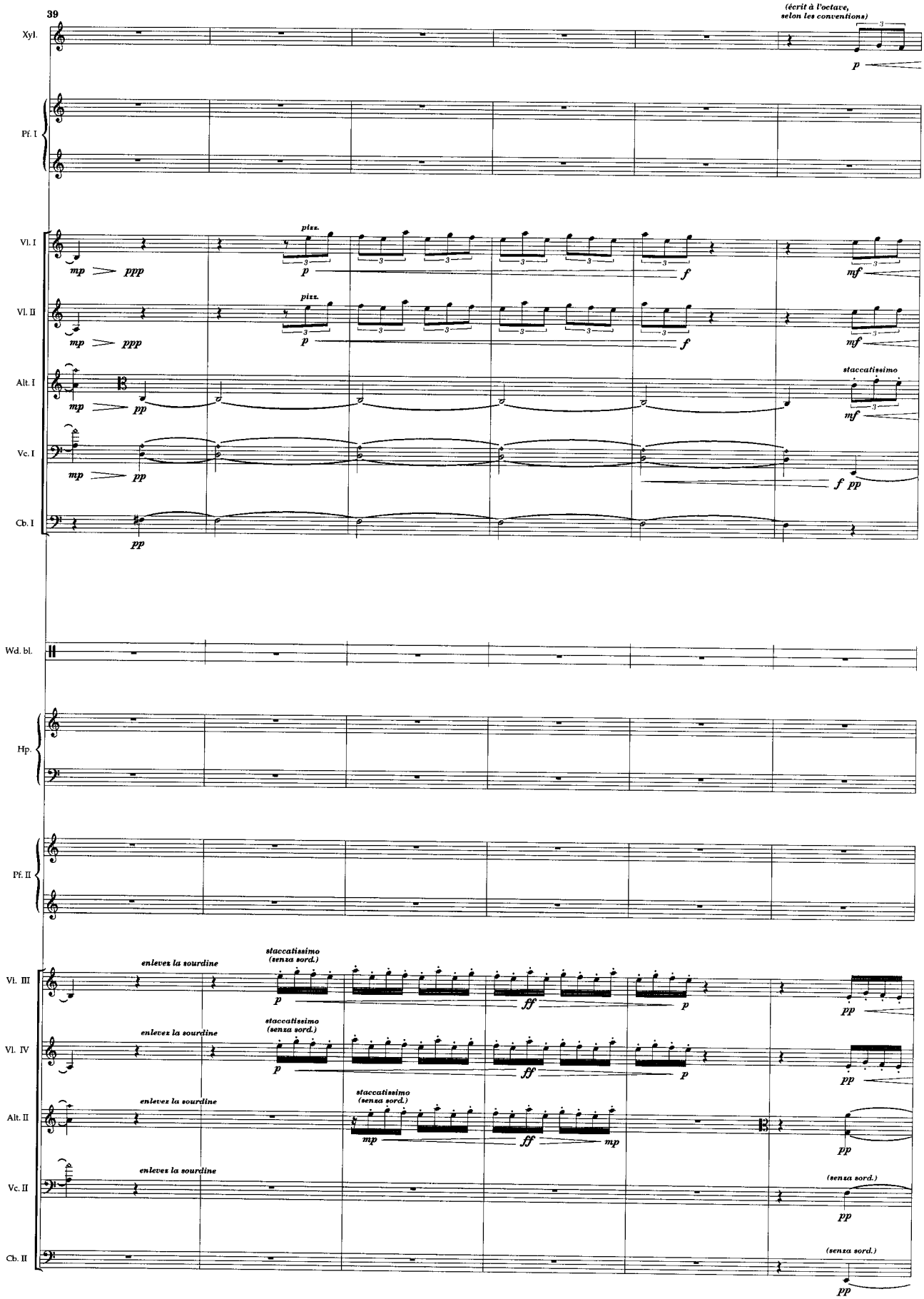
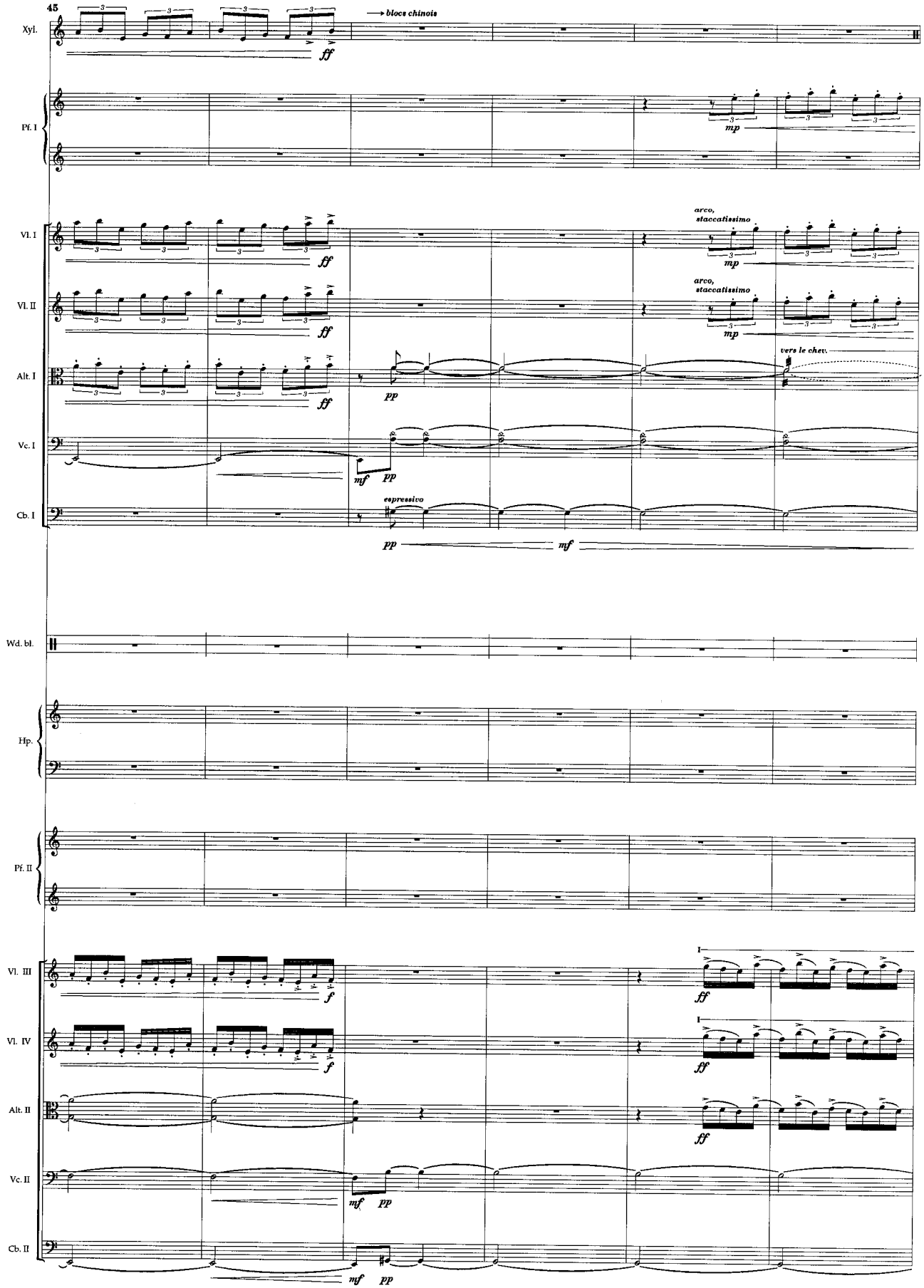
vers le chev.
sul pont.
mf
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
mettes la sourdine
ff
(con sord.)
ord.

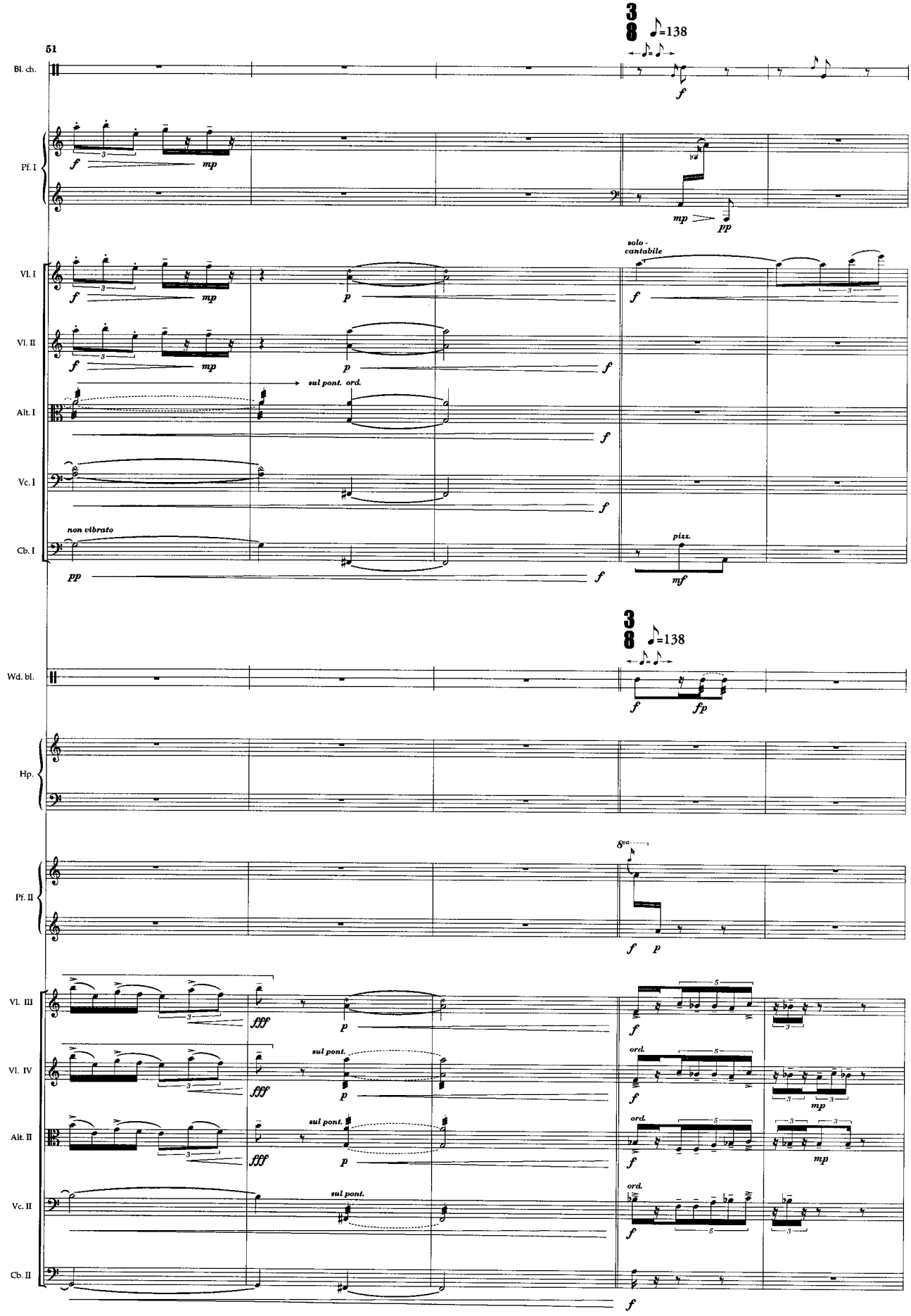

22
Xyl.
Cél.
p
f p
Vl. I
mp
crescendo poco a poco...
...f
ff
Vl. II
ppp
ord.
Alt. I
ppp
mp
f
ppp
Vc. I
ppp
Cb. I
ppp
mf
ppp
Wd. bl.
Hp.
ppp
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

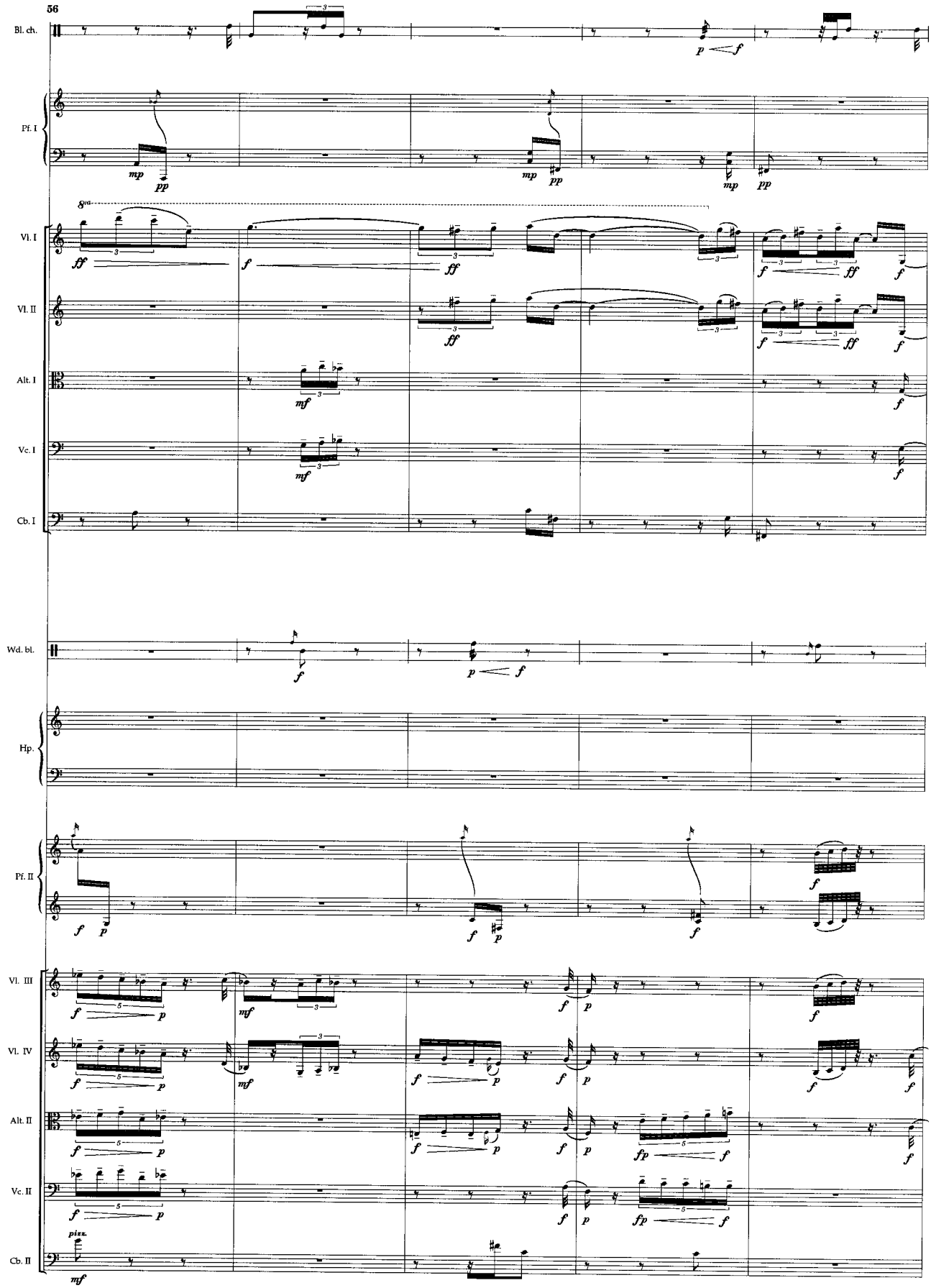

27
Xyl.
Cél.
piano
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
una corda
tre corde
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

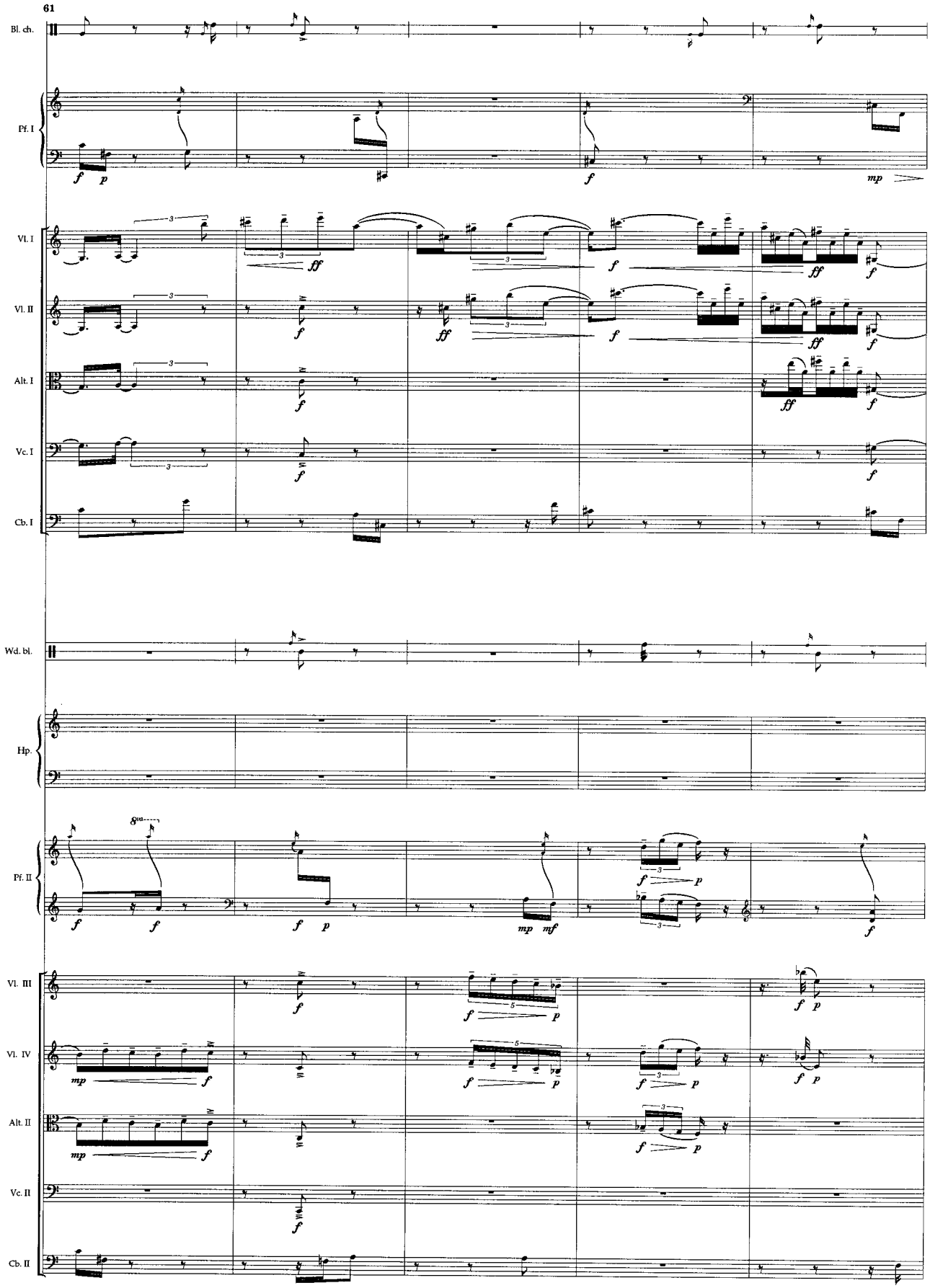

33
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
mf
ff
f
ppp
p
non vibrato
enlevez la sourdine

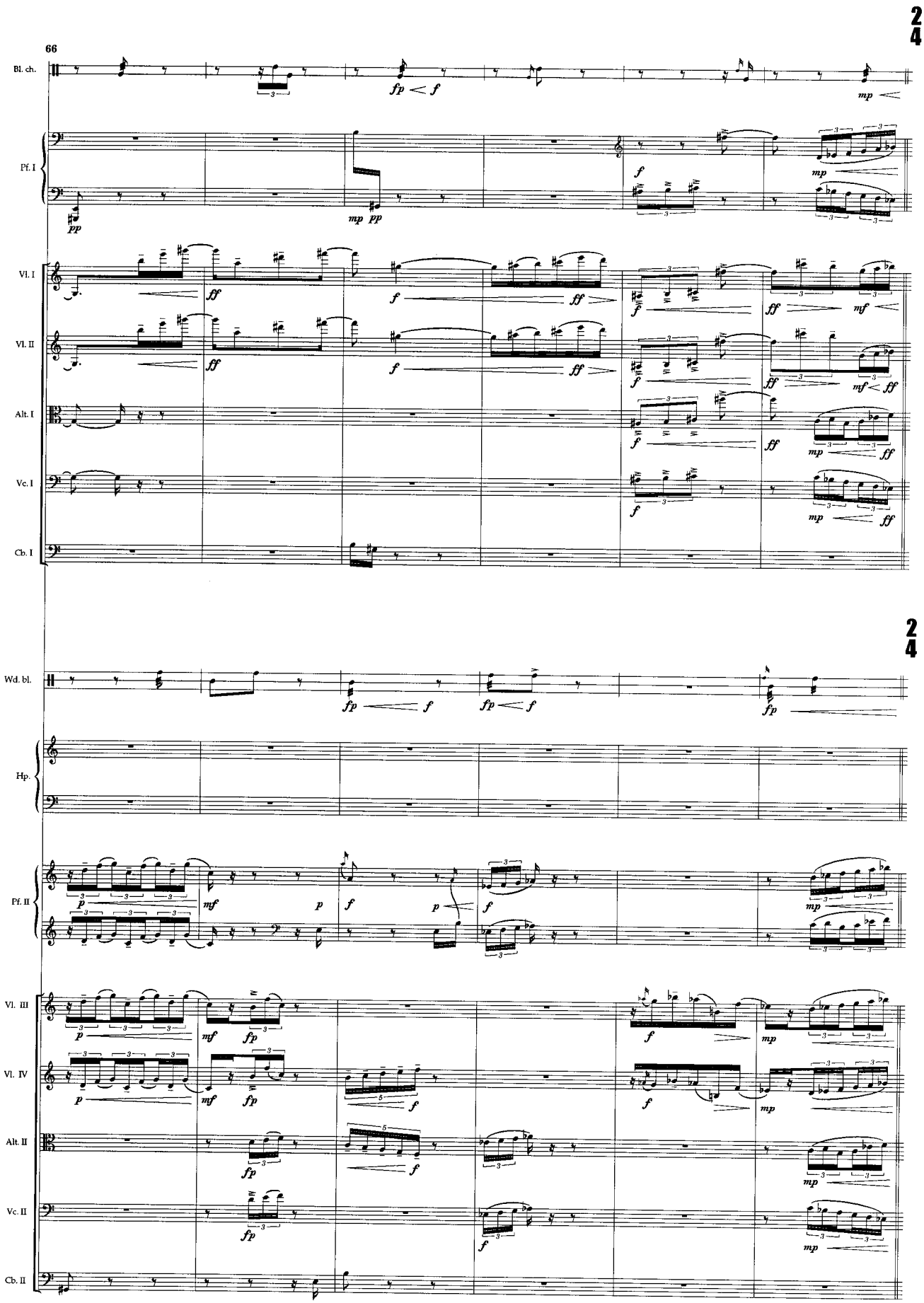

39
(écrit à l'octave, selon les conventions)
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
pizz.
staccatissimo
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
enlevez la sourdine
staccatissimo (senza sord.)
(senza sord.)

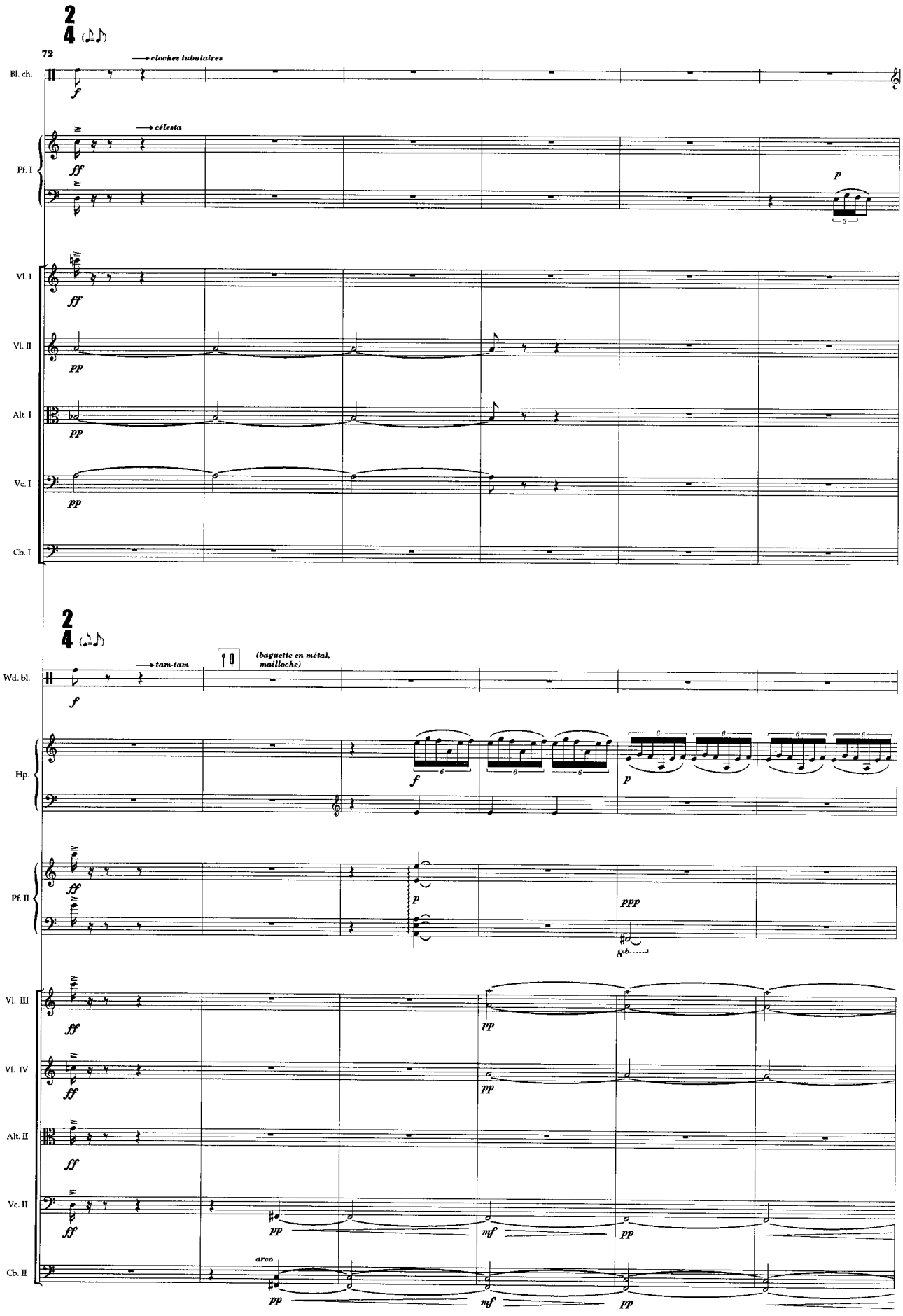

45
Xyl.
→ blocs chinois
ff
Pf. I
mp
Vl. I
arco,
staccatissimo
mp
Vl. II
arco,
staccatissimo
mp
Alt. I
vers le chev.
pp
ff
Vc. I
mf
pp
Cb. I
espressivo
pp
mf
Wd. bl.
Hp.
Pf. II
Vl. III
I
ff
f
Vl. IV
I
ff
f
Alt. II
ff
Vc. II
mf
pp
Cb. II
mf
pp

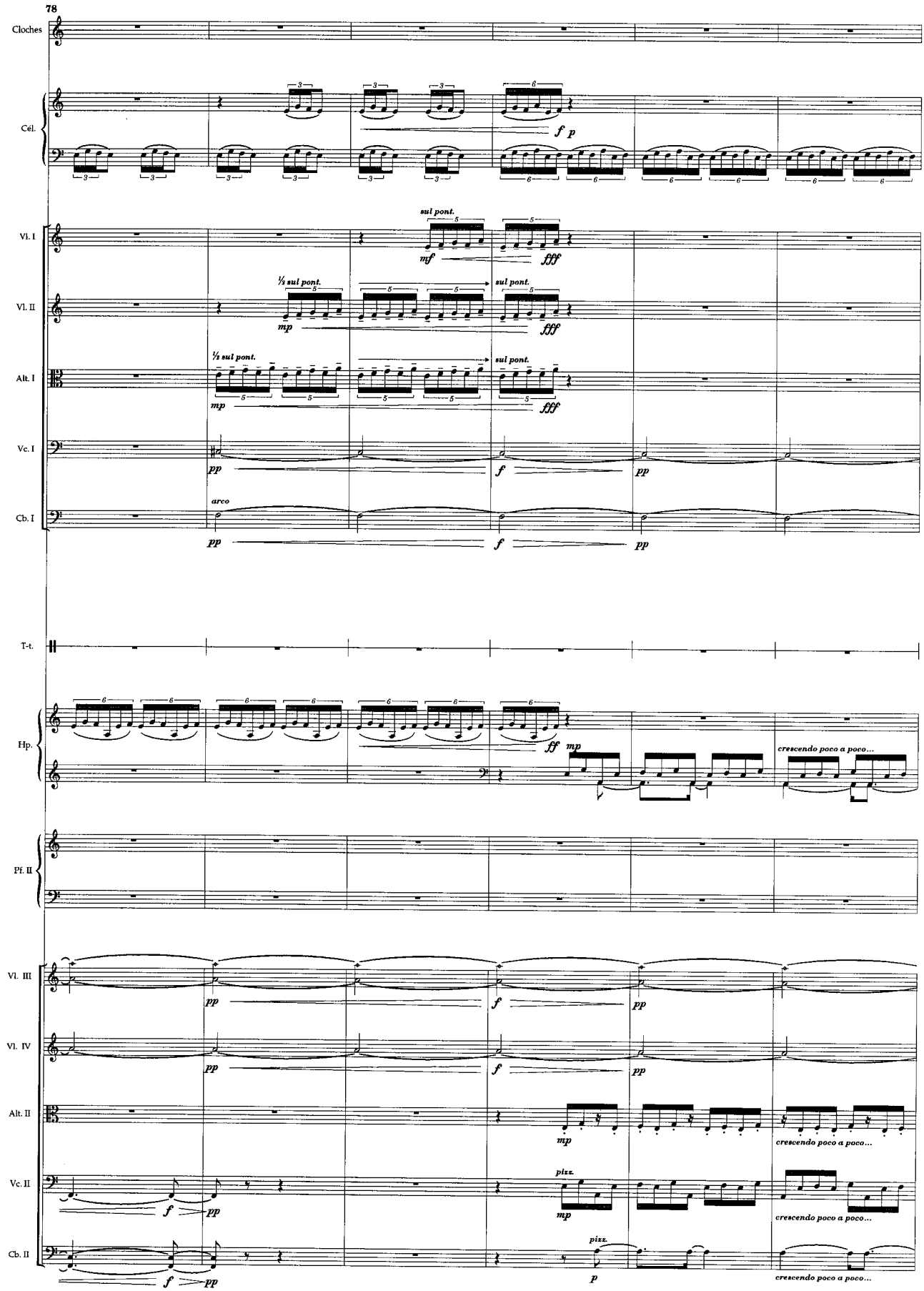

51
Bl. ch.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
3/8 ♪=138
solo - cantabile
sul pont. ord.
non vibrato
pizz.
8va
sul pont.
ord.

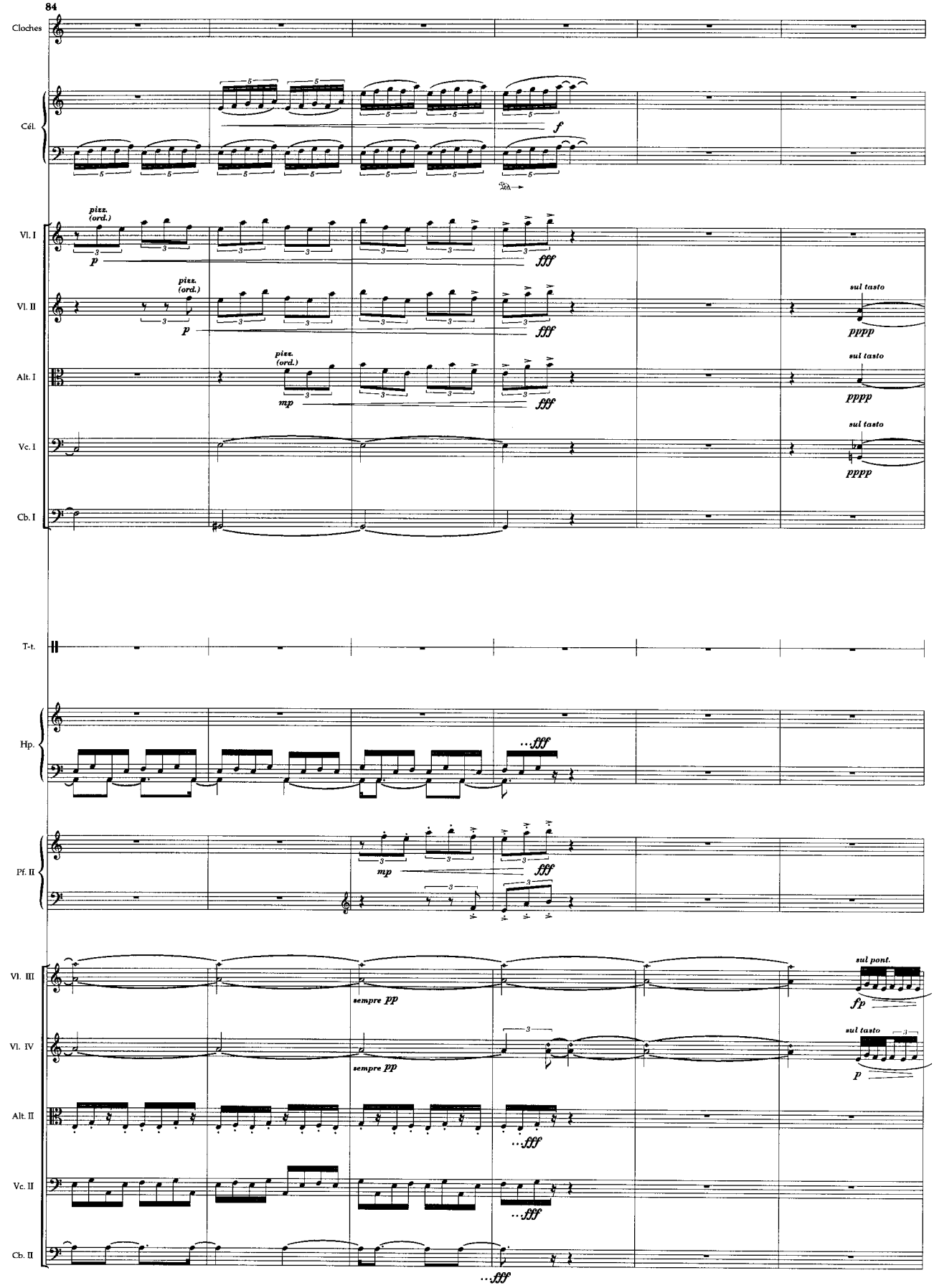

56
Bl. ch.
Pf. I
8va
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.

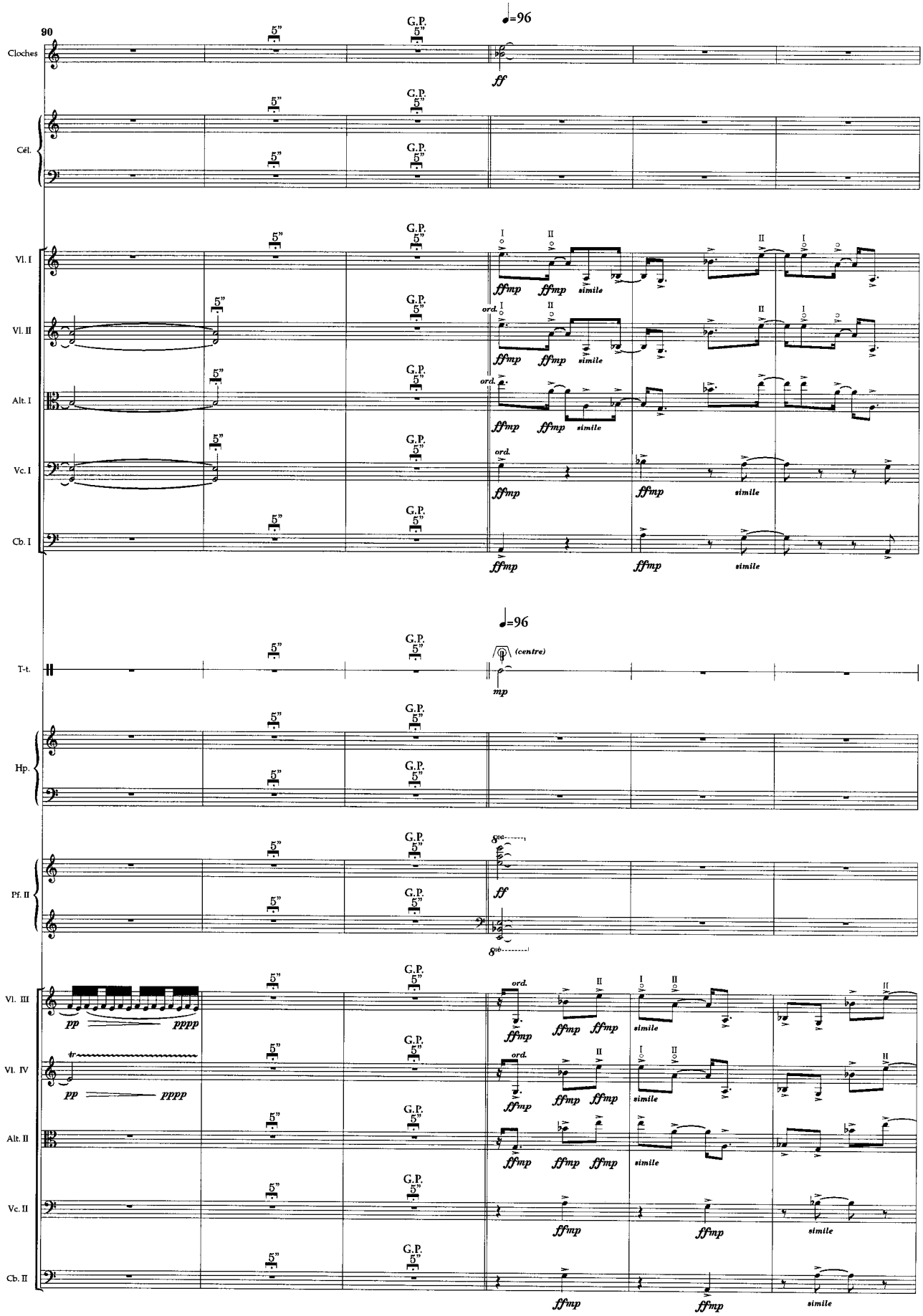

61
Bl. ch.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

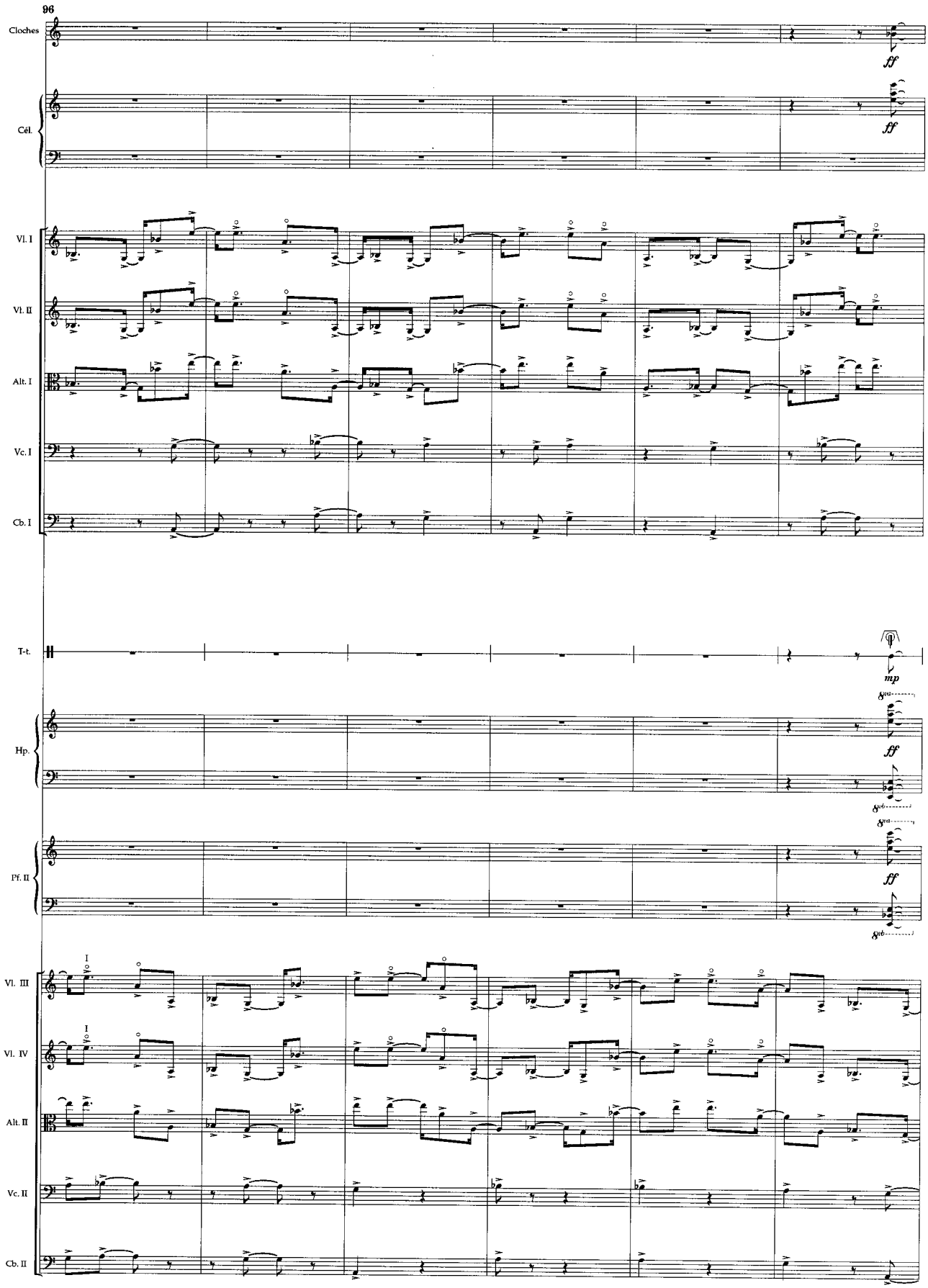

66
Bl. ch.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

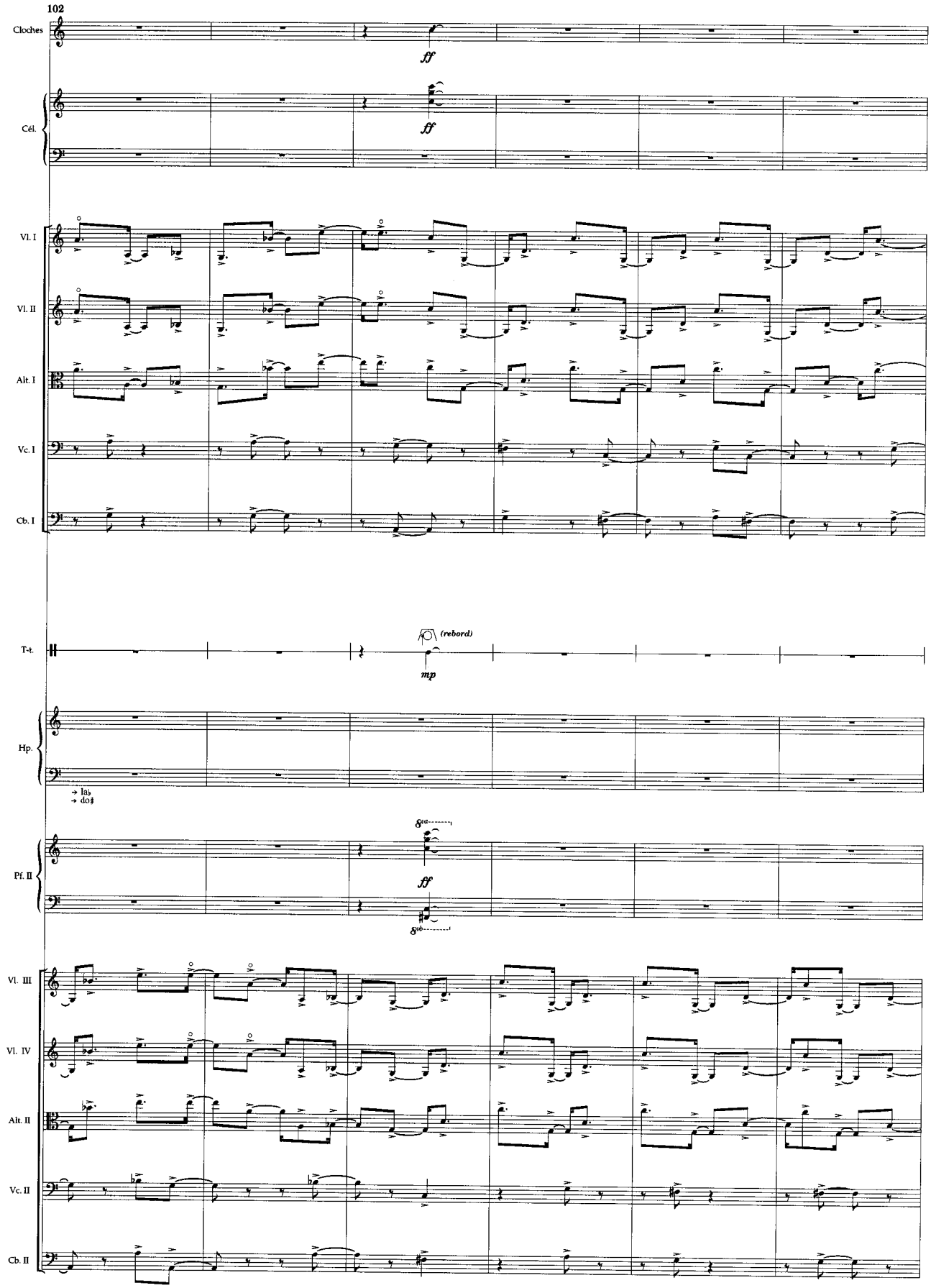

72
Bl. ch.
cloches tubulaires
célesta
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
tam-tam
(baguette en métal, mailloche)
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
arco

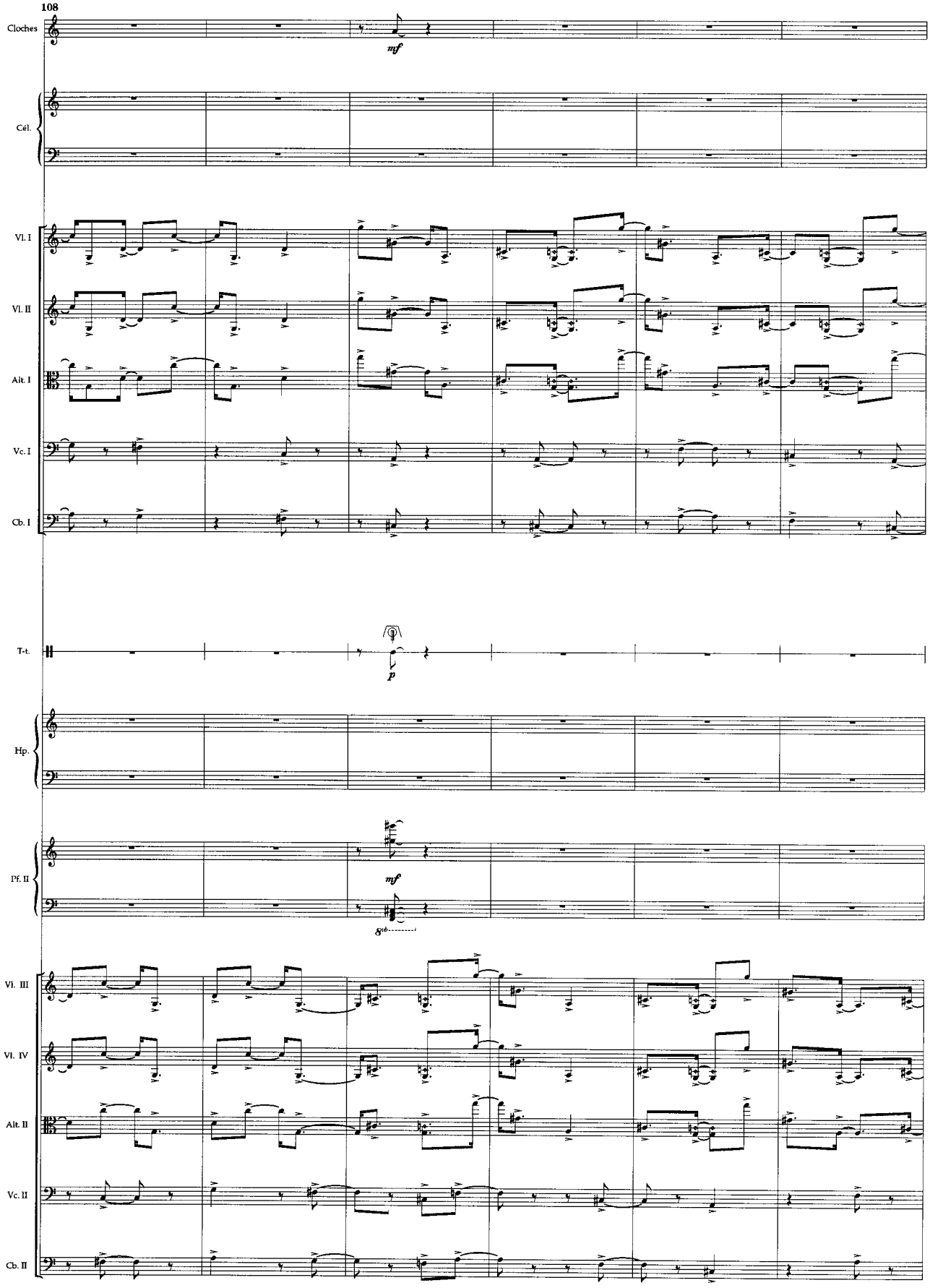

78
Cloches
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
sul pont.
½ sul pont.
arco
pizz.
crescendo poco a poco...

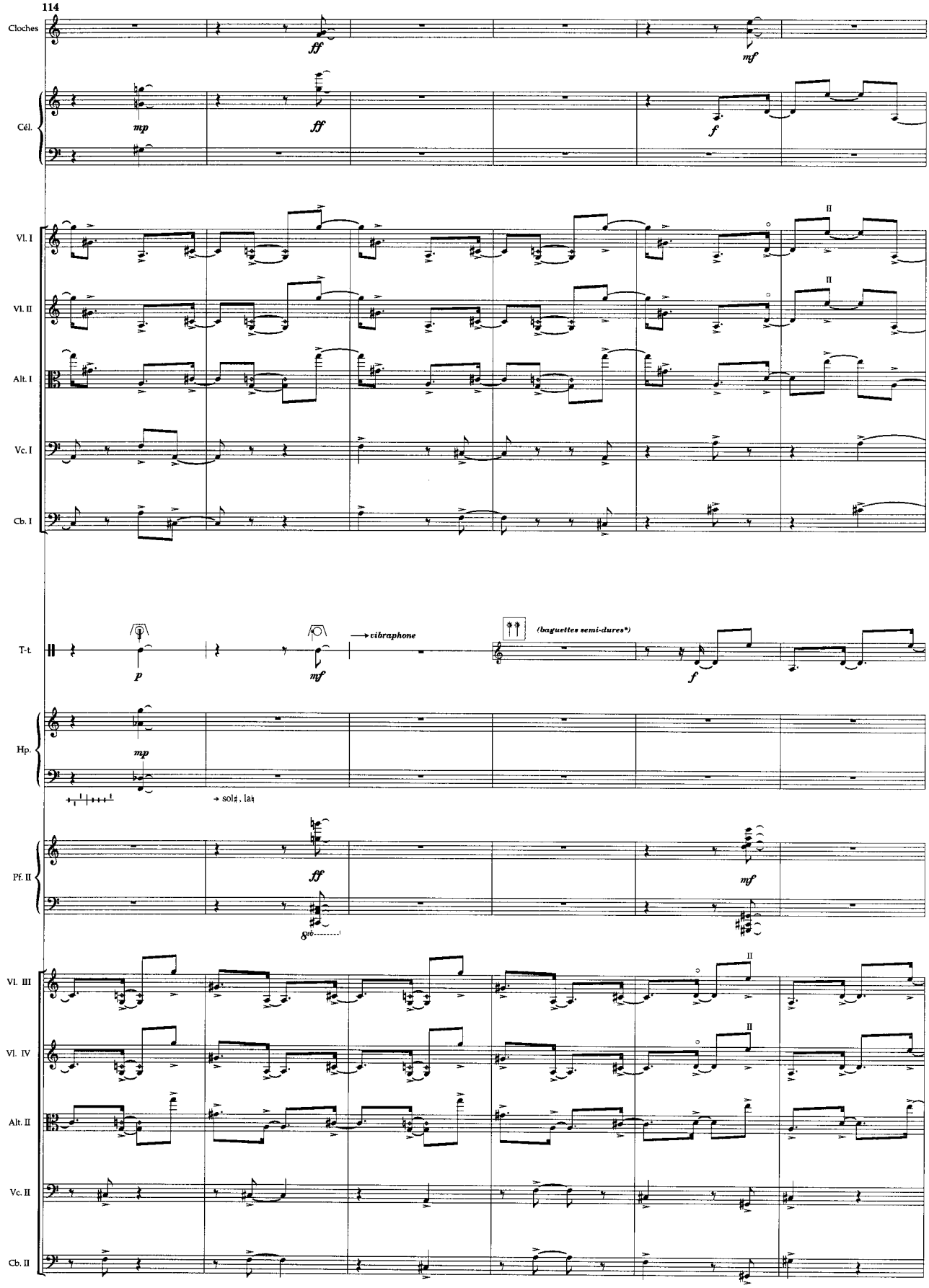

84
Cloches
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz. (ord.)
sul tasto
sul pont.
sempre pp

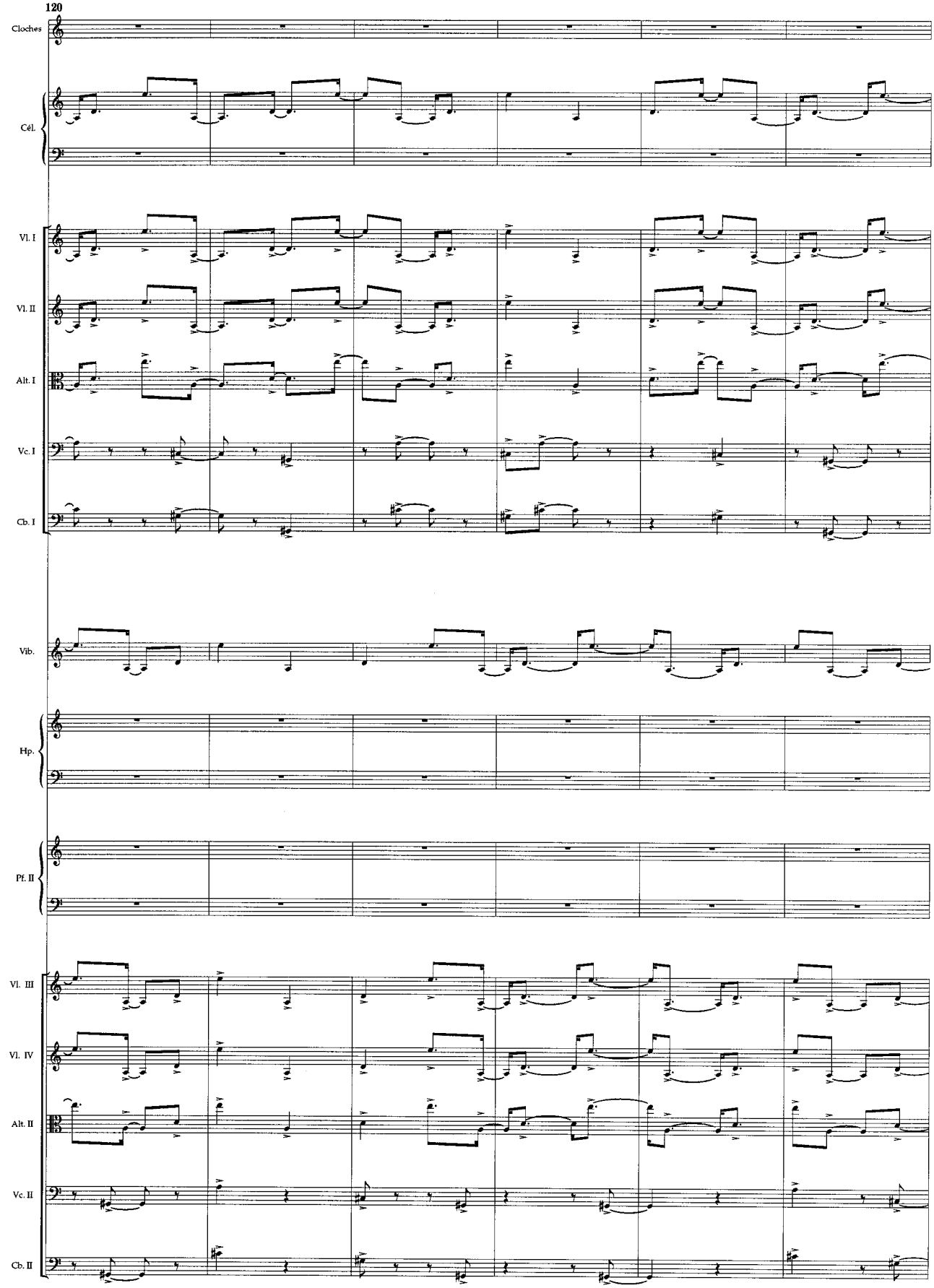

90
♩=96
Cloches
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
5"
G.P.
ff
ffmp
simile
ord.
(centre)
mp
8va
8vb
pp
pppp
tr

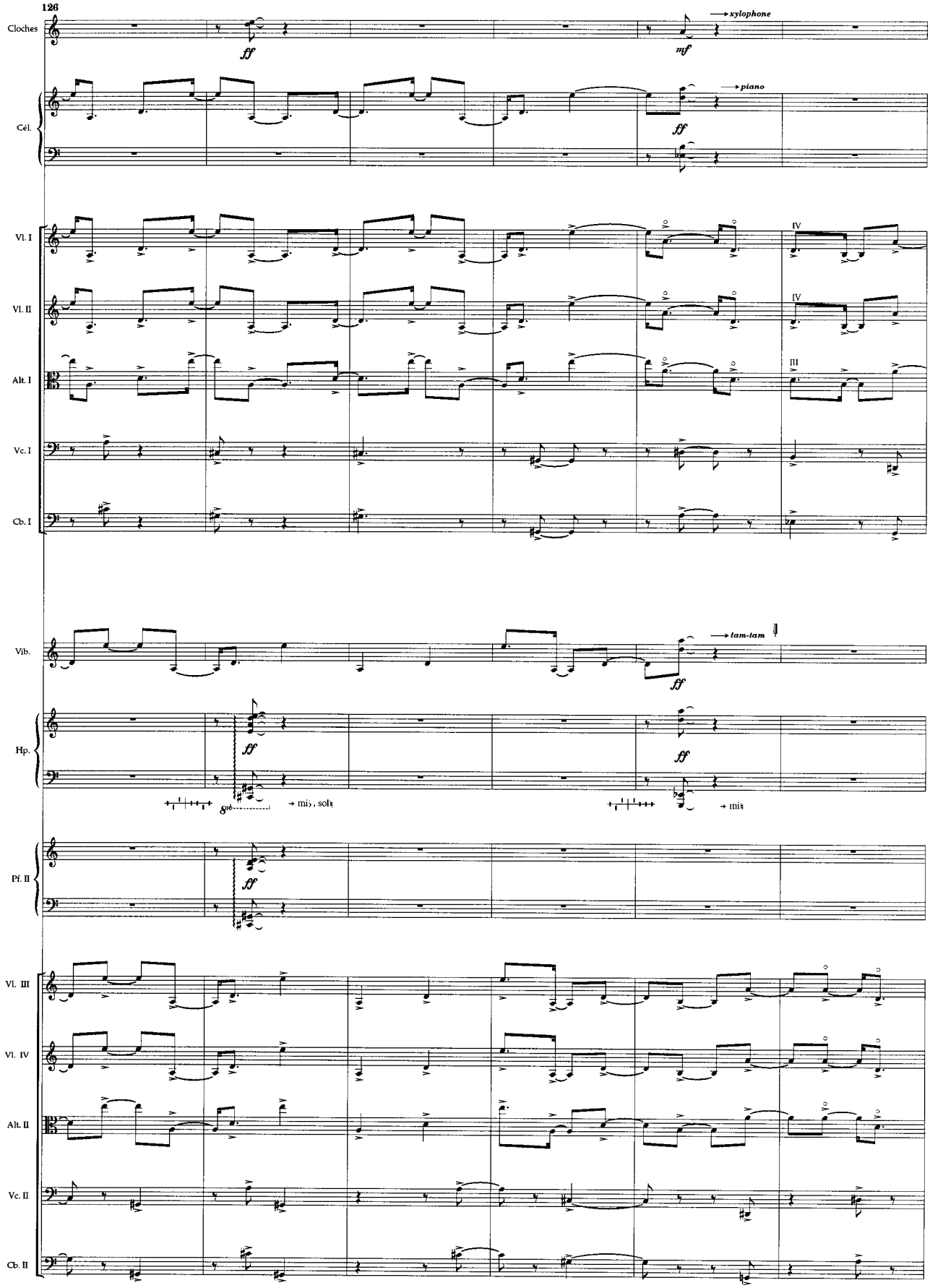

96
Cloches
ff
Cél.
ff
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
mp
Hp.
8va
ff
8vb
Pf. II
8va
ff
8vb
Vl. III
I
Vl. IV
I
Alt. II
Vc. II
Cb. II

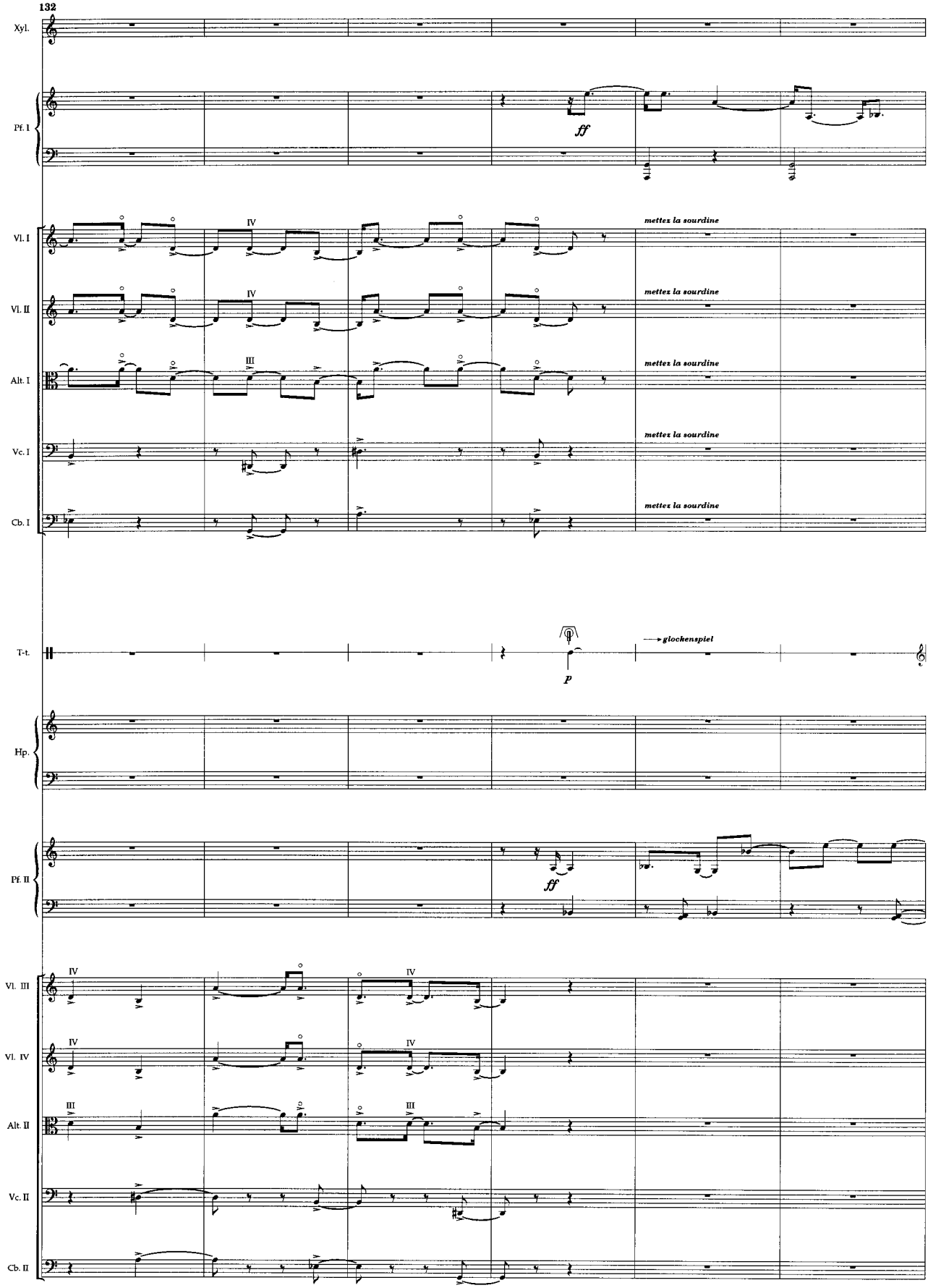

102
Cloches
ff
Cél.
ff
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
(rebord)
mp
Hp.
→ la♭
→ do♯
Pf. II
8va
ff
8va
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

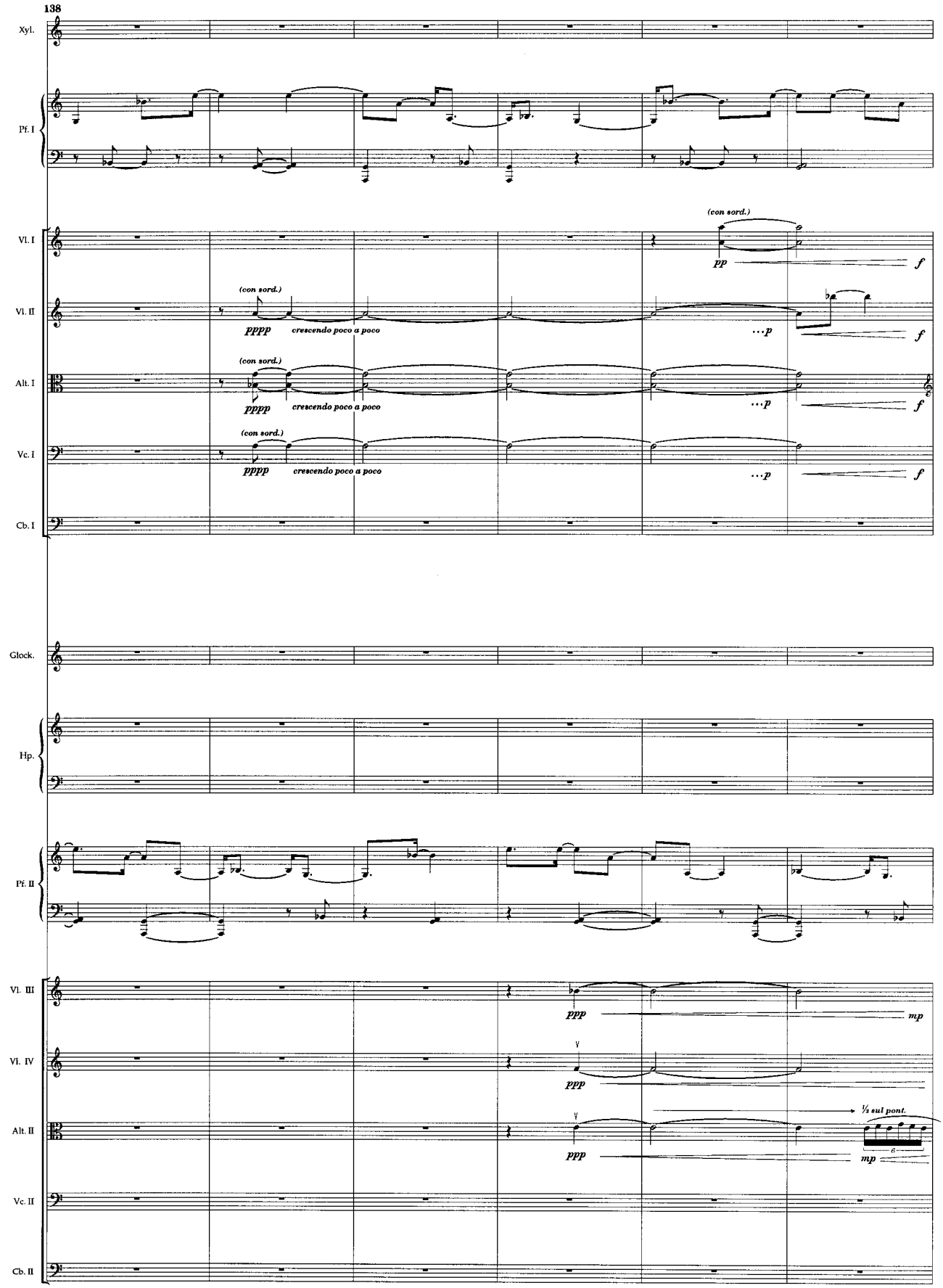

108
Cloches
mf
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
p
Hp.
Pf. II
mf
8vb
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

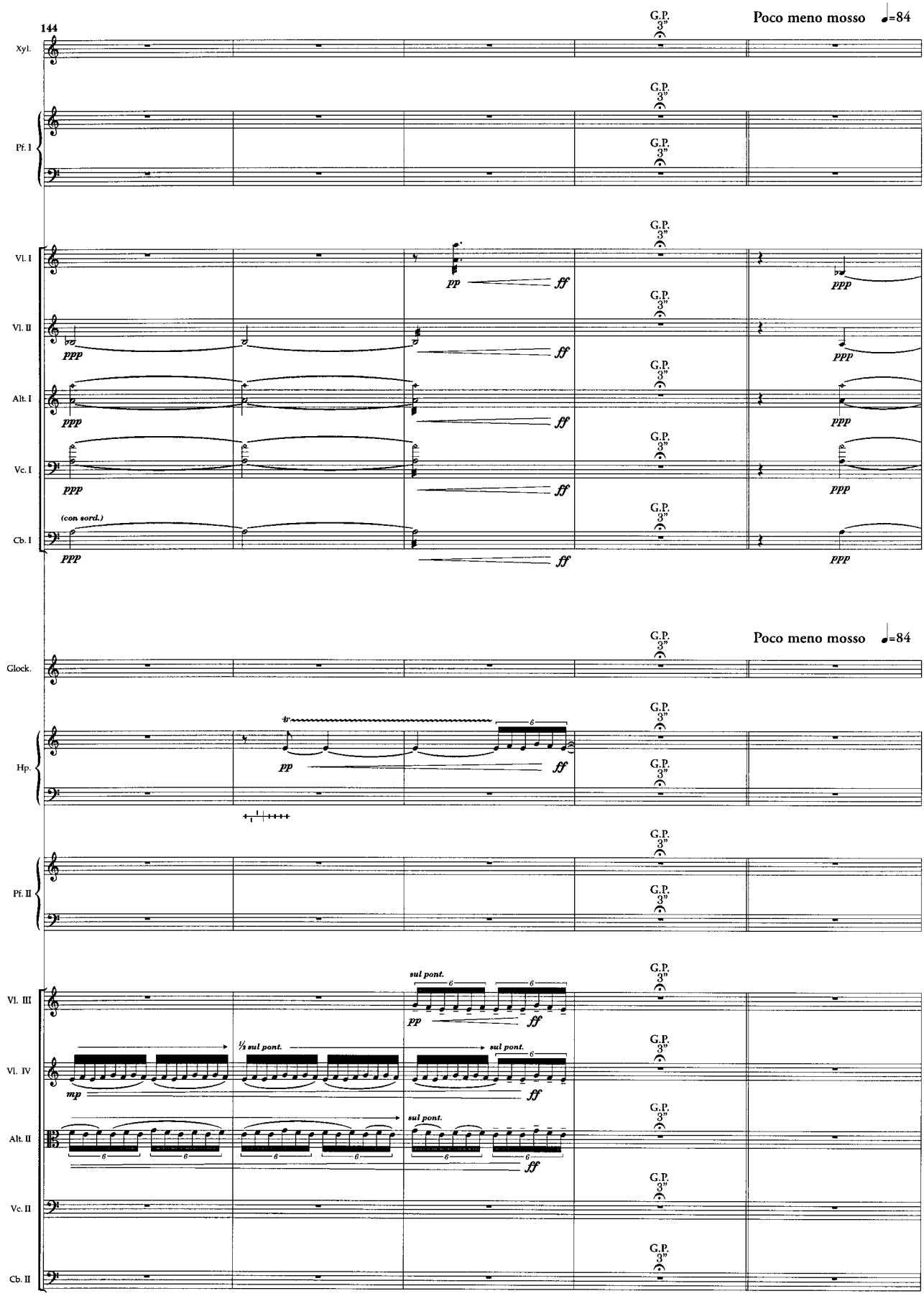

114
Cloches
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
ff
mf
mp
f
p
II
vibraphone
(baguettes semi-dures*)
→ sol♯, la♮
8vb

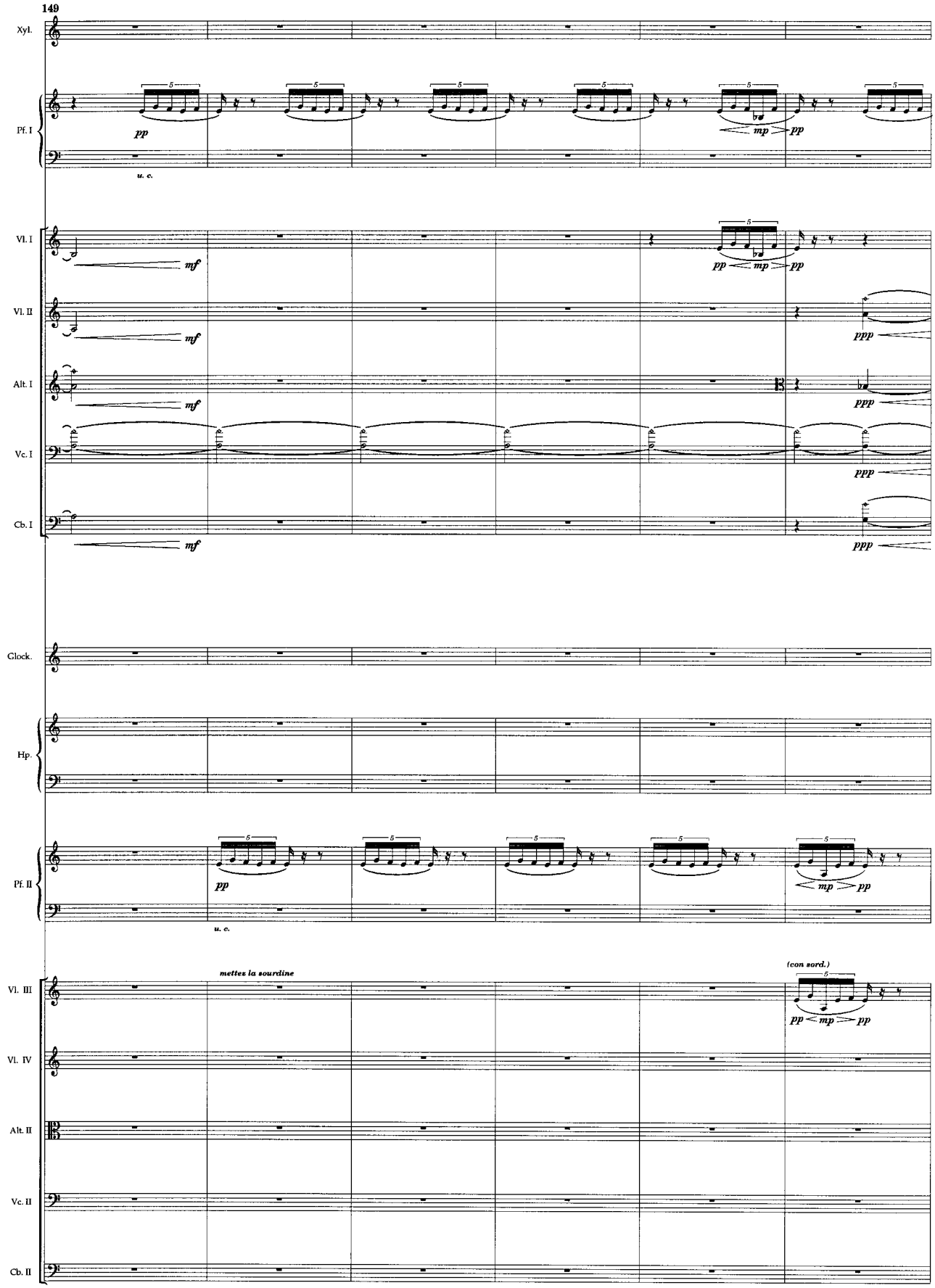

120
Cloches
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Vib.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

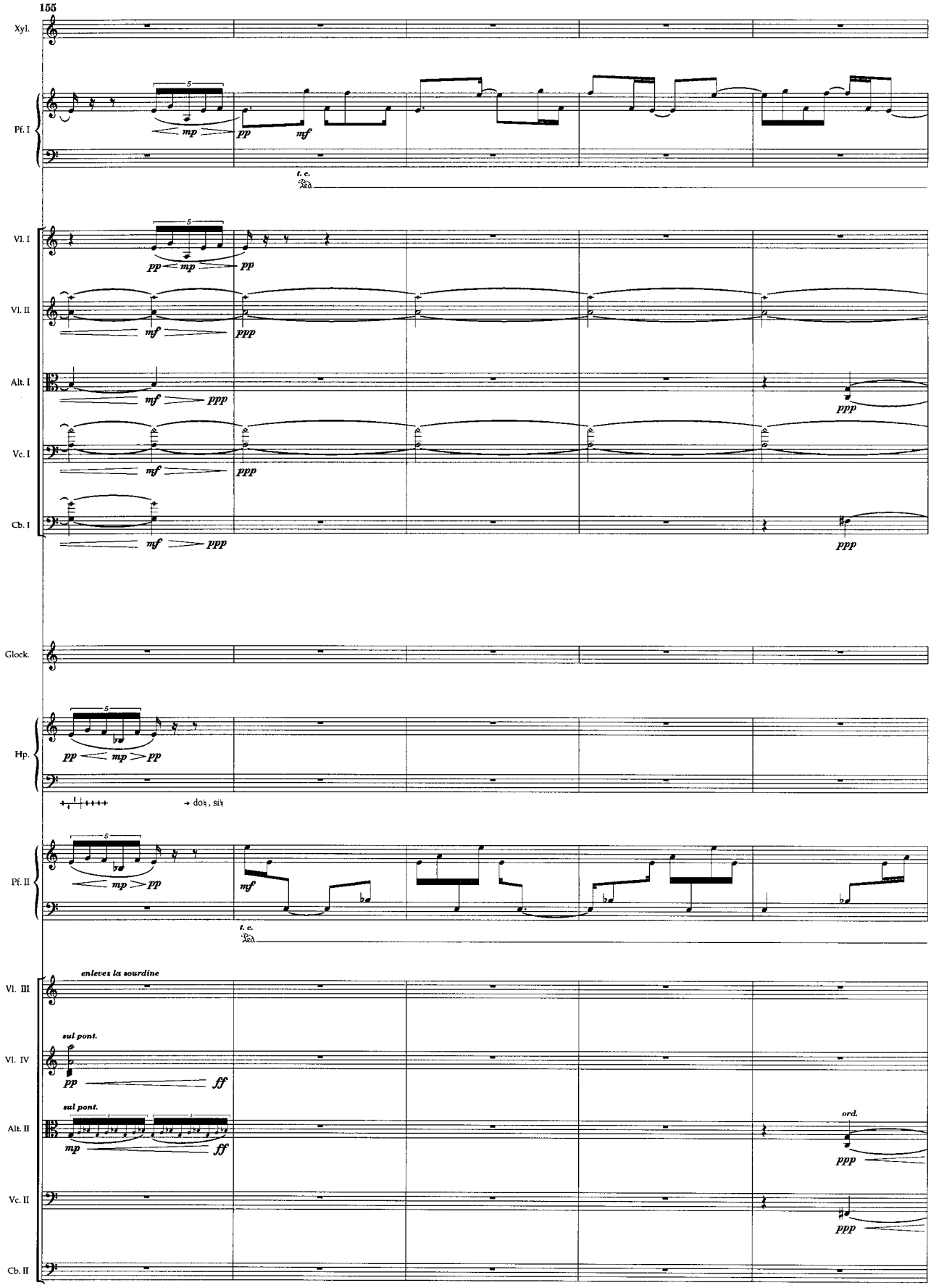

126
Cloches
xylophone
ff
mf
Cél.
piano
ff
Vl. I
IV
Vl. II
IV
Alt. I
III
Vc. I
Cb. I
Vib.
tam-tam
ff
Hp.
ff
ff
8va
→ mi♭, sol♮
→ mi♮
Pf. II
ff
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

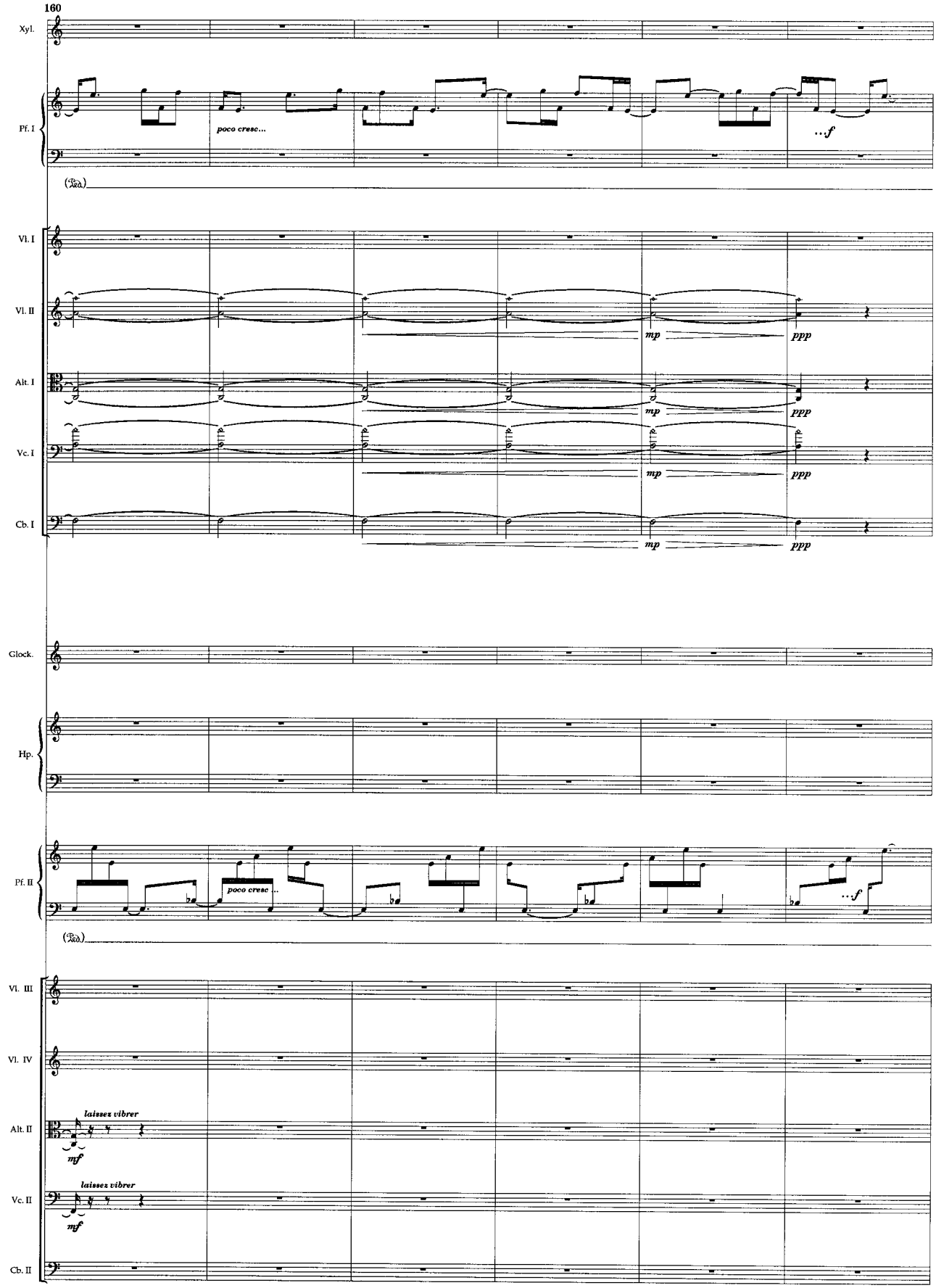

132
Xyl.
Pf. I
ff
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
IV
III
mettez la sourdine
T-t.
p
glockenspiel
Hp.
Pf. II
ff
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

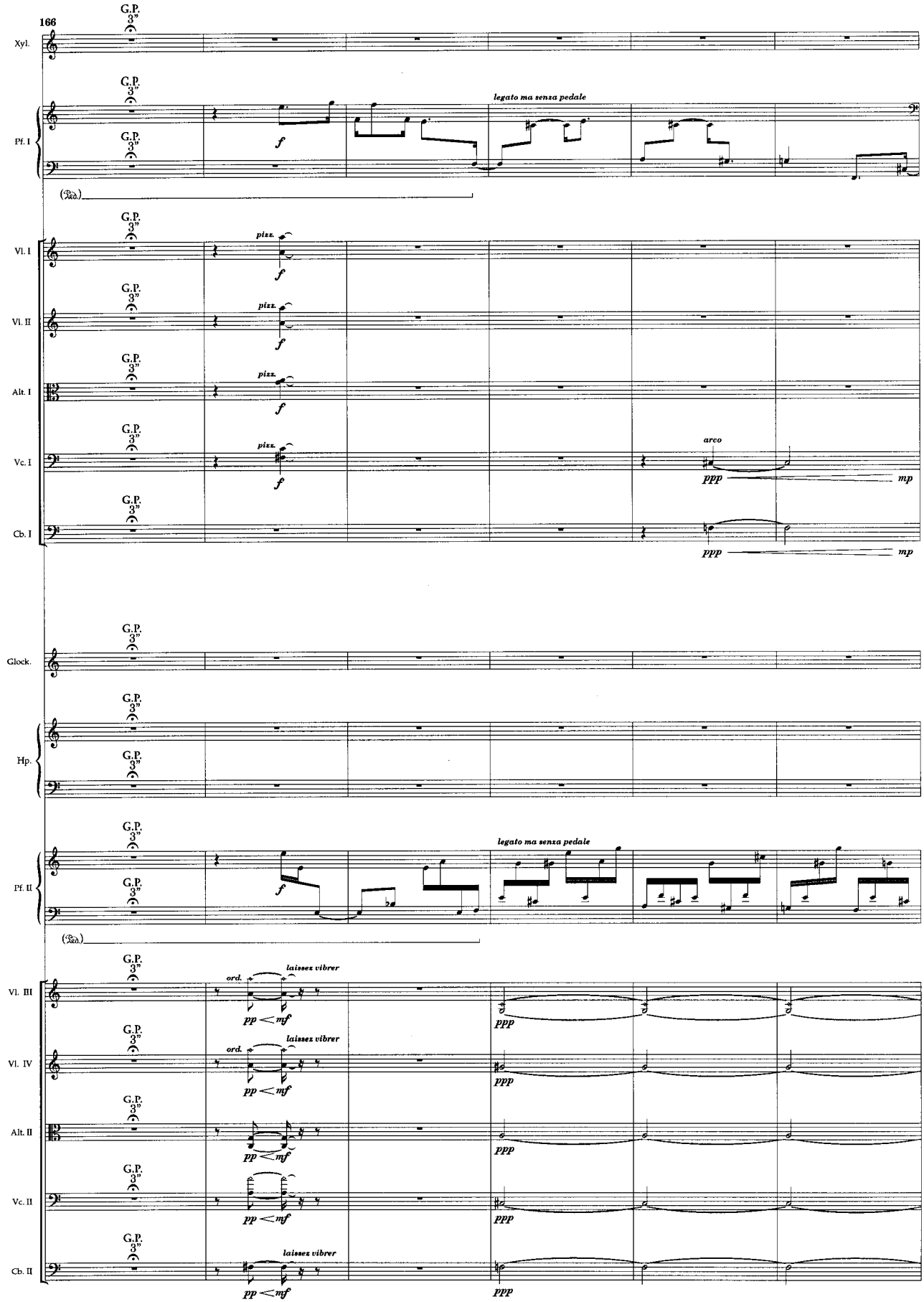

138
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
(con sord.)
pp
f
pppp
crescendo poco a poco
...p
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
ppp
mp
½ sul pont.

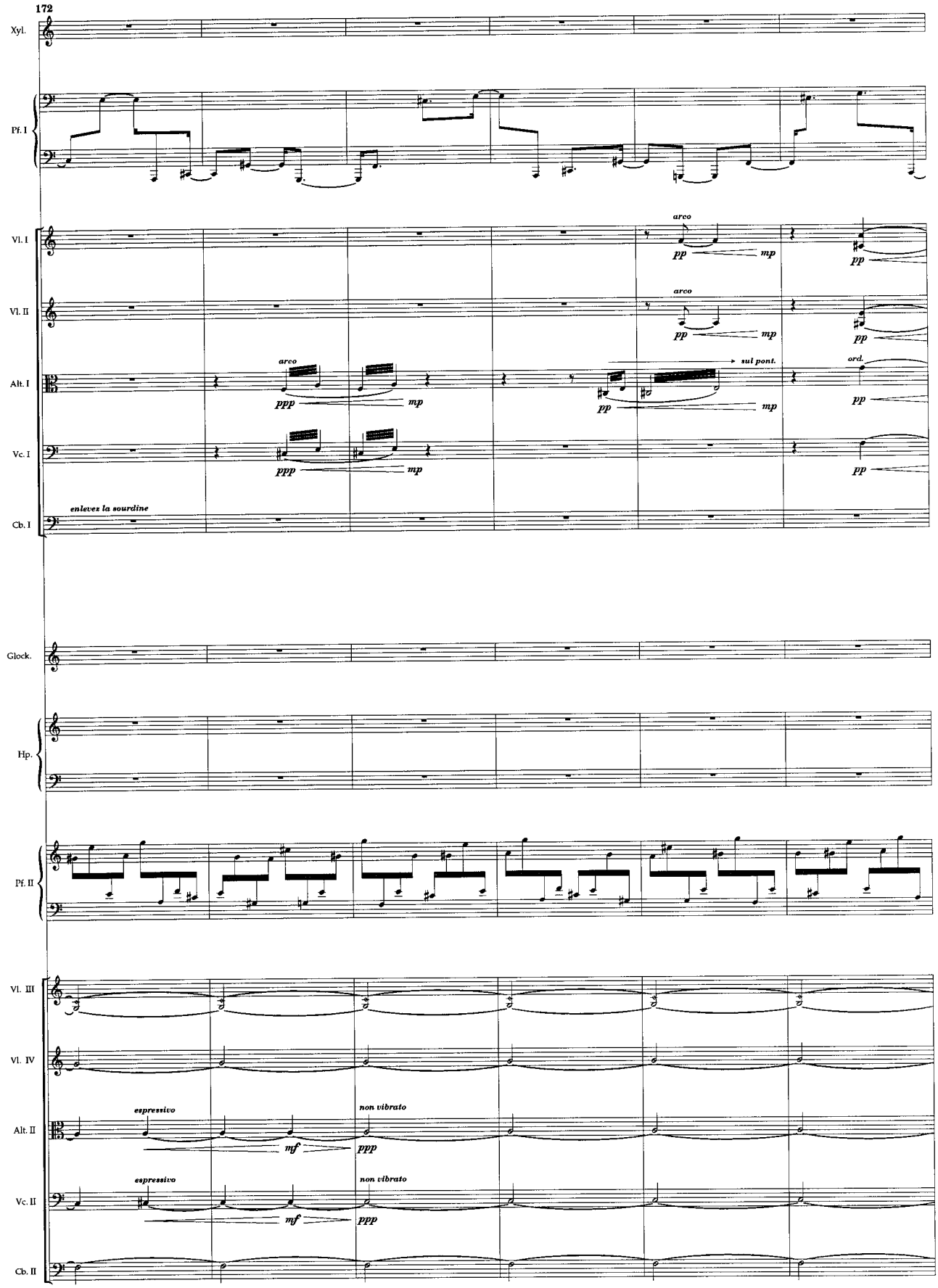

144
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
(con sord.)
Cb. I
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
G.P.
3"
Poco meno mosso
♩=84
pp
ff
ppp
mp
sul pont.
½ sul pont.

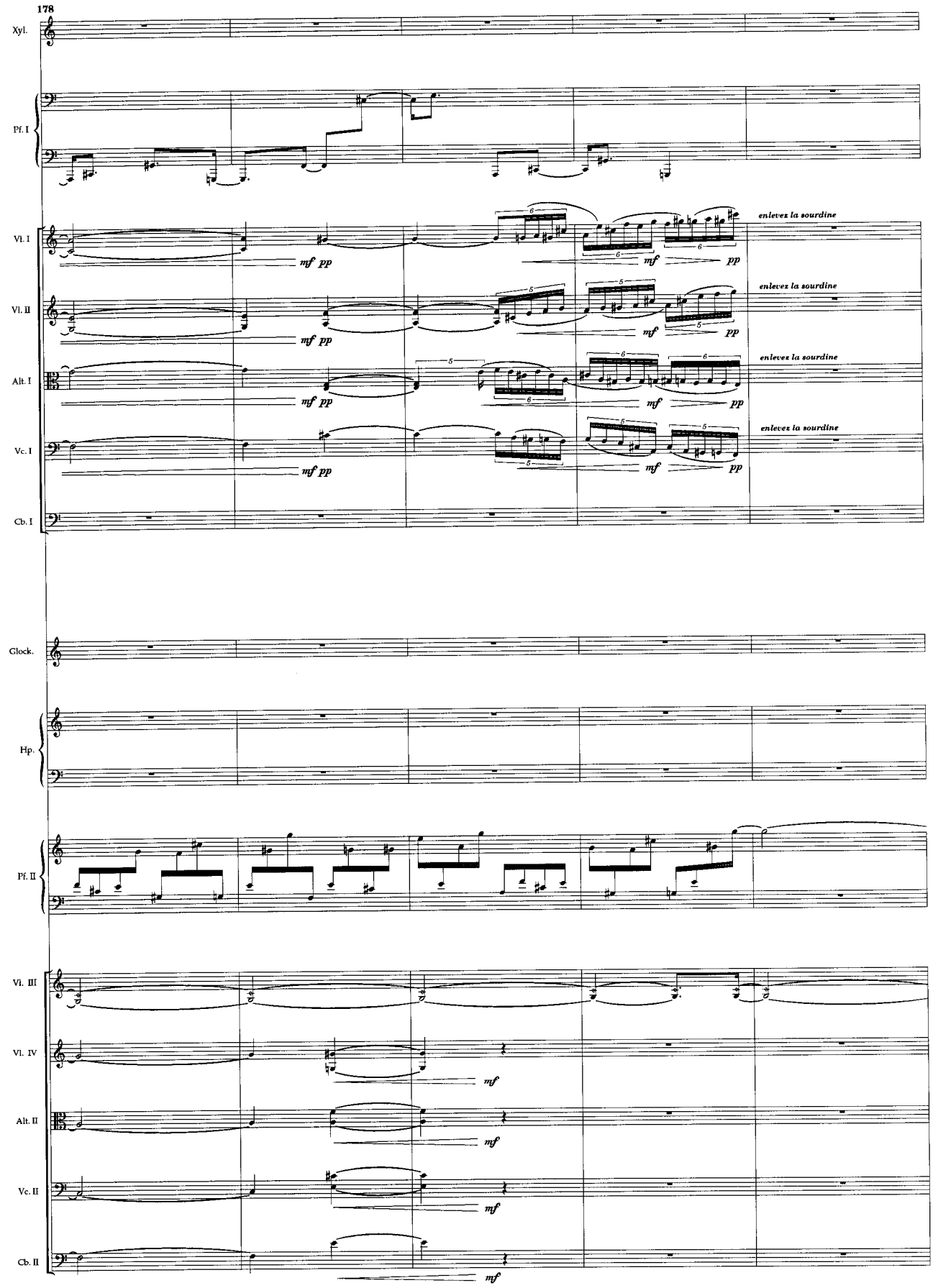

149
Xyl.
Pf. I
pp
u. c.
mp
Vl. I
mf
Vl. II
Alt. I
Vc. I
Cb. I
ppp
Glock.
Hp.
Pf. II
mettez la sourdine
(con sord.)
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

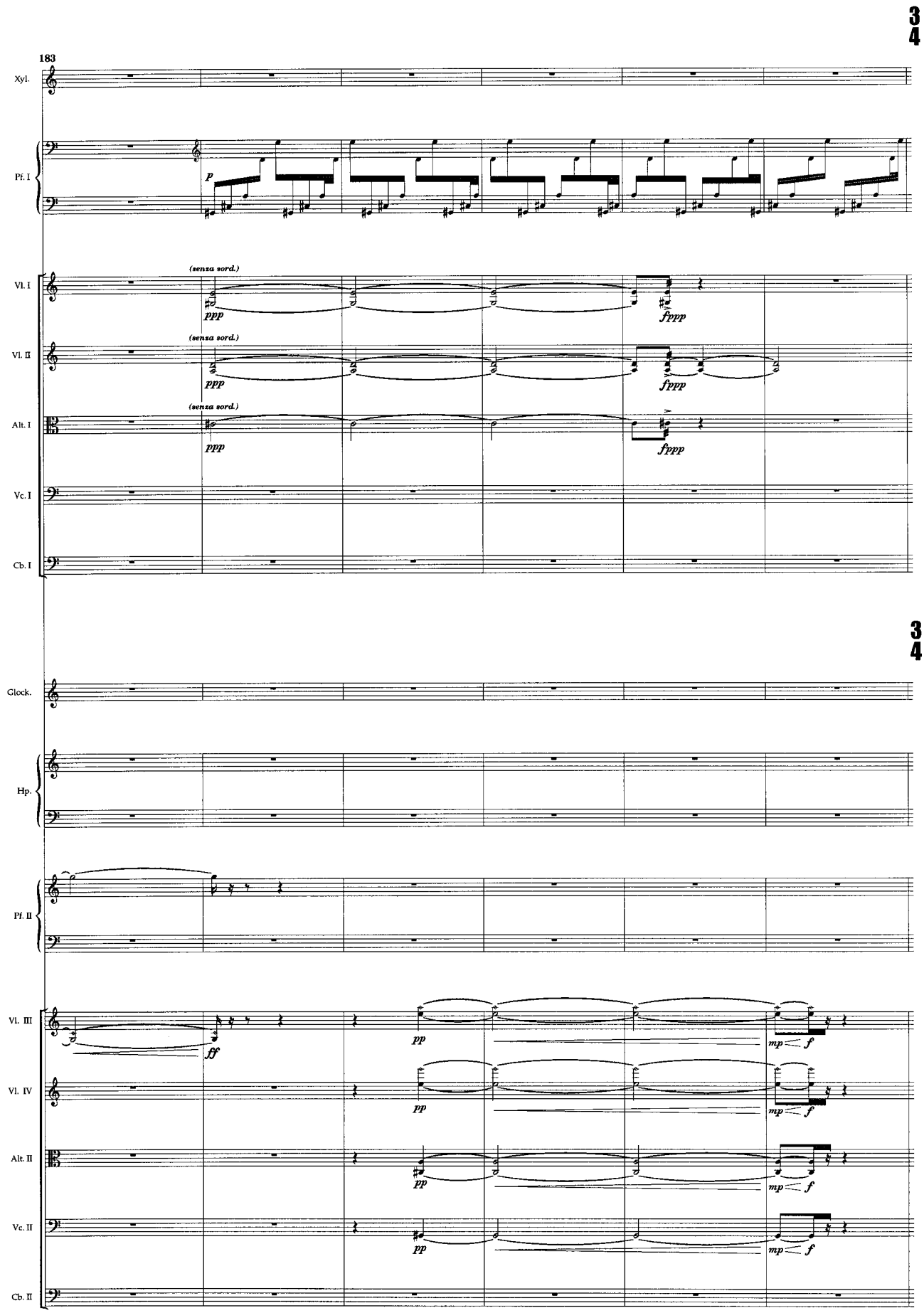

155
Xyl.
Pf. I
t. c.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Glock.
Hp.
→ doł, sił
Pf. II
t. c.
enlevez la sourdine
Vl. III
sul pont.
Vl. IV
sul pont.
Alt. II
ord.
Vc. II
Cb. II

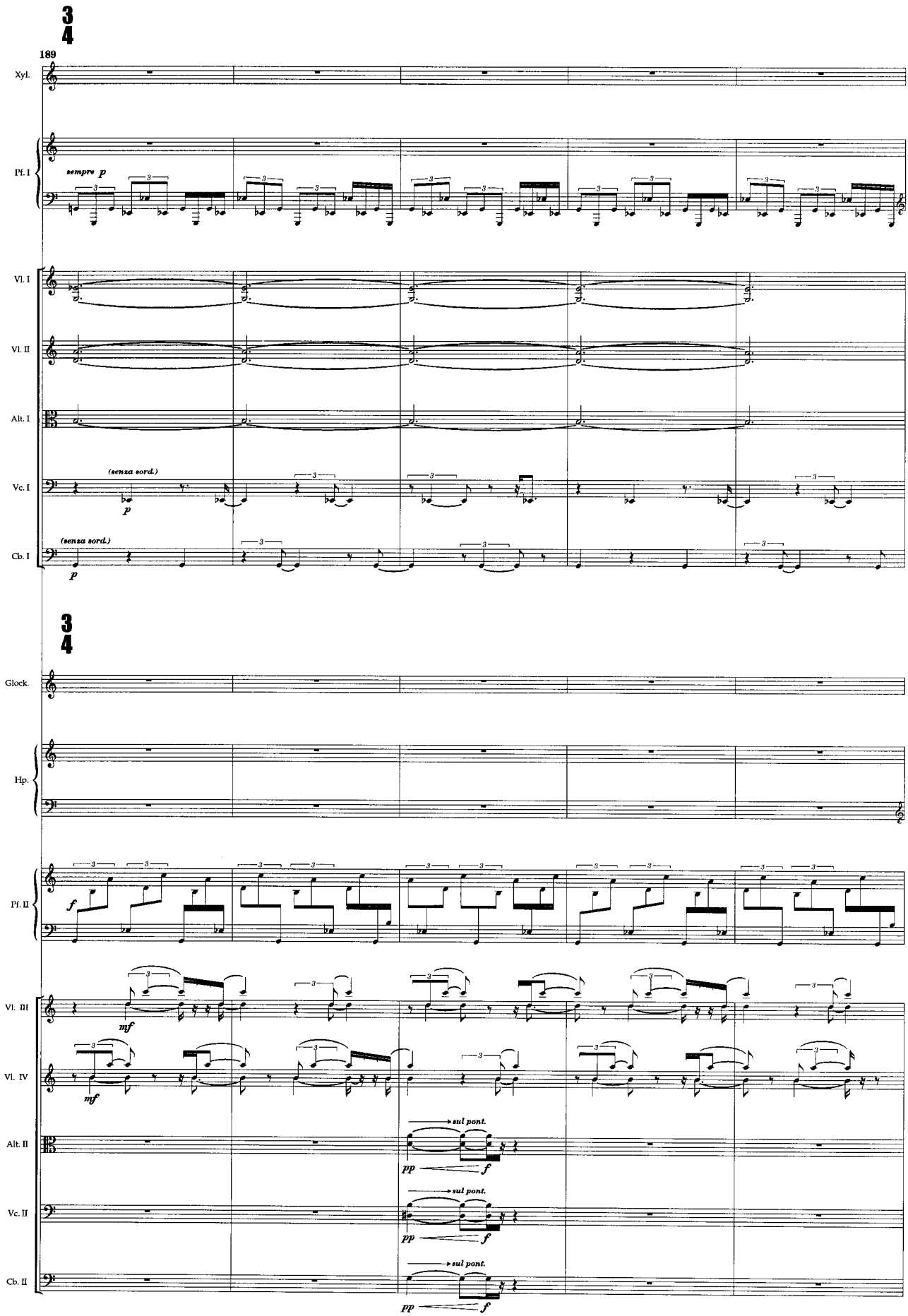

160
Xyl.
Pf. I
poco cresc...
..f
(Ped.)
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
mp
ppp
Glock.
Hp.
Pf. II
poco cresc ...
..f
(Ped.)
Vl. III
Vl. IV
Alt. II
laissez vibrer
mf
Vc. II
laissez vibrer
mf
Cb. II

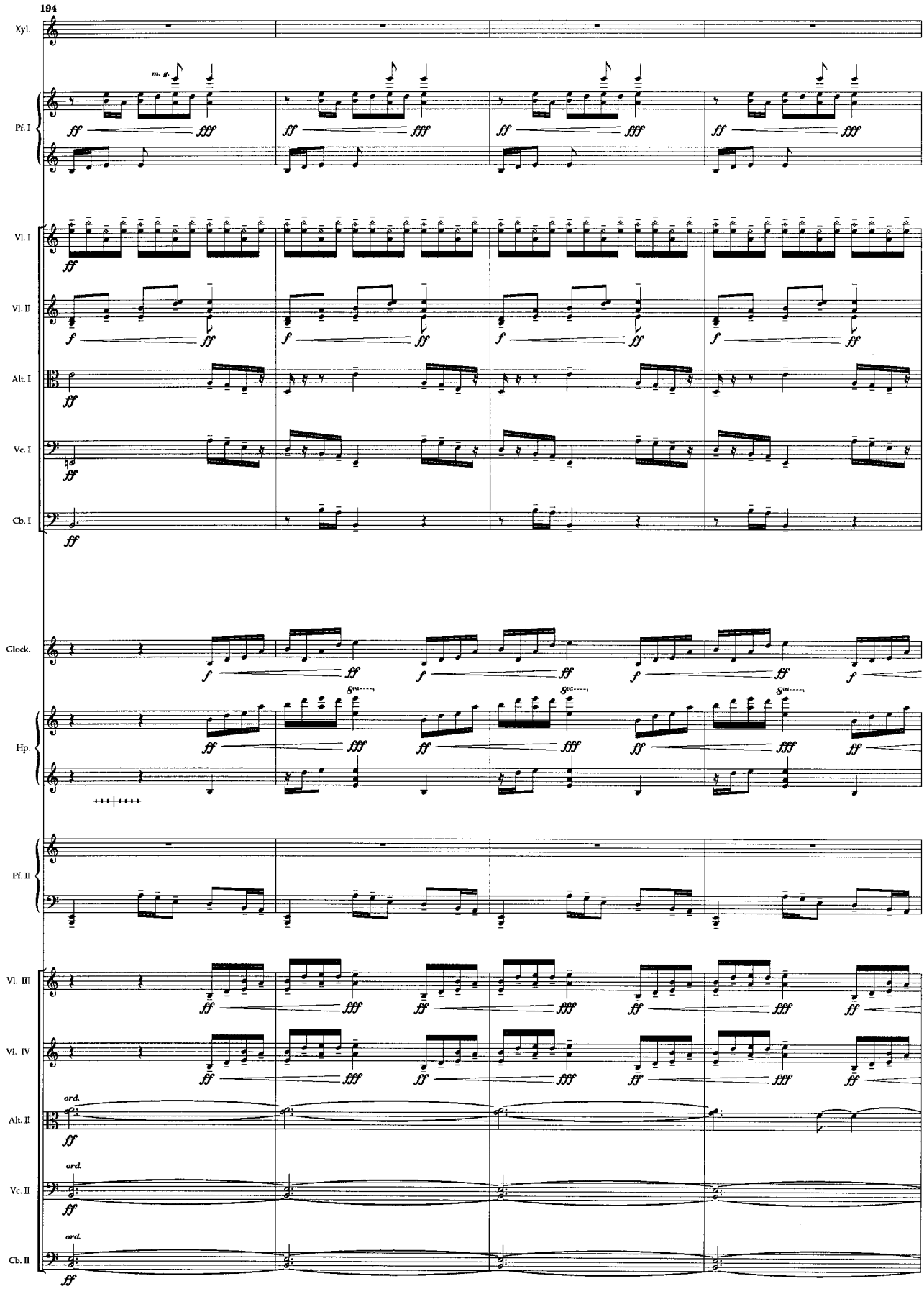

166
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
G.P.
3"
legato ma senza pedale
pizz.
arco
laissez vibrer
ord.
(Ped.)
f
ppp
mp
pp
mf

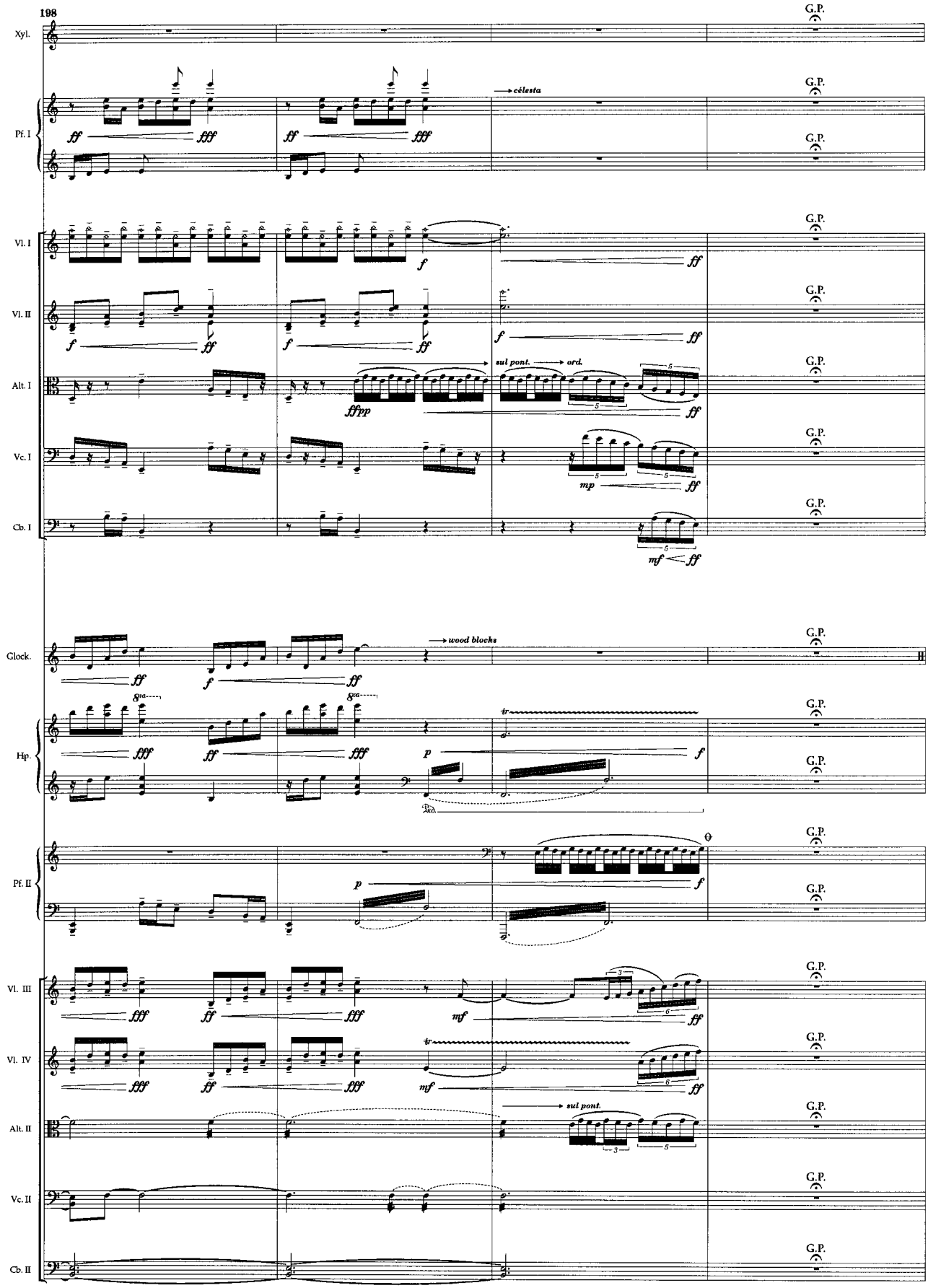

172
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
arco
pp
mp
arco
pp
mp
pp
arco
ppp
mp
sul pont.
pp
mp
ord.
pp
ppp
mp
pp
enlevez la sourdine
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
espressivo
mf
non vibrato
ppp
Vc. II
espressivo
mf
non vibrato
ppp
Cb. II

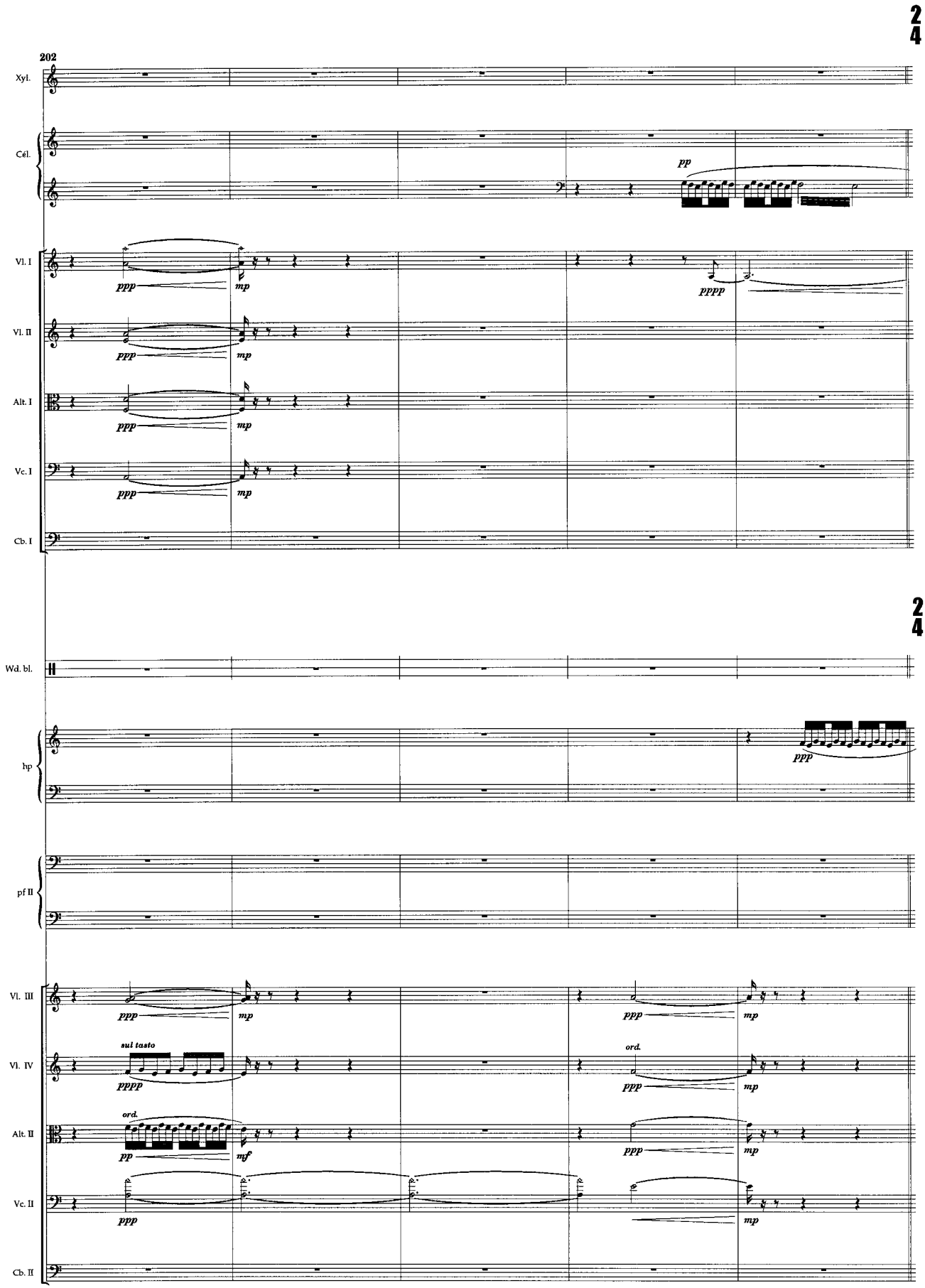

178
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
mf pp
mf
pp
enlevez la sourdine
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

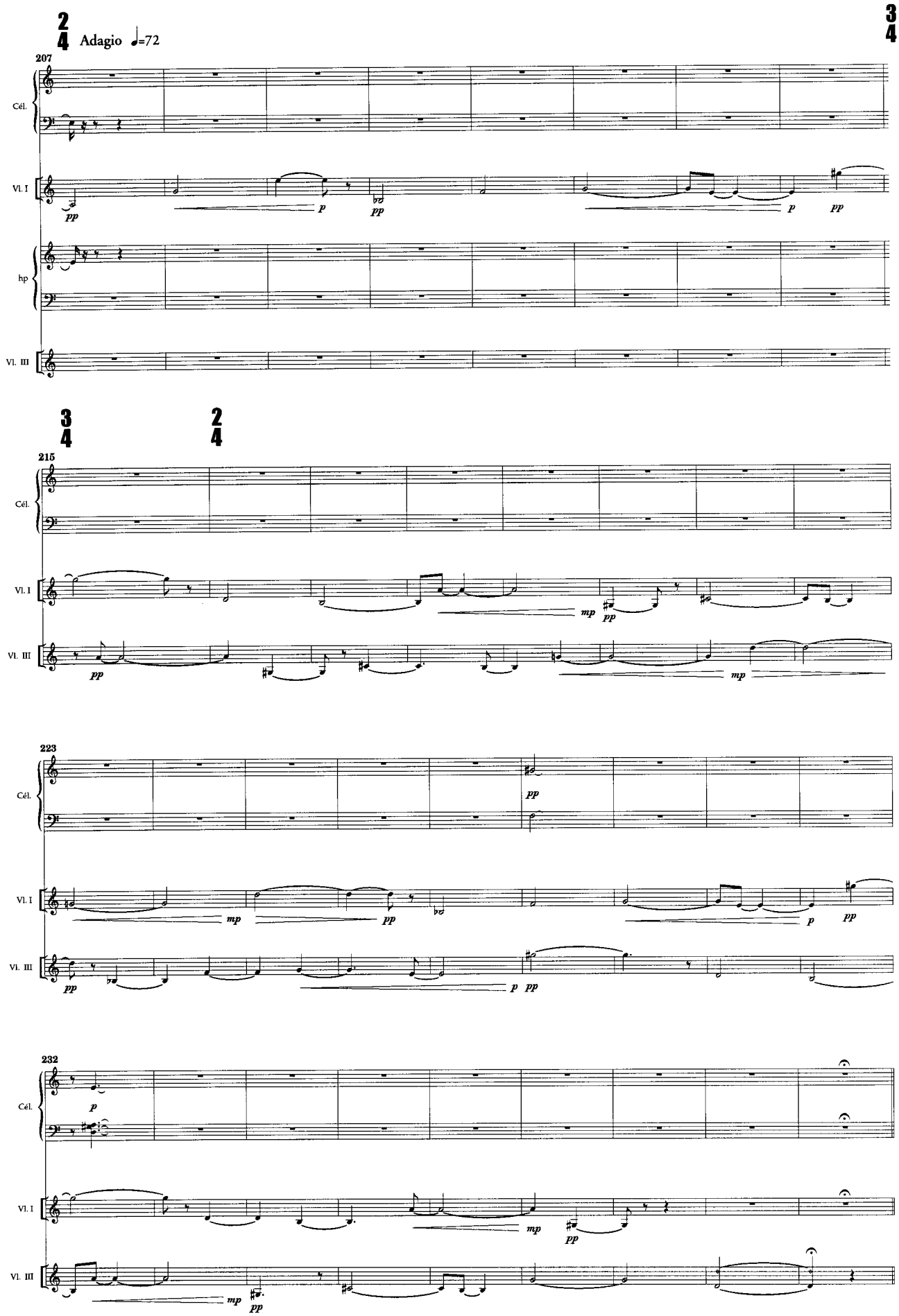

183
3
4
Xyl.
Pf. I
p
Vl. I
(senza sord.)
ppp
fppp
Vl. II
(senza sord.)
ppp
fppp
Alt. I
(senza sord.)
ppp
fppp
Vc. I
Cb. I
3
4
Glock.
Hp.
Pf. II
Vl. III
ff
pp
mp
f
Vl. IV
pp
mp
f
Alt. II
pp
mp
f
Vc. II
pp
mp
f
Cb. II

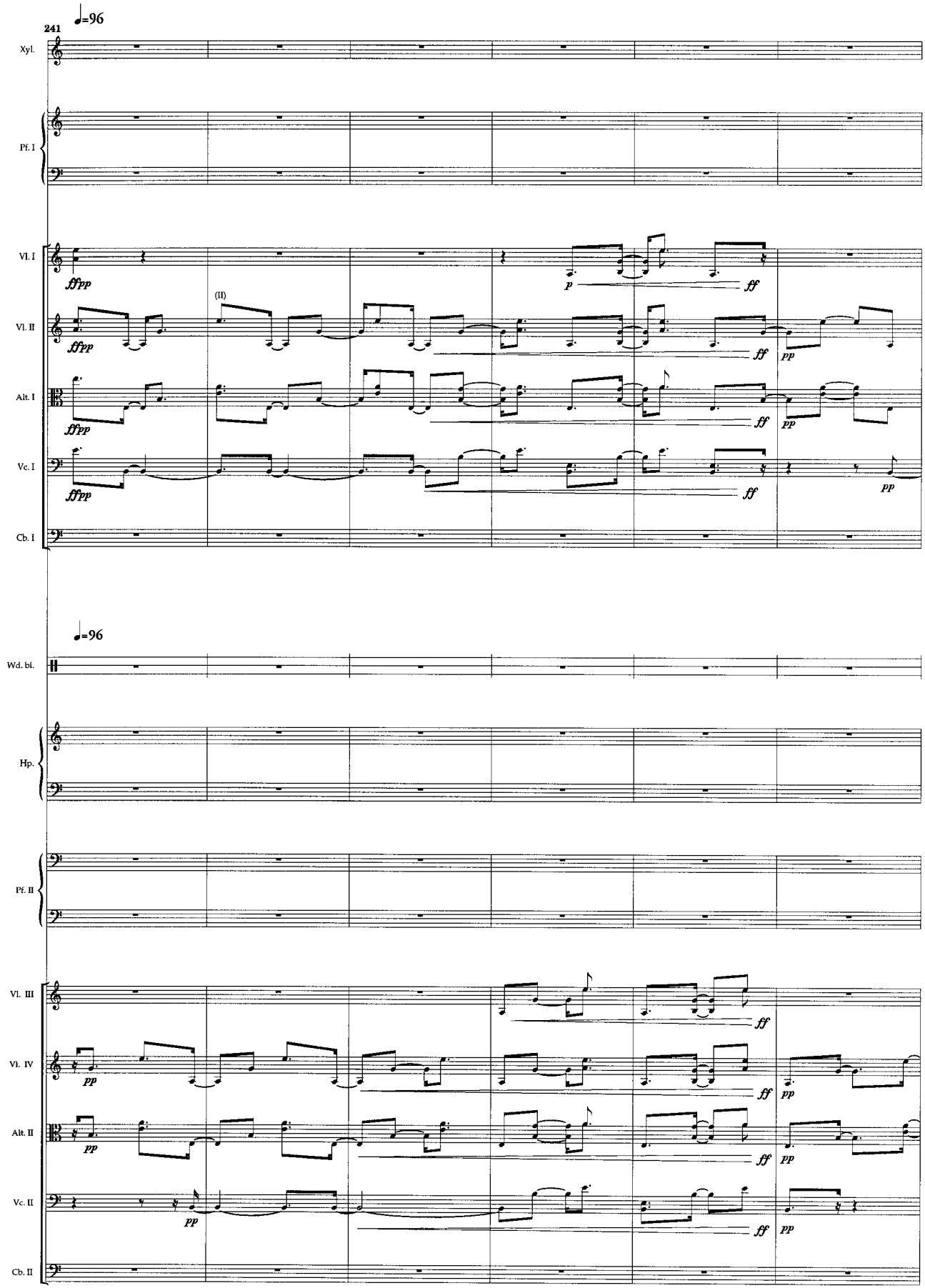

3
4
189
Xyl.
Pf. I
sempre p
Vl. I
Vl. II
Alt. I
Vc. I
(senza sord.)
p
Cb. I
(senza sord.)
p
3
4
Glock.
Hp.
Pf. II
f
Vl. III
mf
Vl. IV
mf
Alt. II
sul pont.
pp
f
Vc. II
sul pont.
pp
f
Cb. II
sul pont.
pp
f

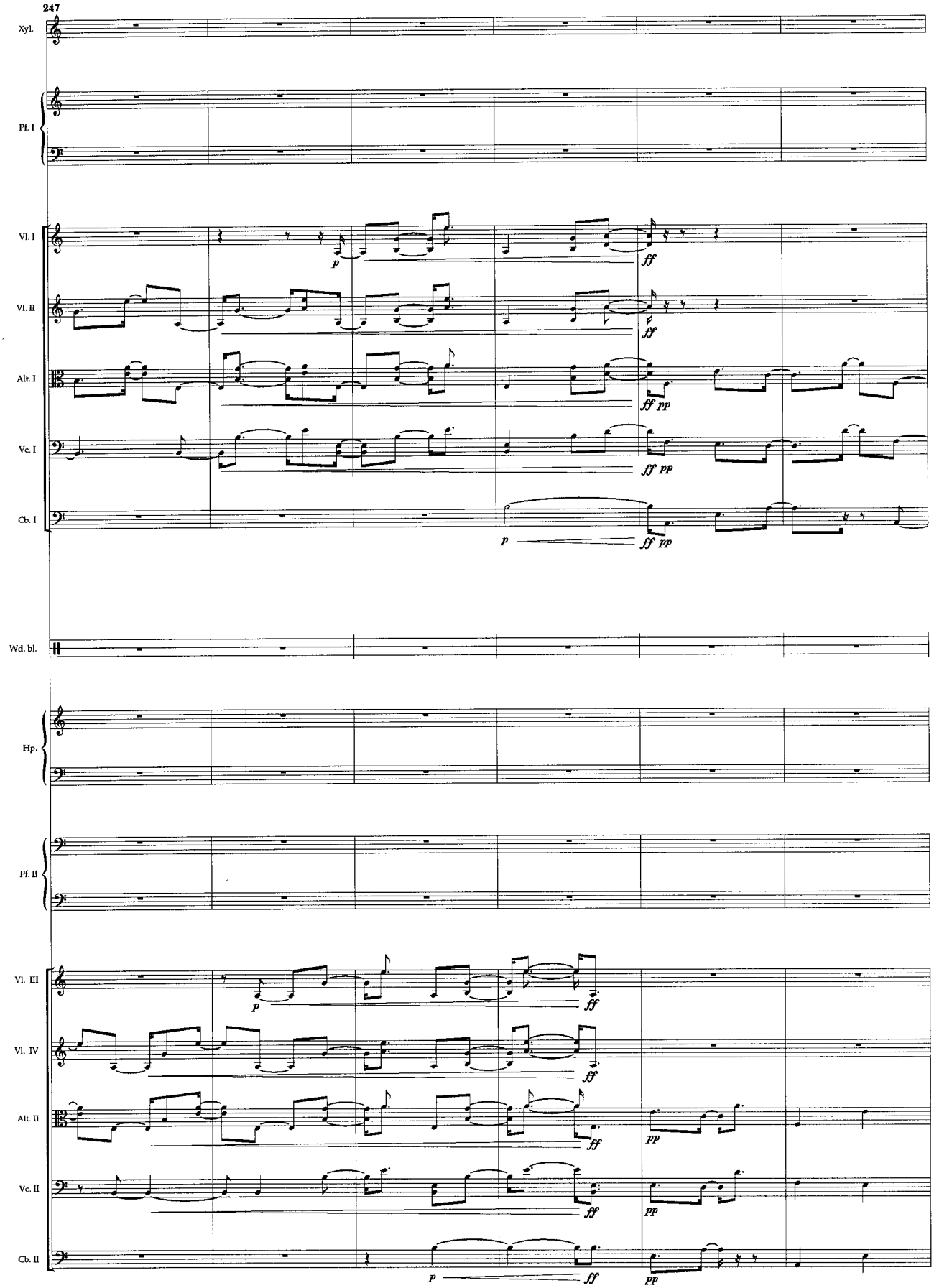

194
Xyl.
m. g.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
ord.

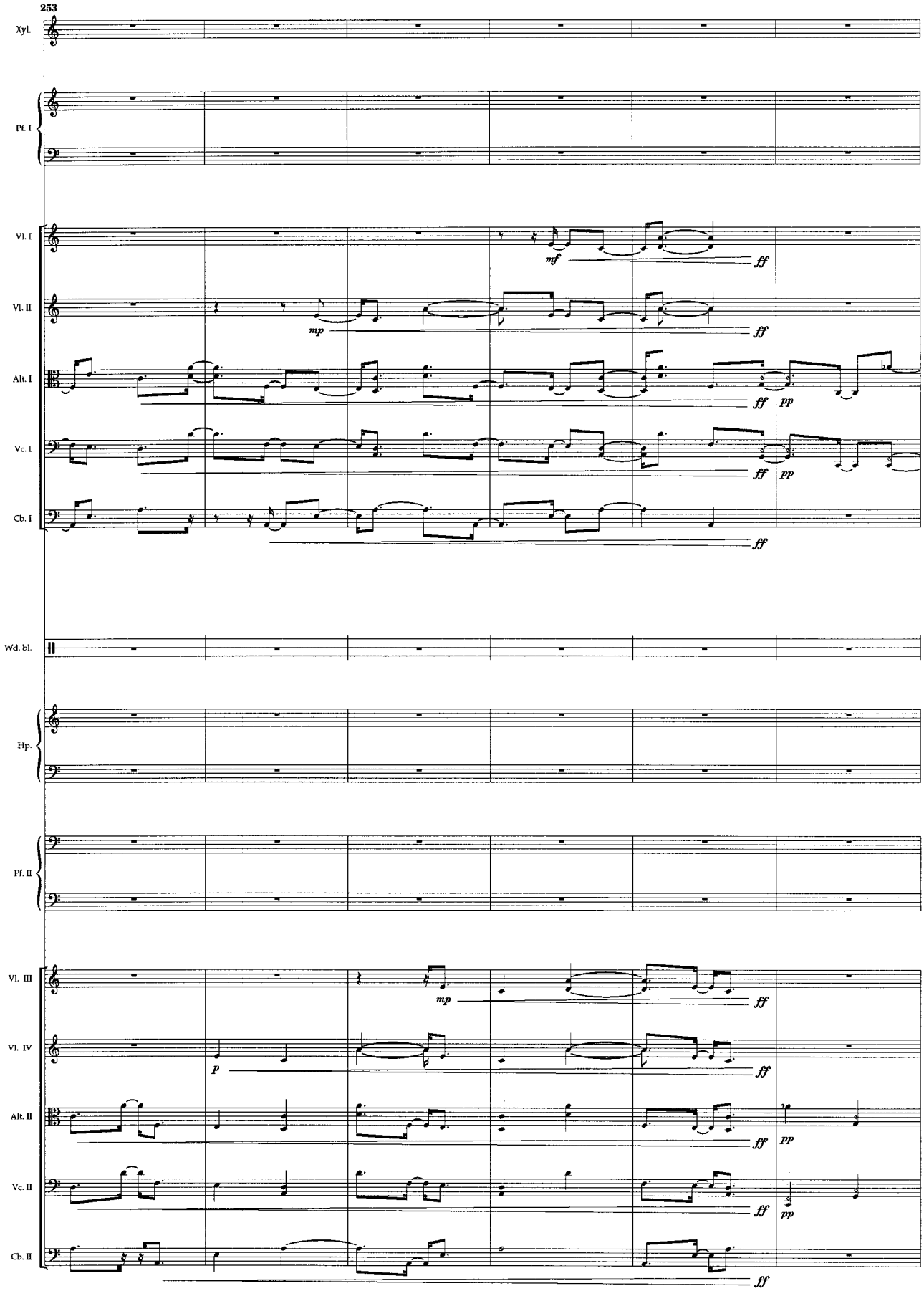

198
Xyl.
Pf. I
célesta
Vl. I
Vl. II
Alt. I
sul pont.
ord.
Vc. I
Cb. I
Glock.
wood blocks
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
sul pont.
Vc. II
Cb. II
G.P.

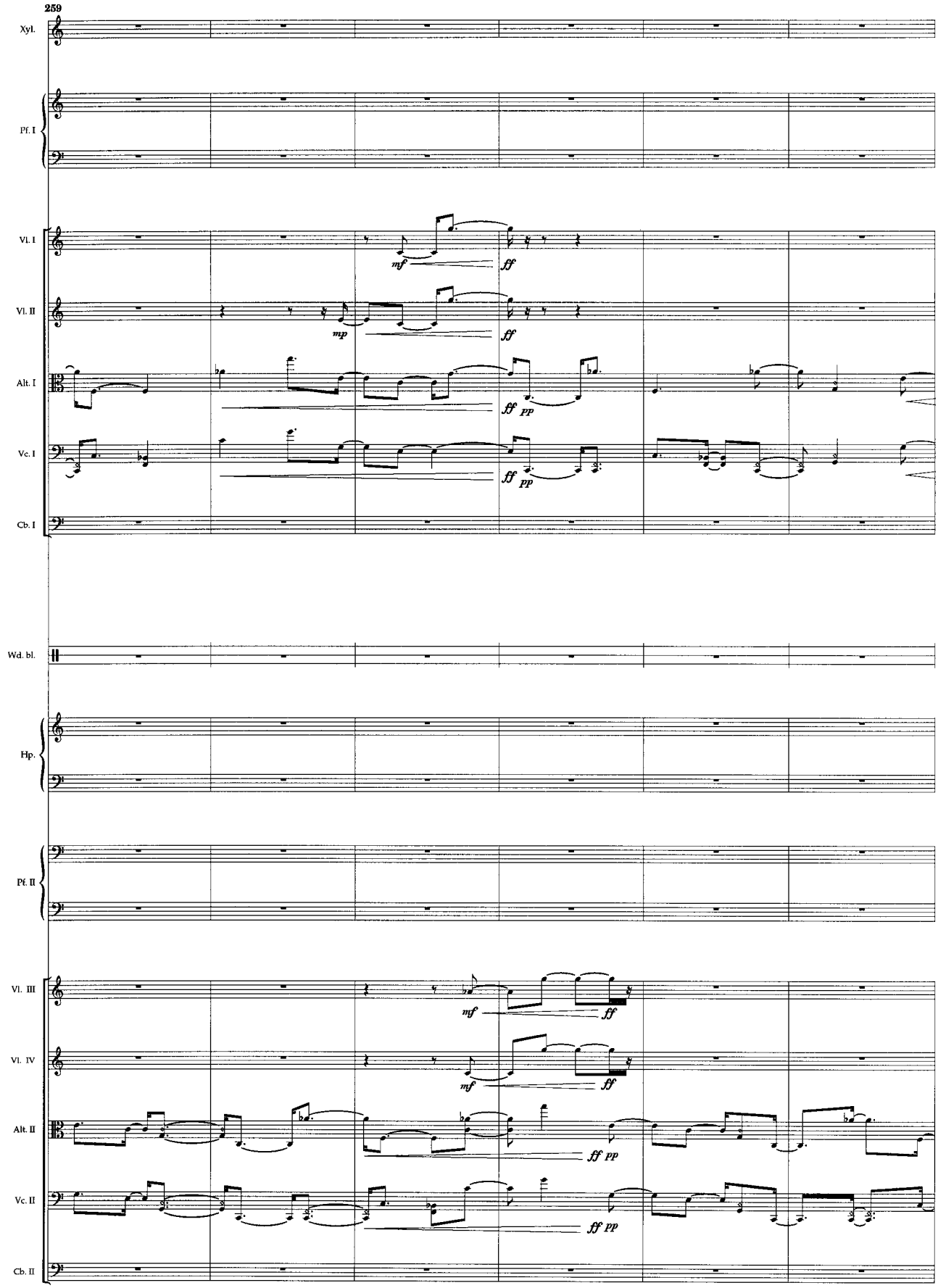

2
4
202
Xyl.
Cél.
pp
Vl. I
ppp
mp
pppp
Vl. II
Alt. I
Vc. I
Cb. I
2
4
Wd. bl.
hp
ppp
pf II
Vl. III
Vl. IV
sul tasto
ord.
Alt. II
pp
mf
Vc. II
Cb. II

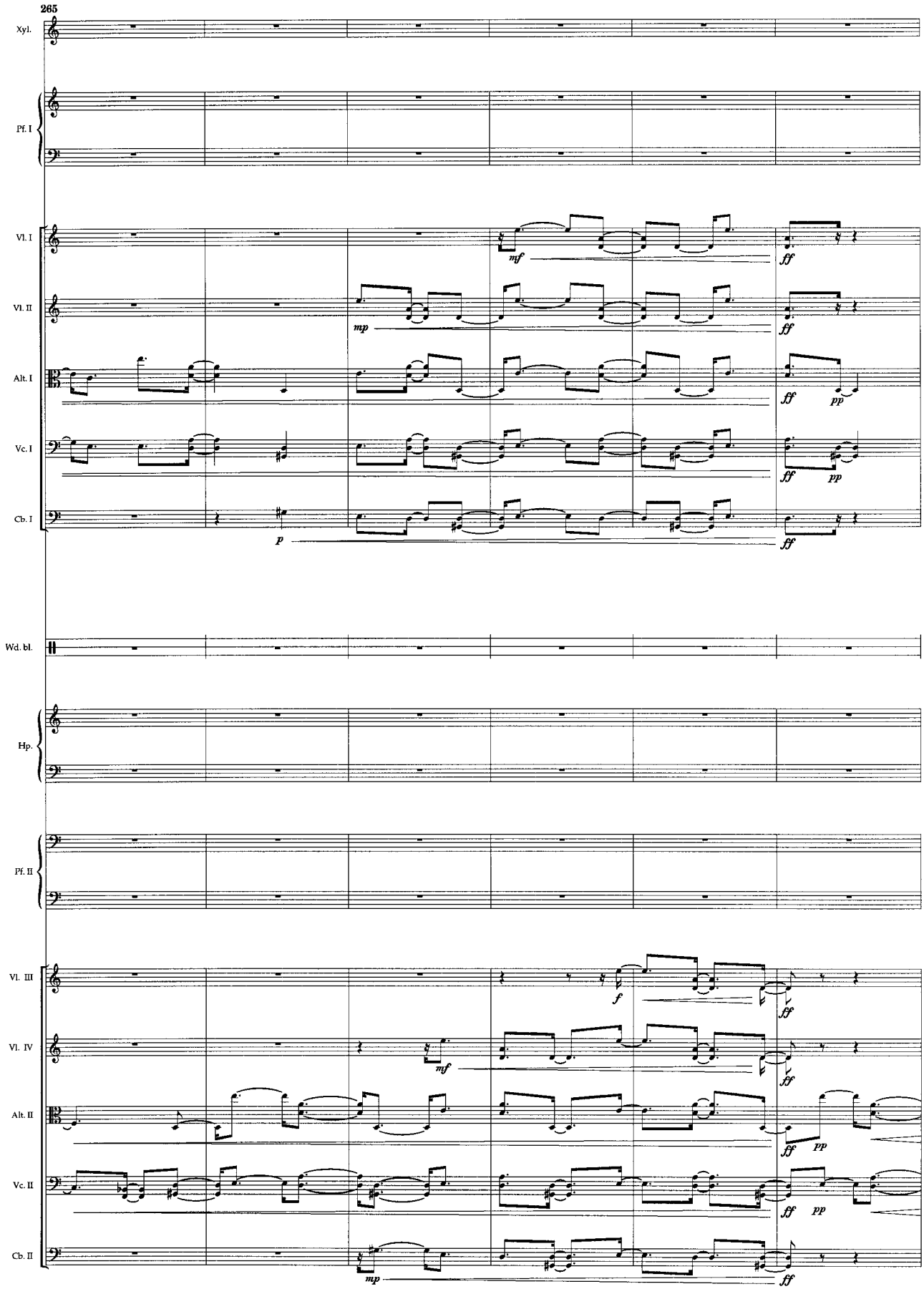

2/4 Adagio ♩=72
3/4
207
Cél.
Vl. I
hp
Vl. III
pp
p
pp
p
pp
3/4
2/4
215
Cél.
Vl. I
Vl. III
mp
pp
pp
mp
223
Cél.
Vl. I
Vl. III
pp
mp
pp
p
pp
pp
p
pp
232
Cél.
Vl. I
Vl. III
p
mp
pp
mp
pp

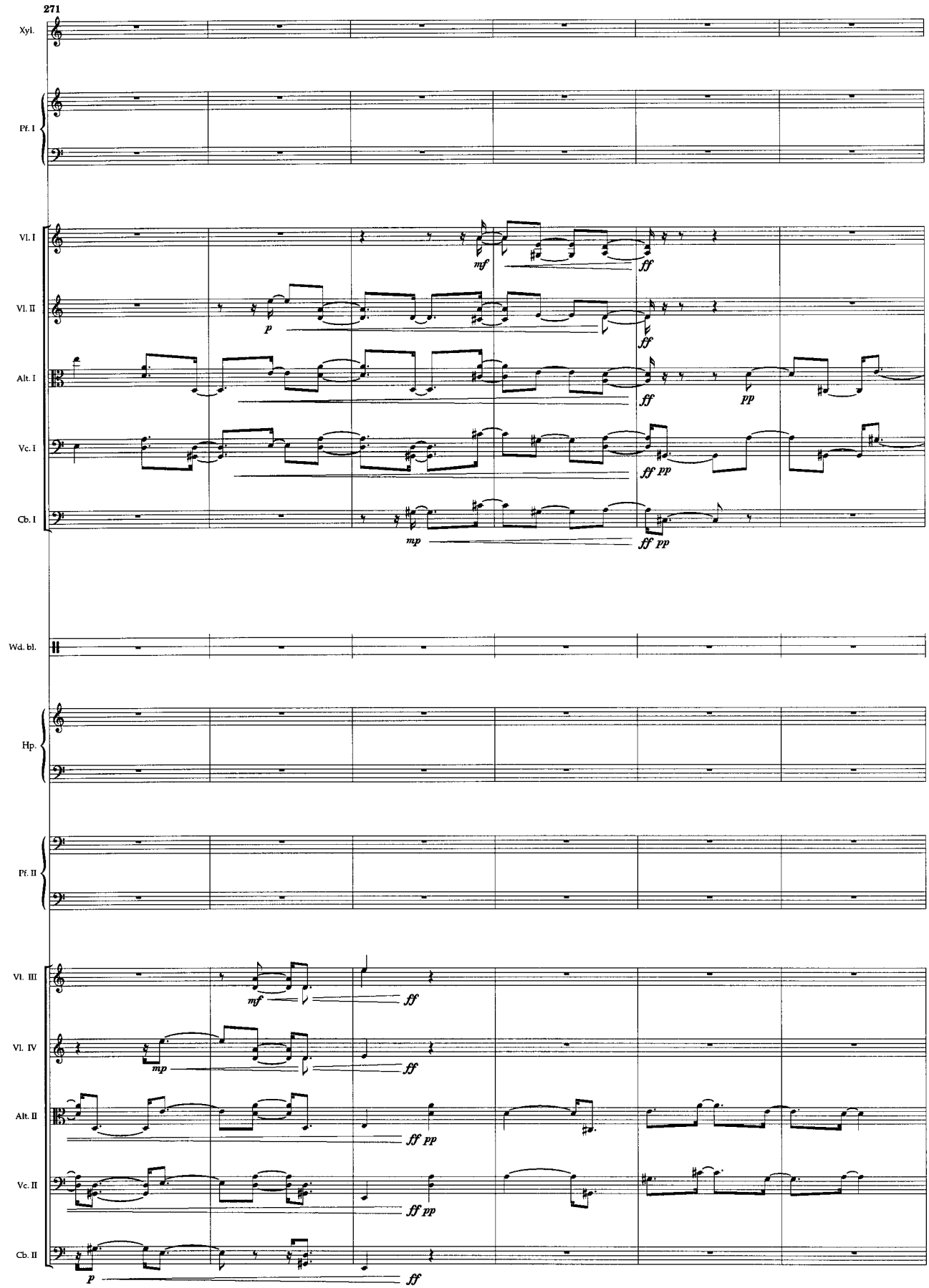

241
♩=96
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
(II)
ffpp
p
ff
pp
♩=96
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

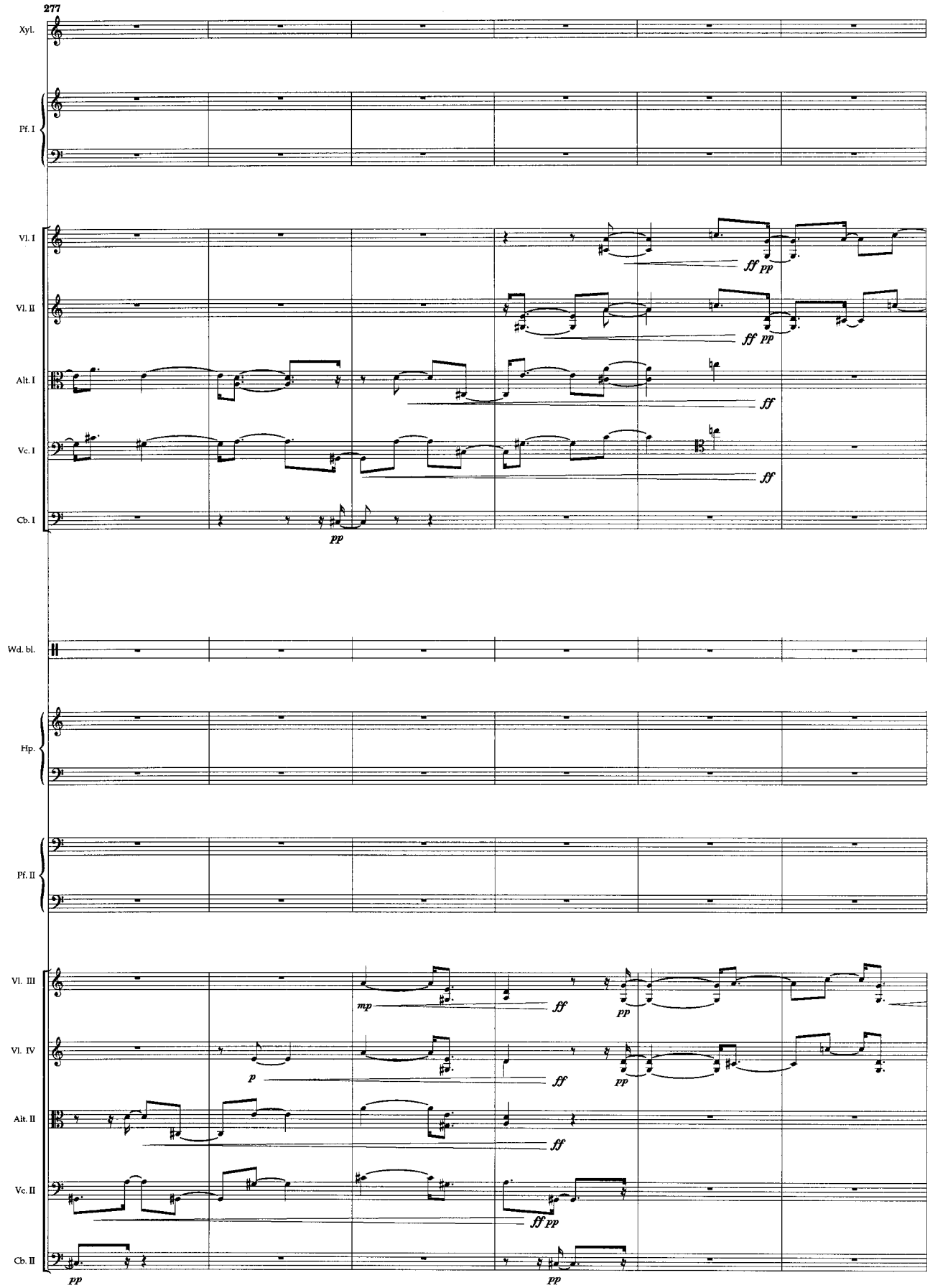

247
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
p
ff
pp

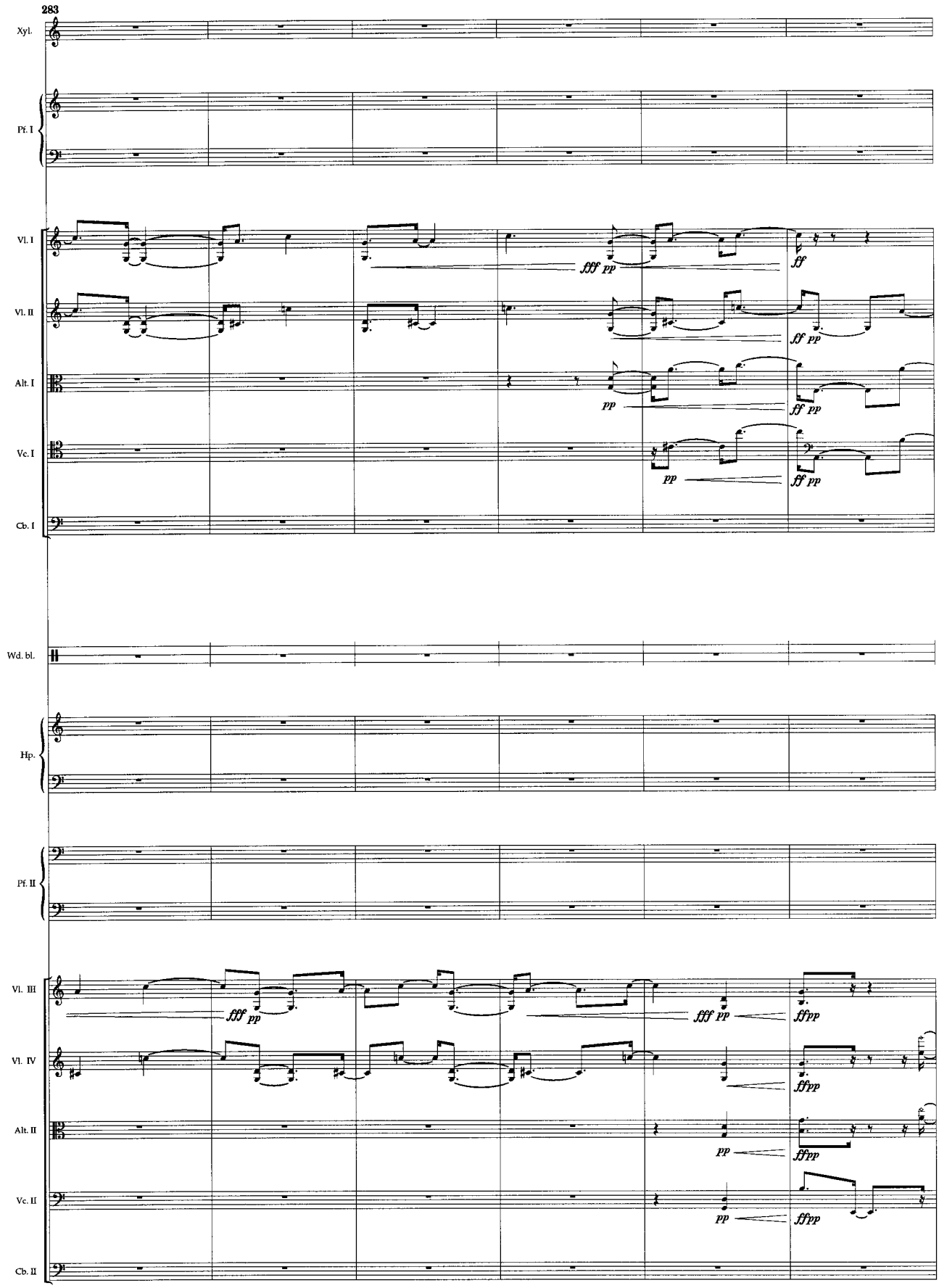

253
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
mf
ff
mp
pp
p

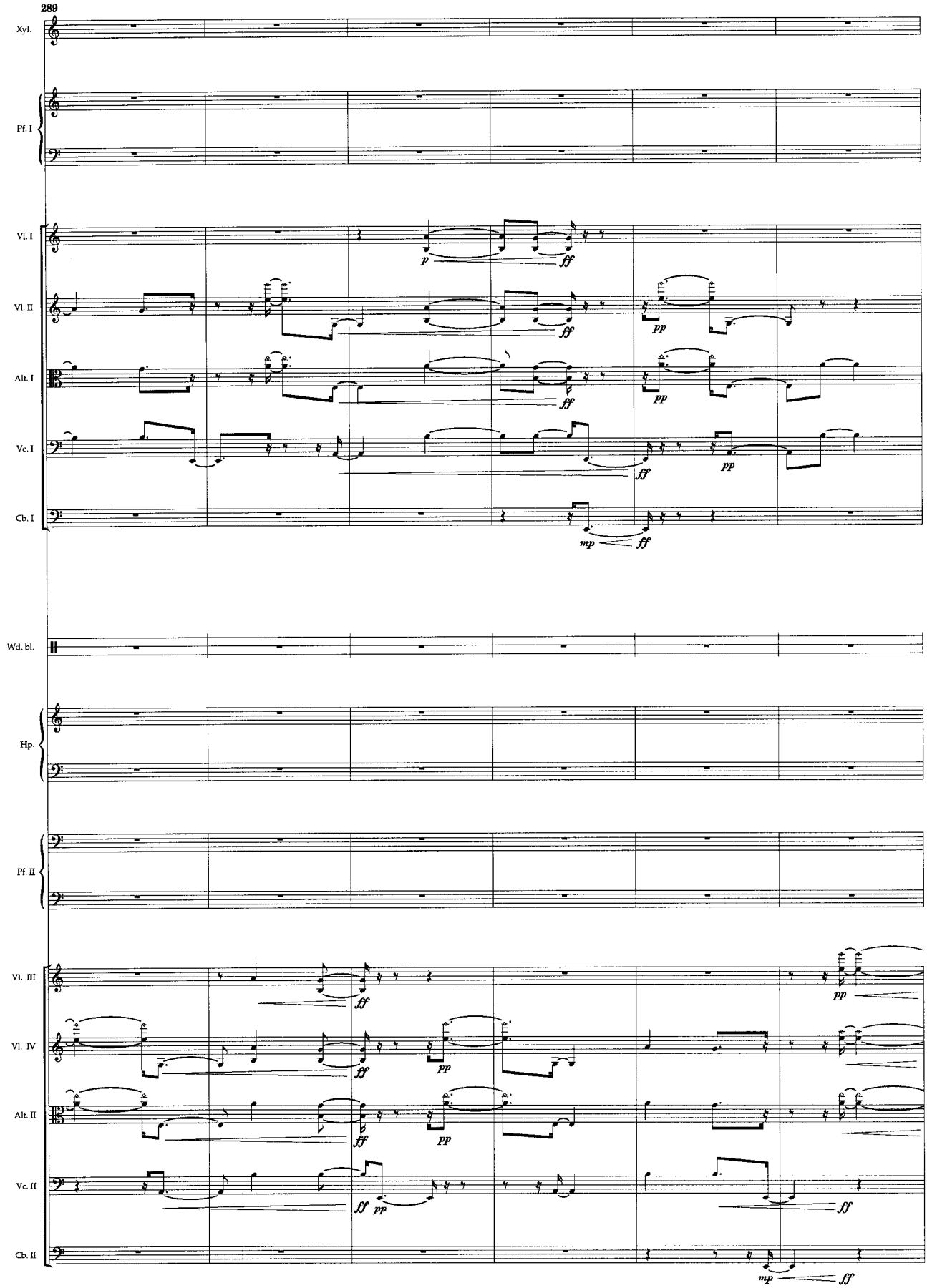

259
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
mf
ff
mp
pp

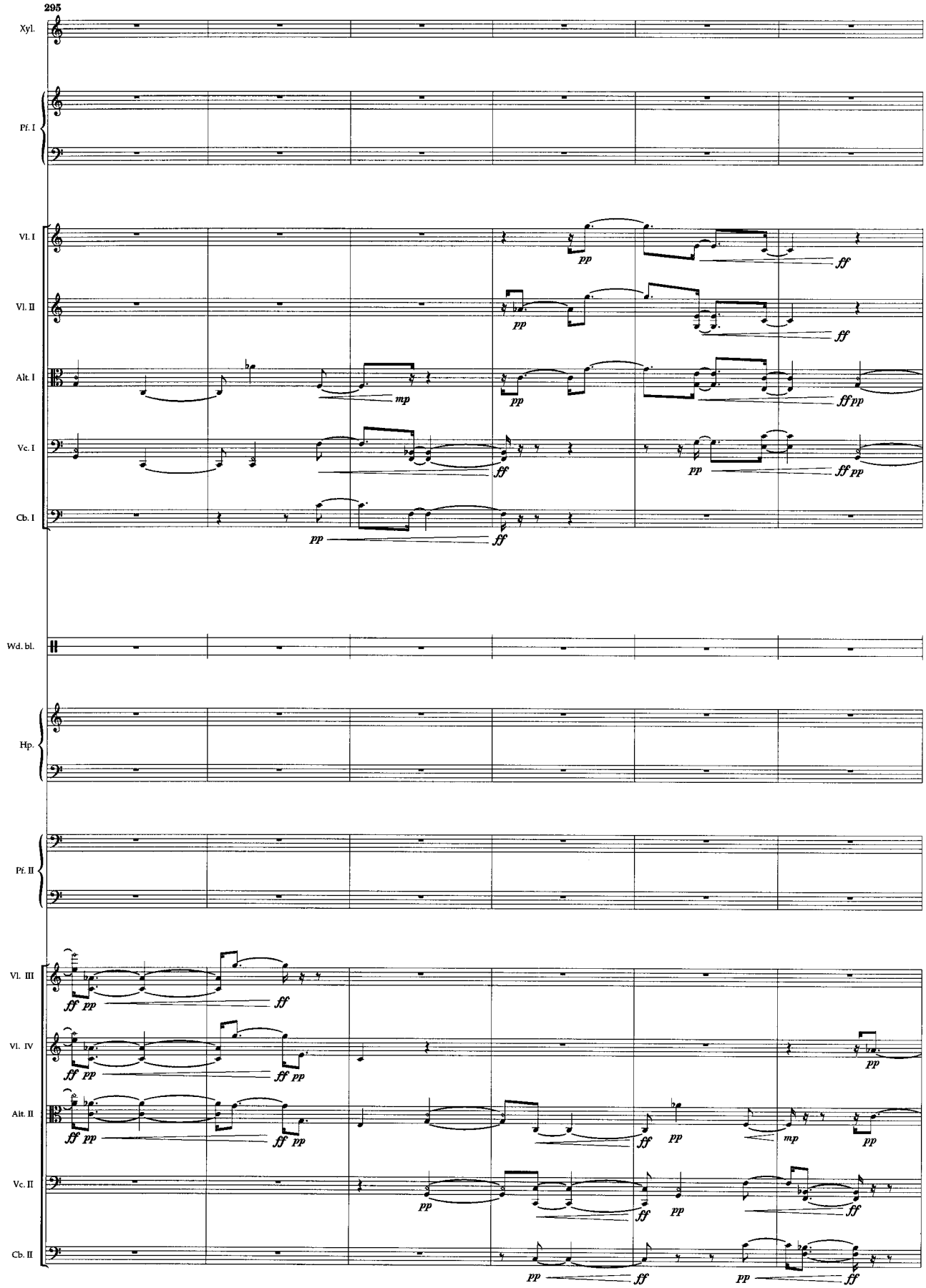

265
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

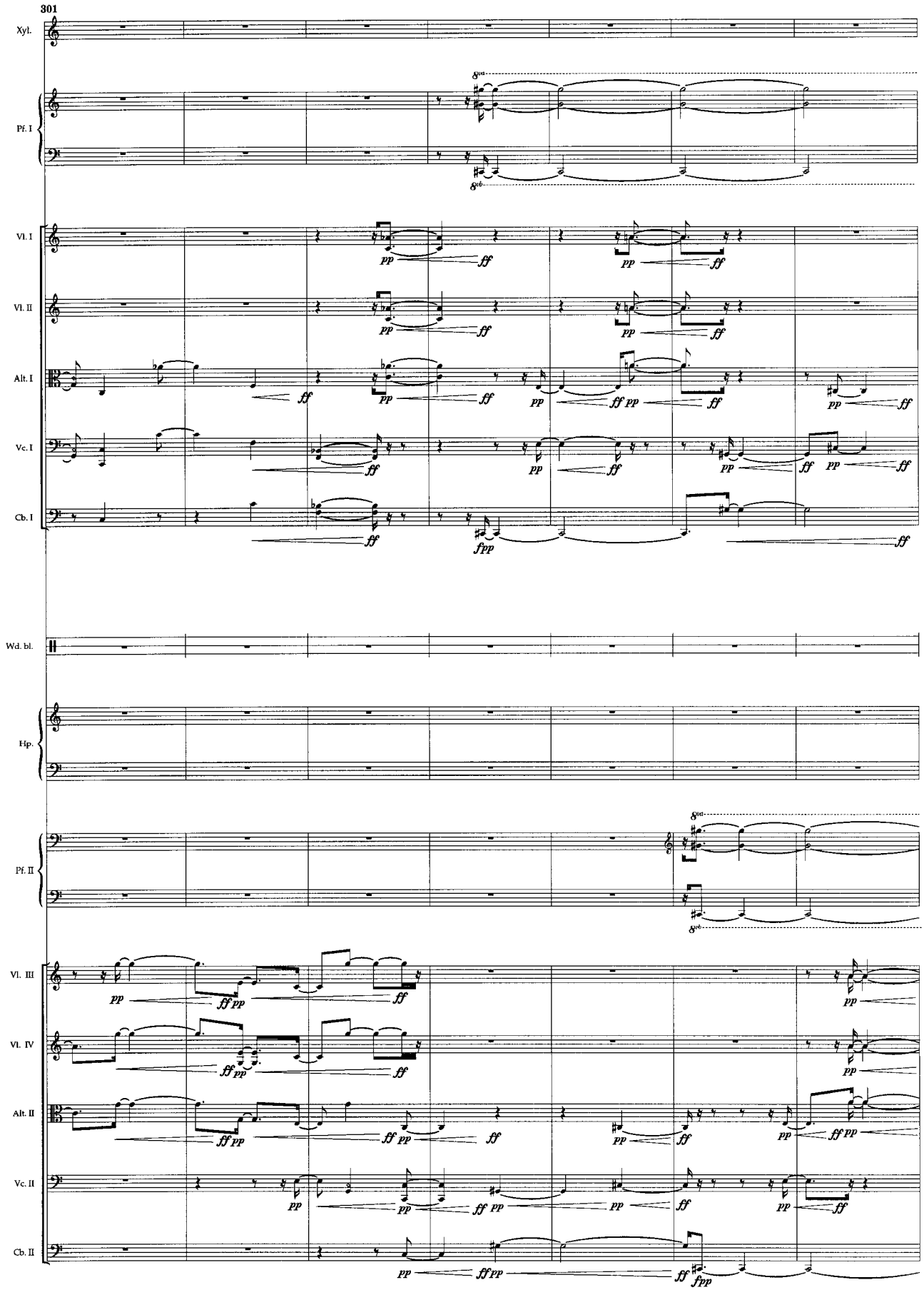

271
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

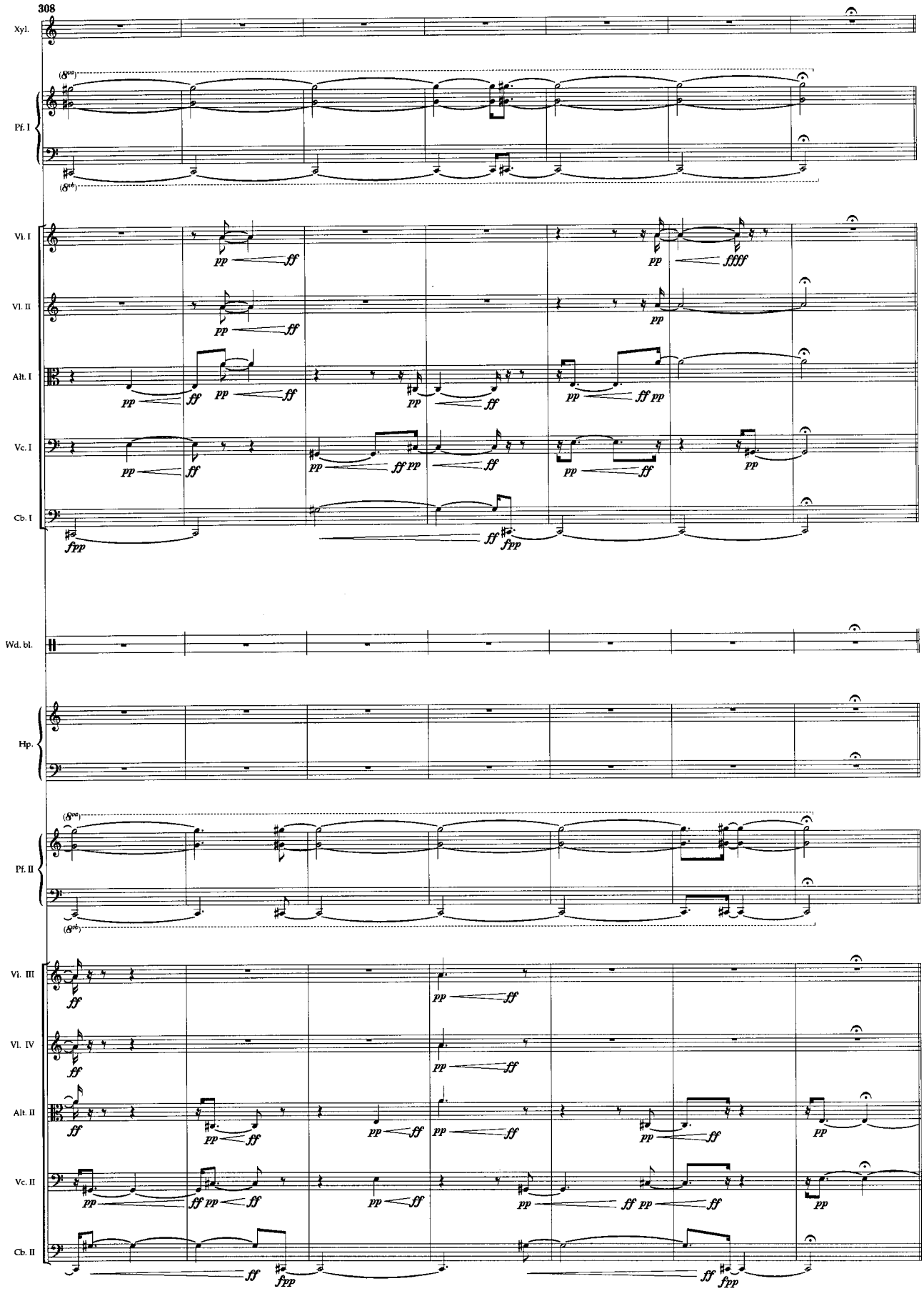

277
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
ff pp
ff
pp
mp
p

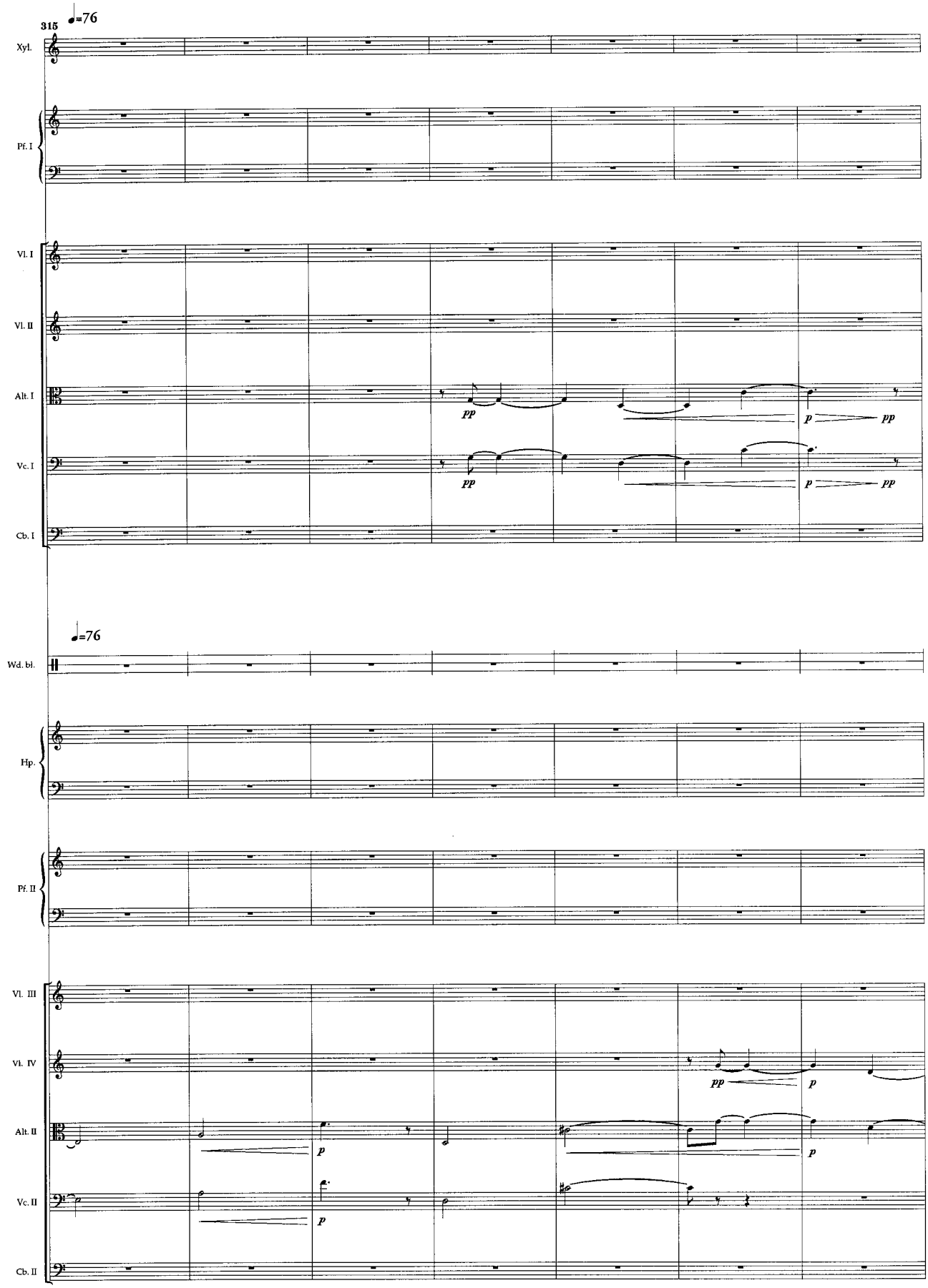

283
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
fff pp
ff
ff pp
pp
fffpp
ffpp

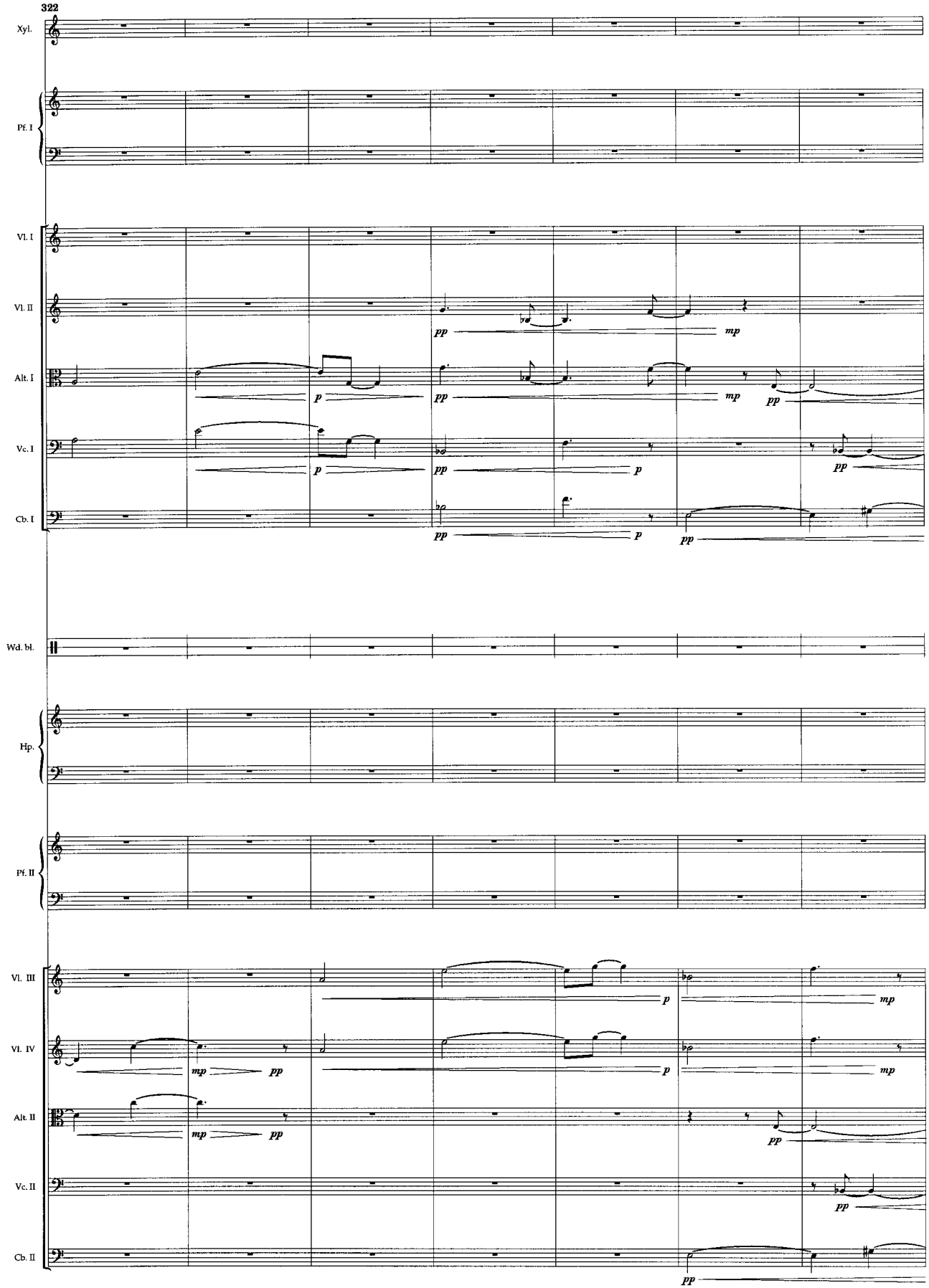

289
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
p
ff
pp
mp

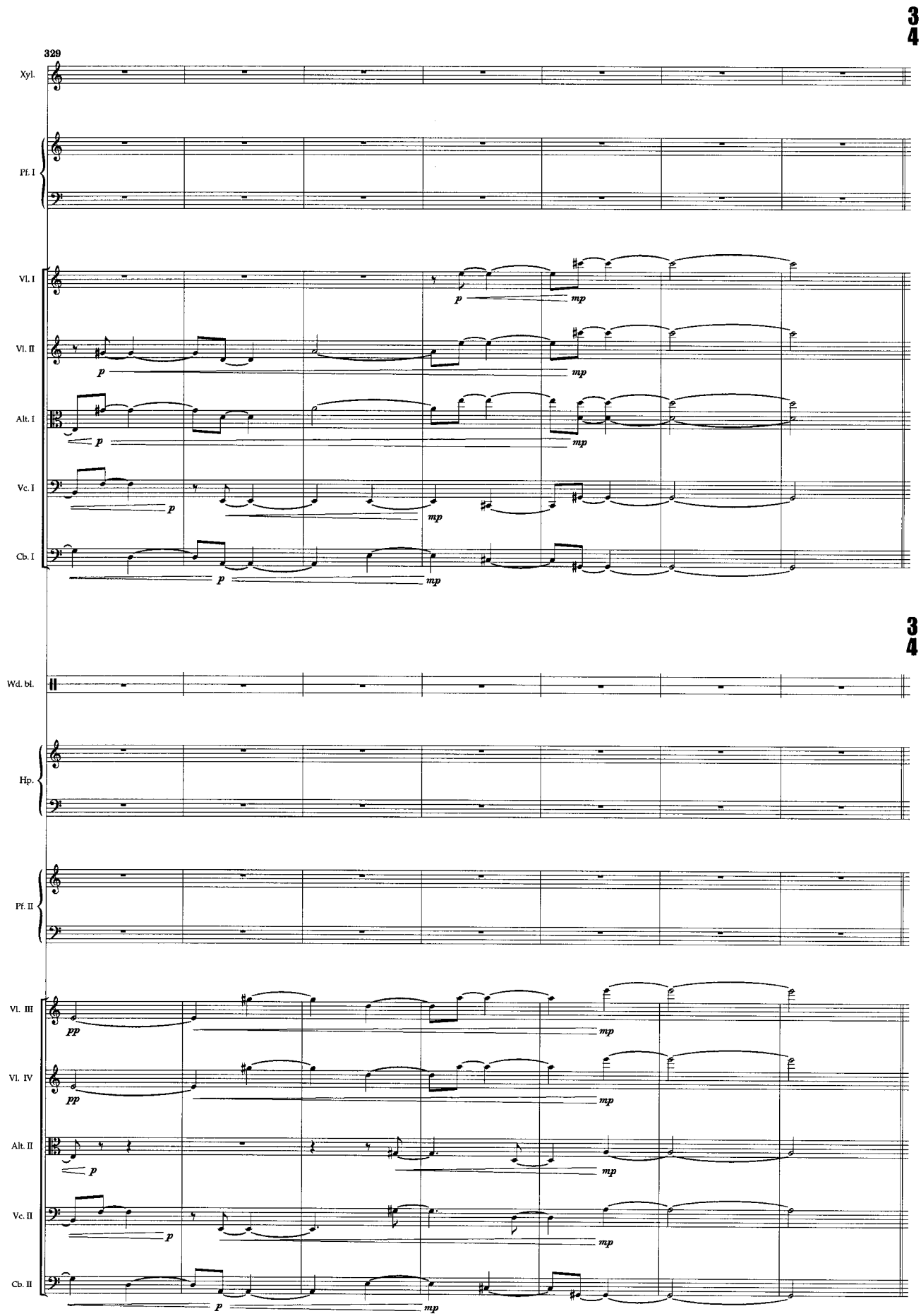

295
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

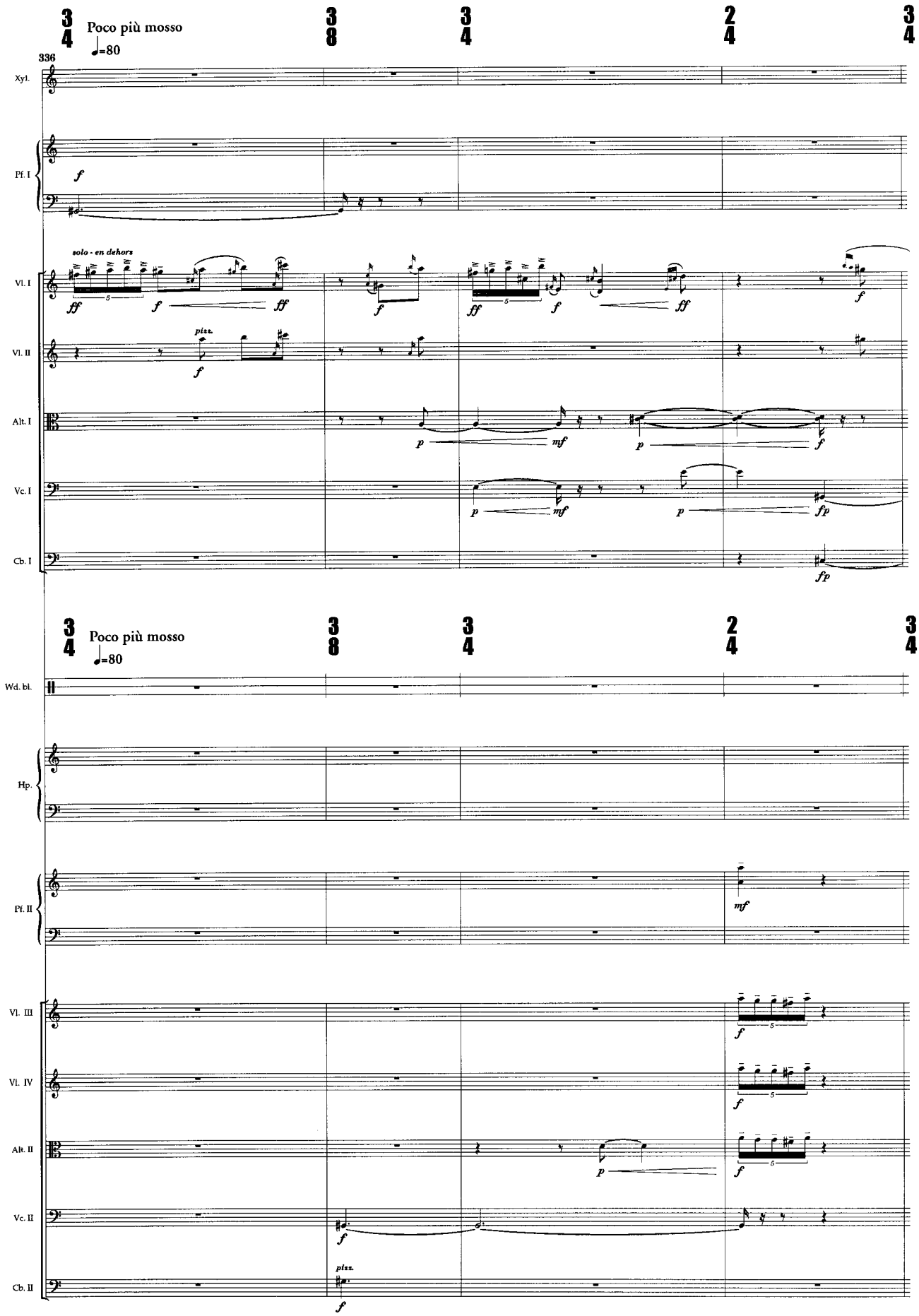

301
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

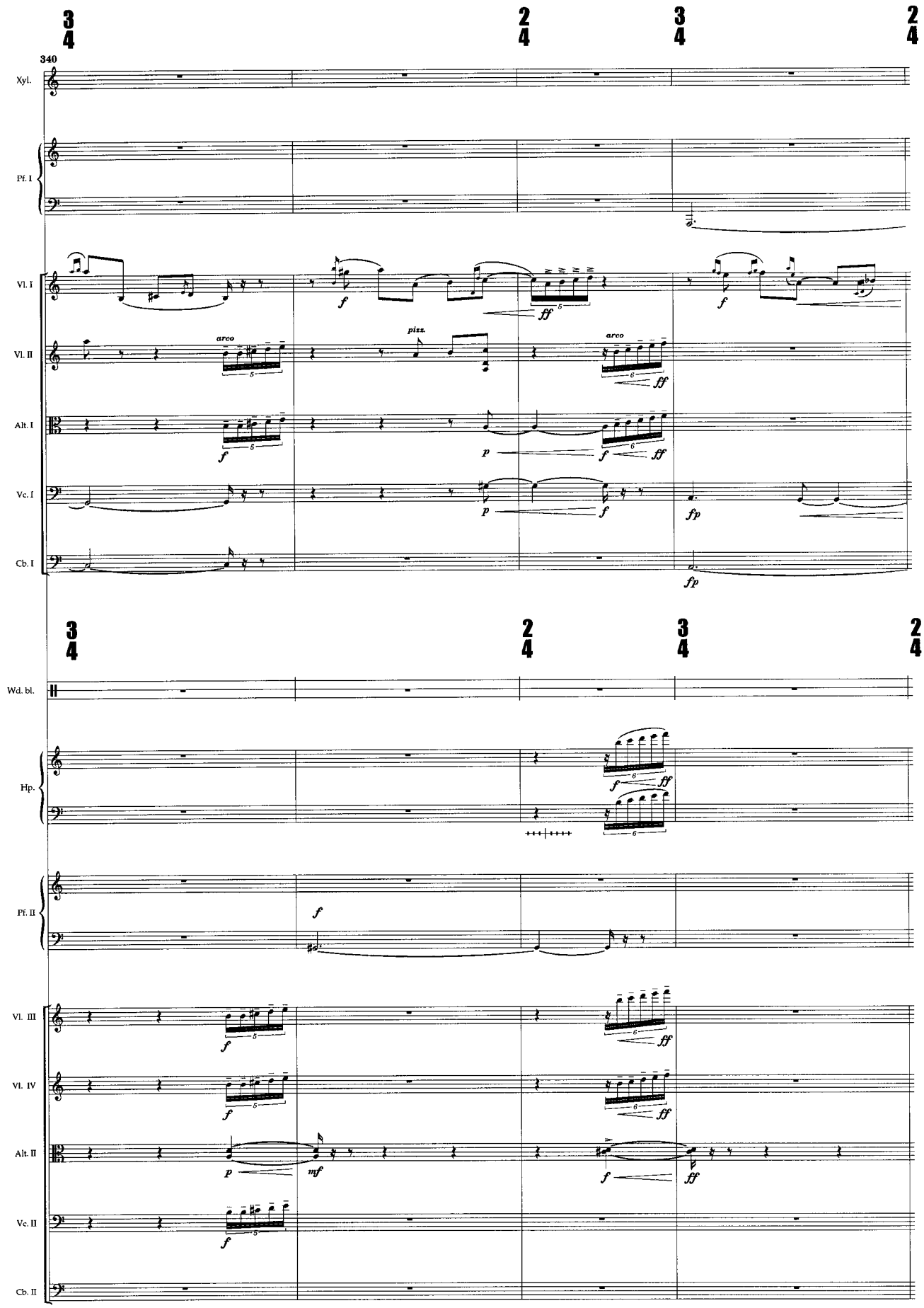

308
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

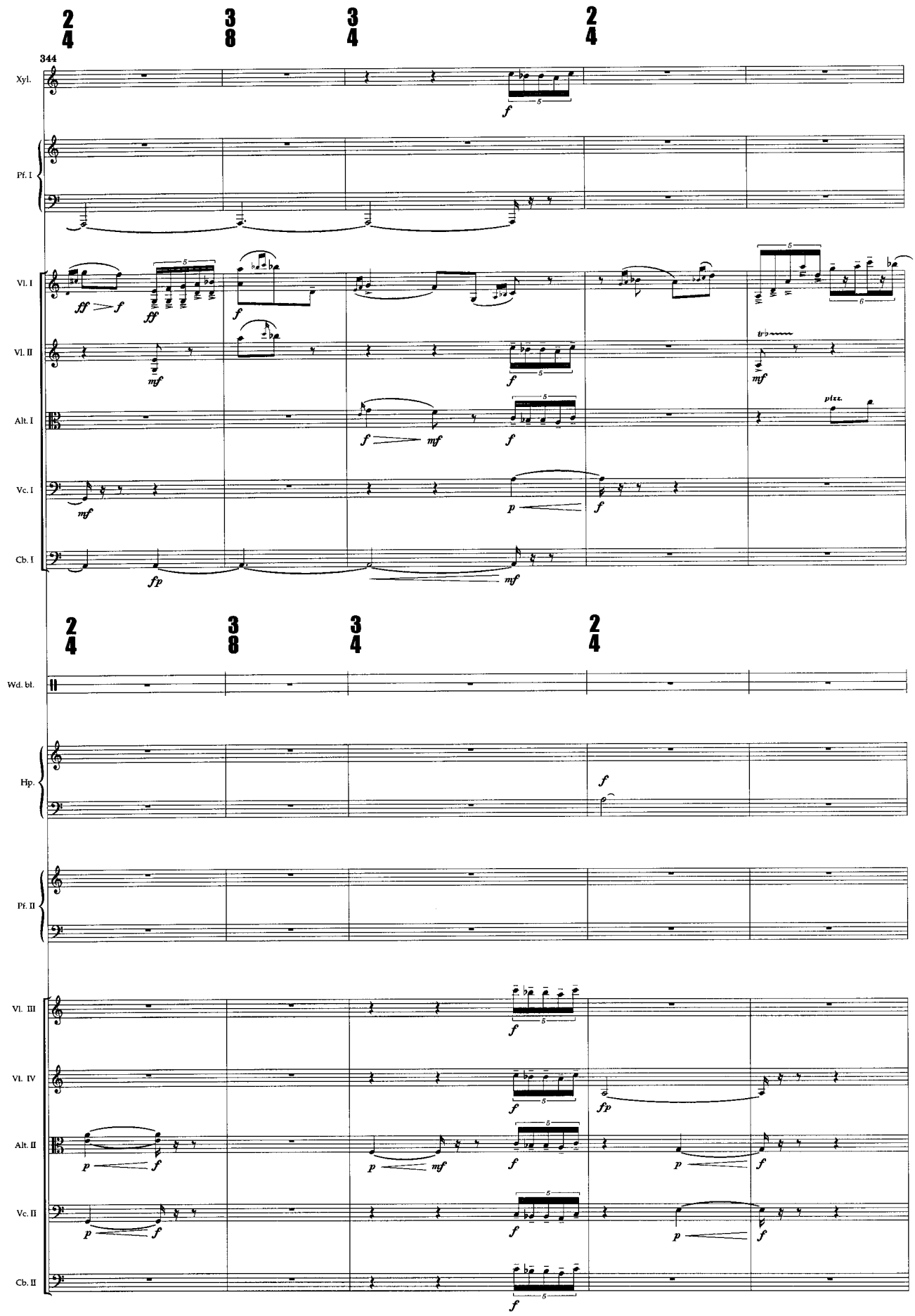

315
♩=76
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
pp
p
pp
pp
p
pp
♩=76
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pp
p
p
p

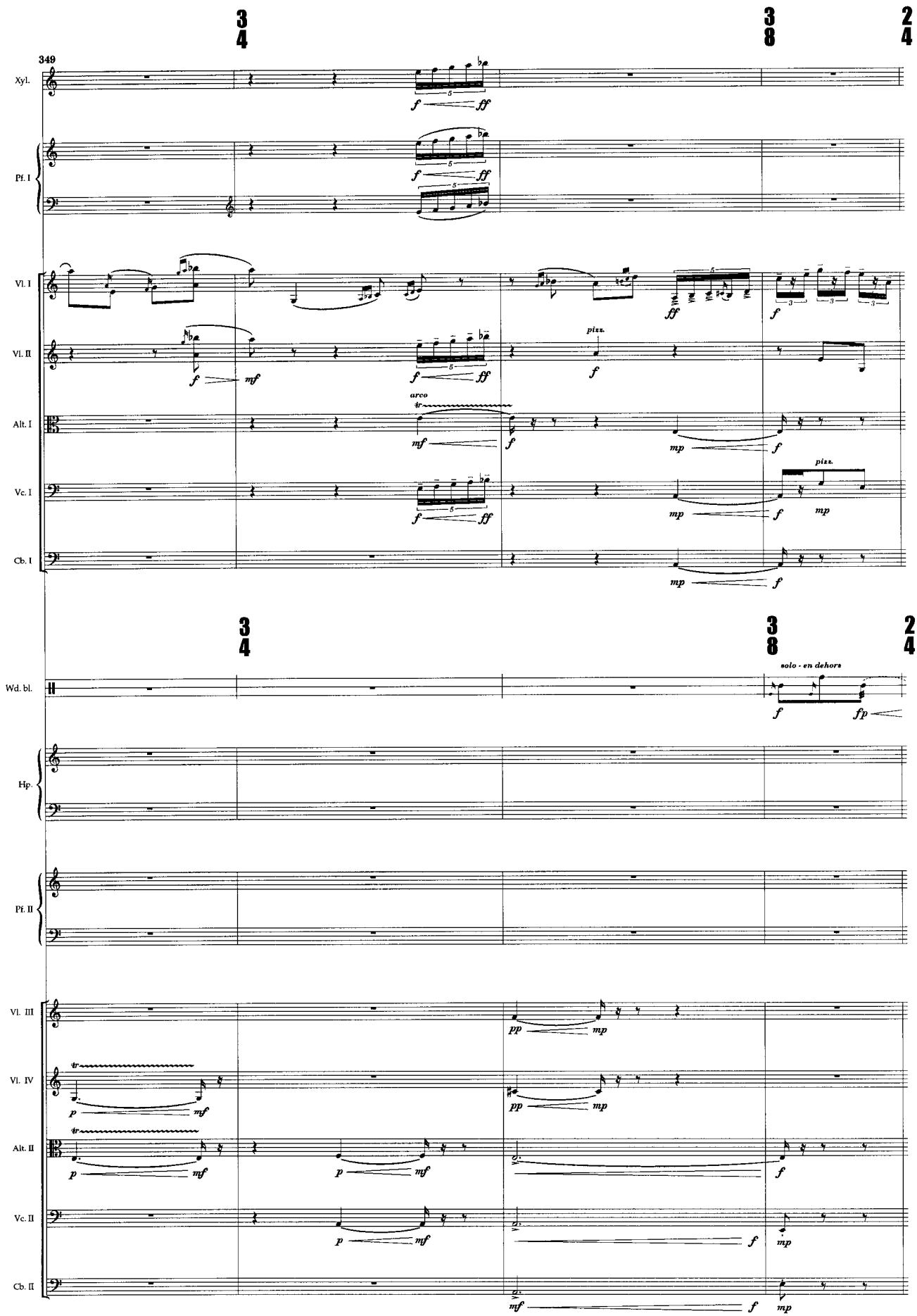

322
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

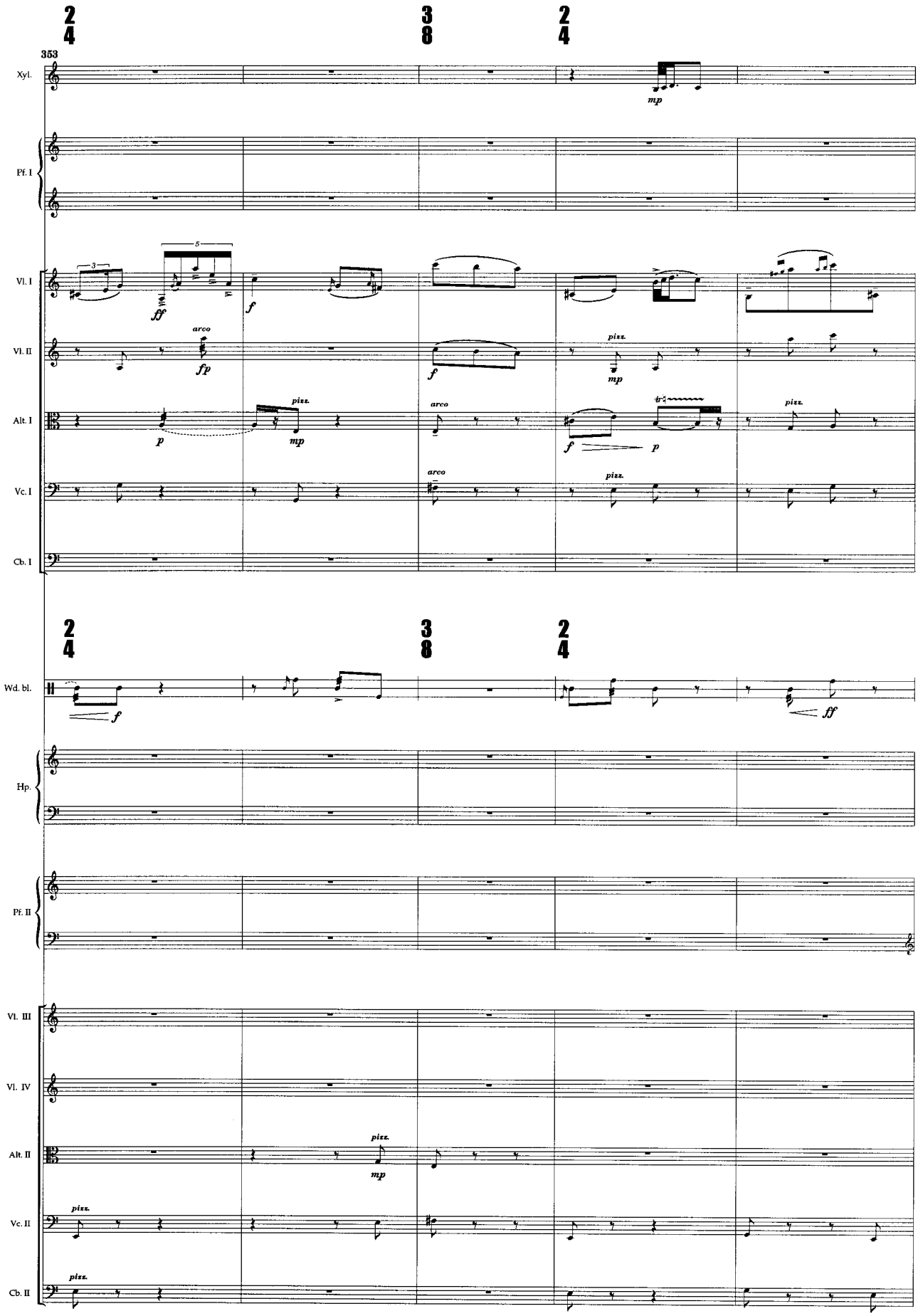

329
3
4
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
p
mp
3
4
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pp
p
mp

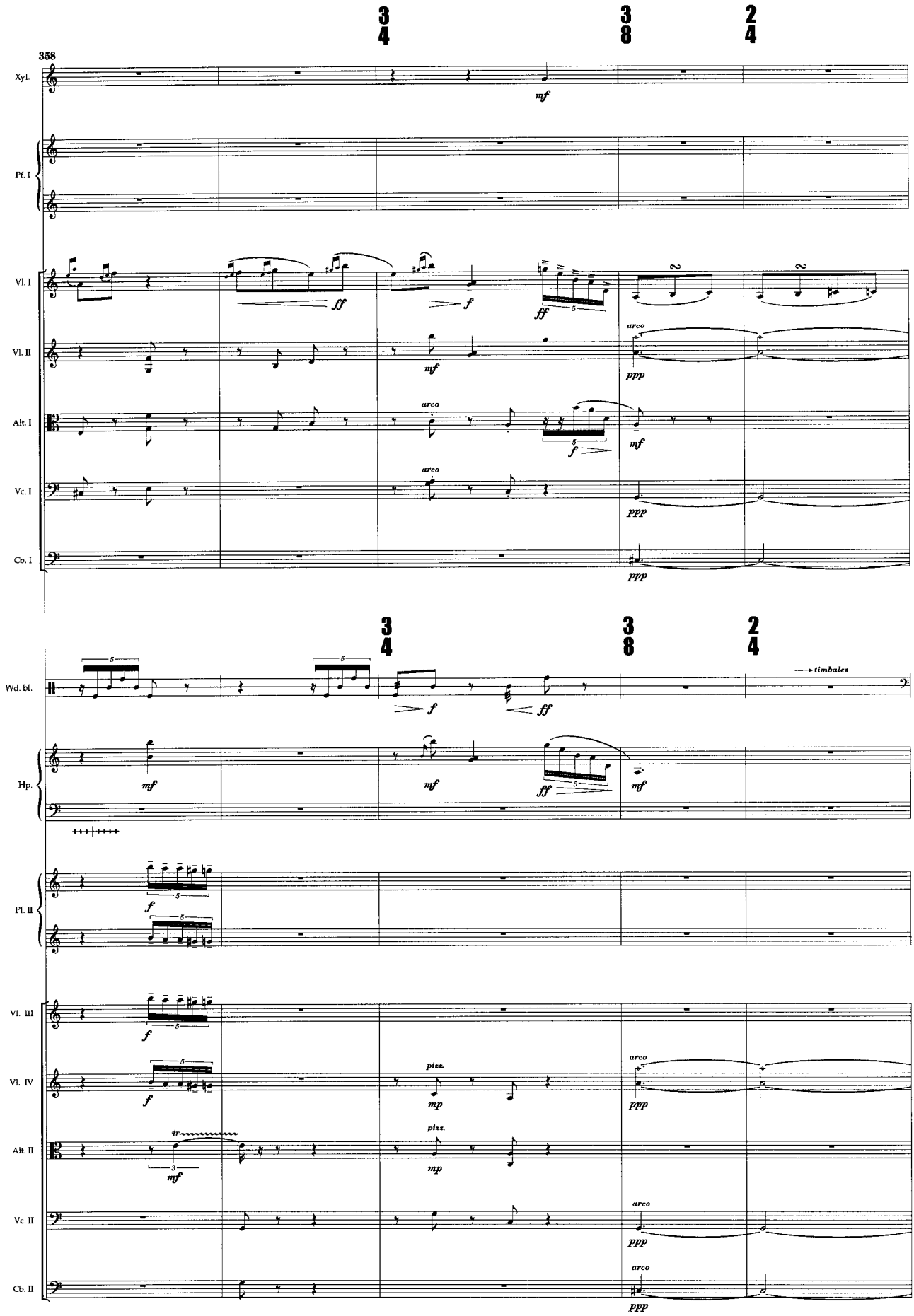

Poco più mosso
♩=80
336
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
solo - en dehors
pizz.
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

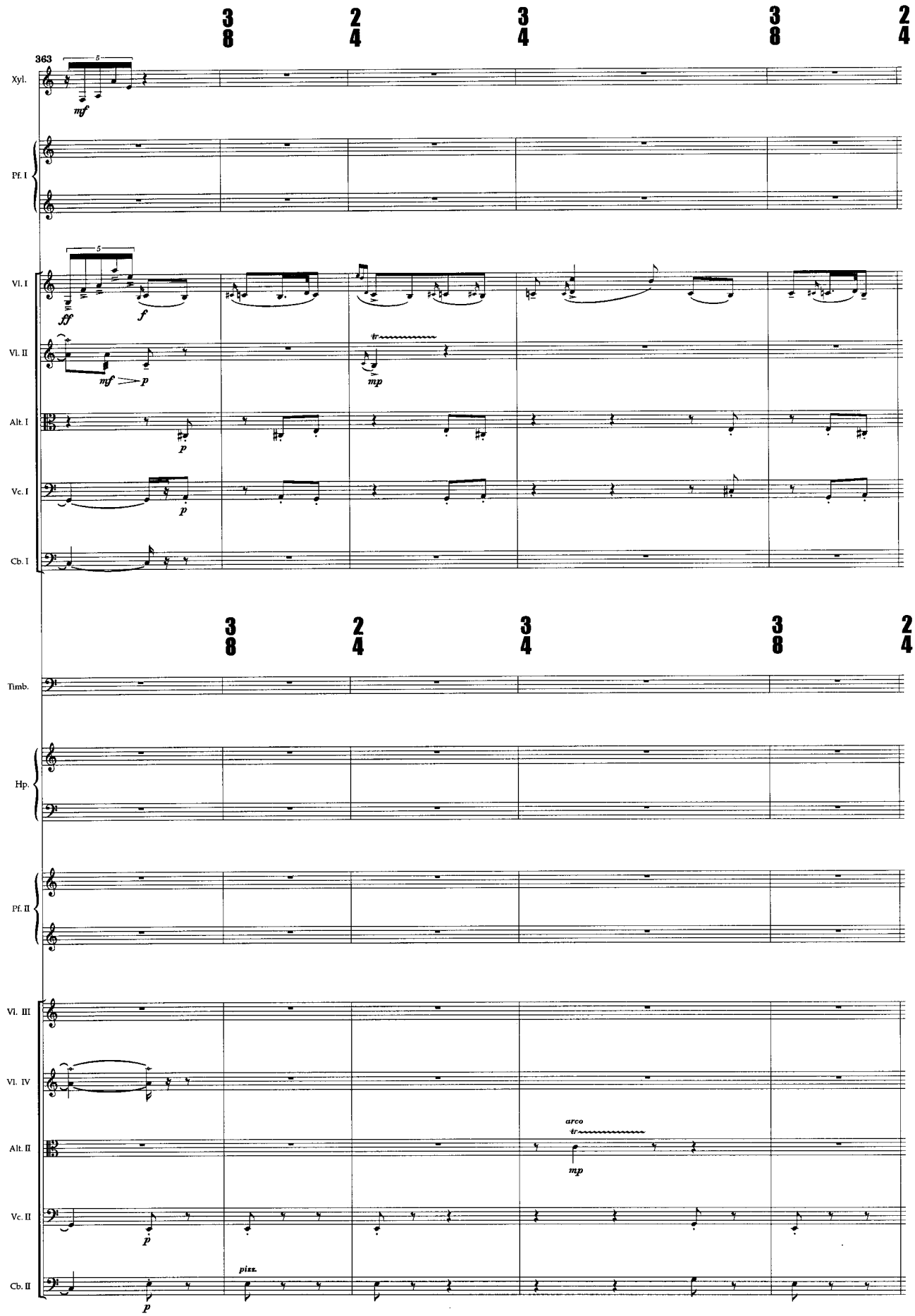

340
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
arco
pizz.
arco
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

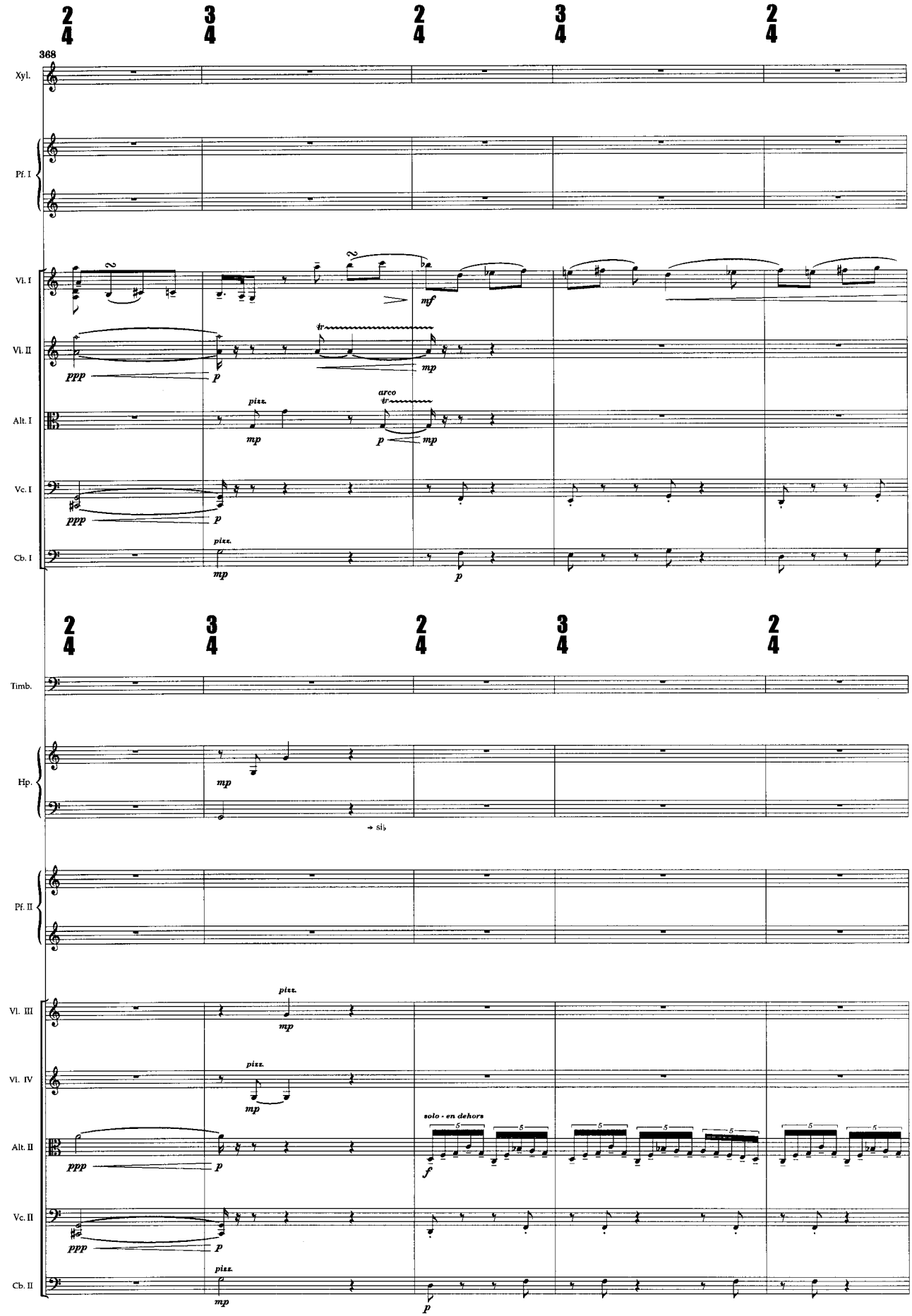

344
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.

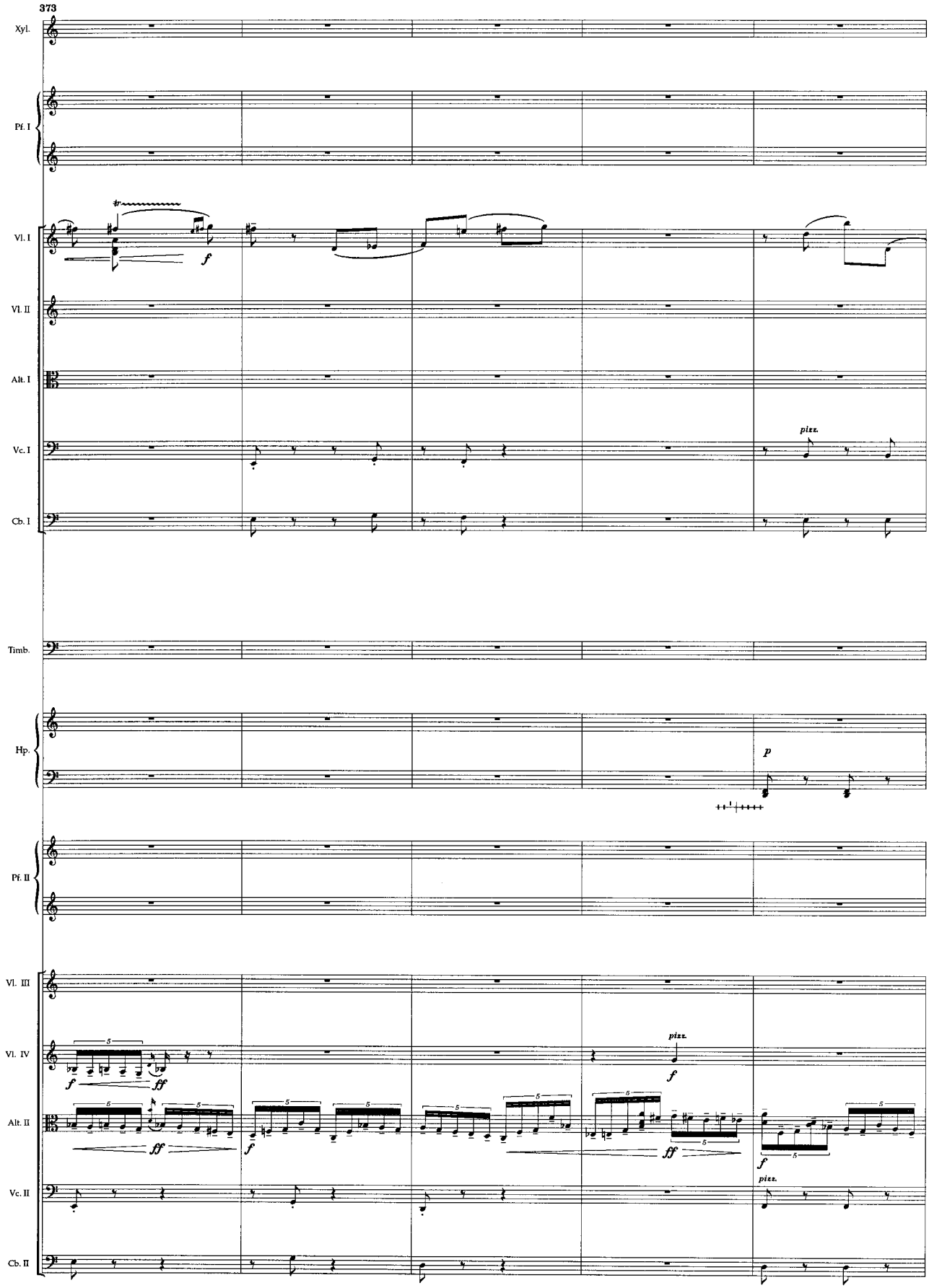

3/4
3/8
2/4
349
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
pizz.
arco
Wd. bl.
solo - en dehors
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

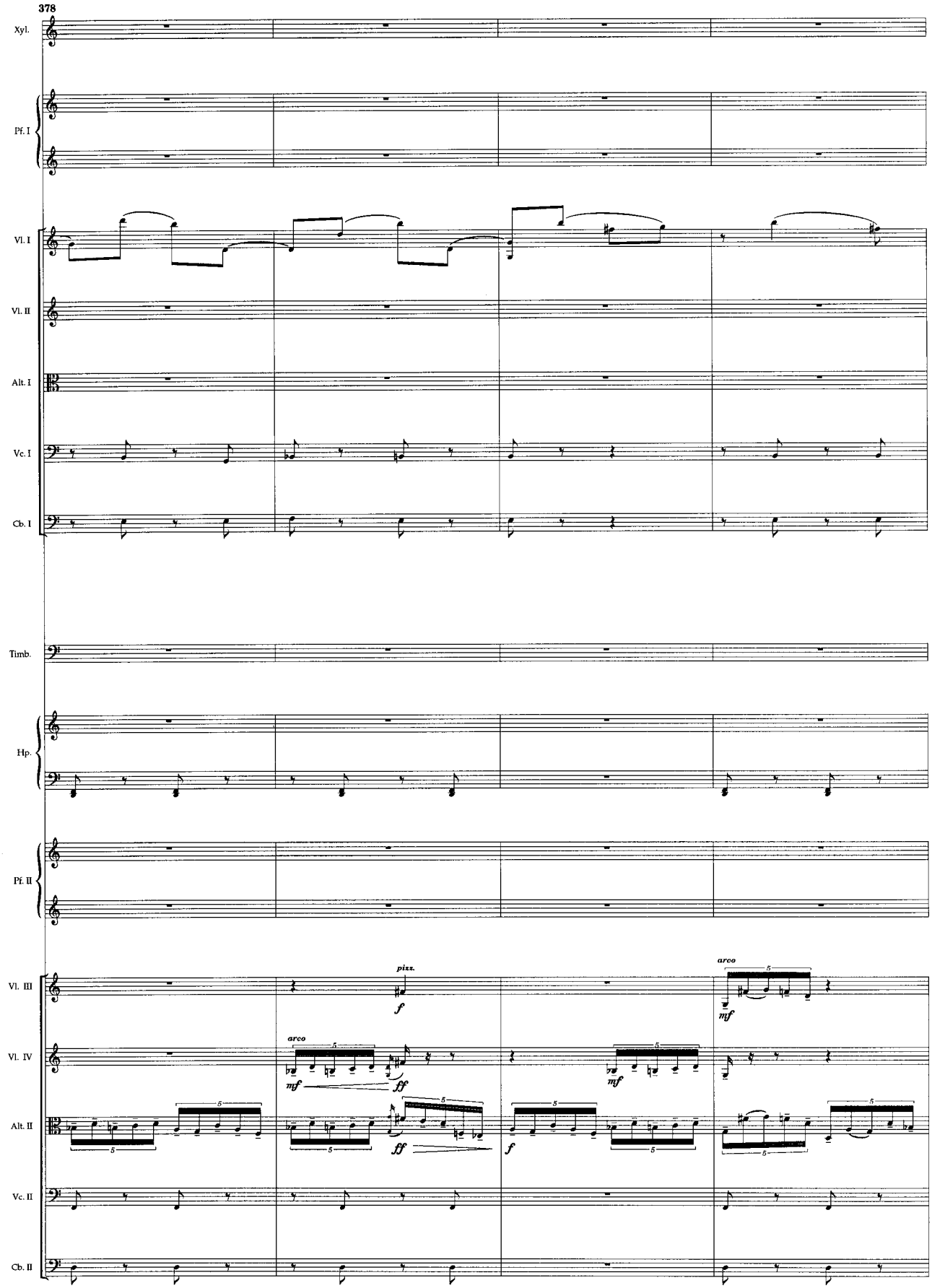

353
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
arco
pizz.

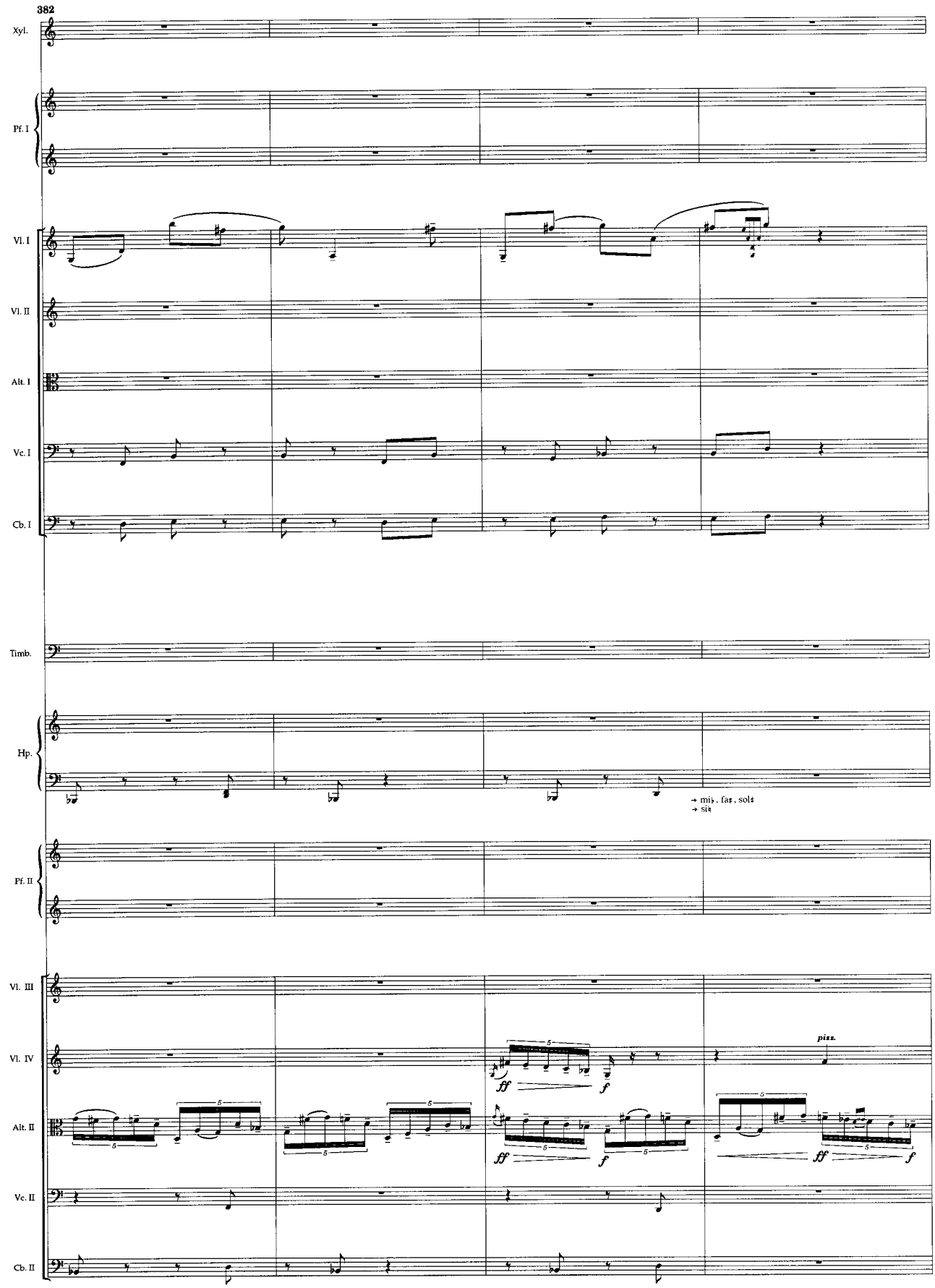

358
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
timbales
arco
pizz.

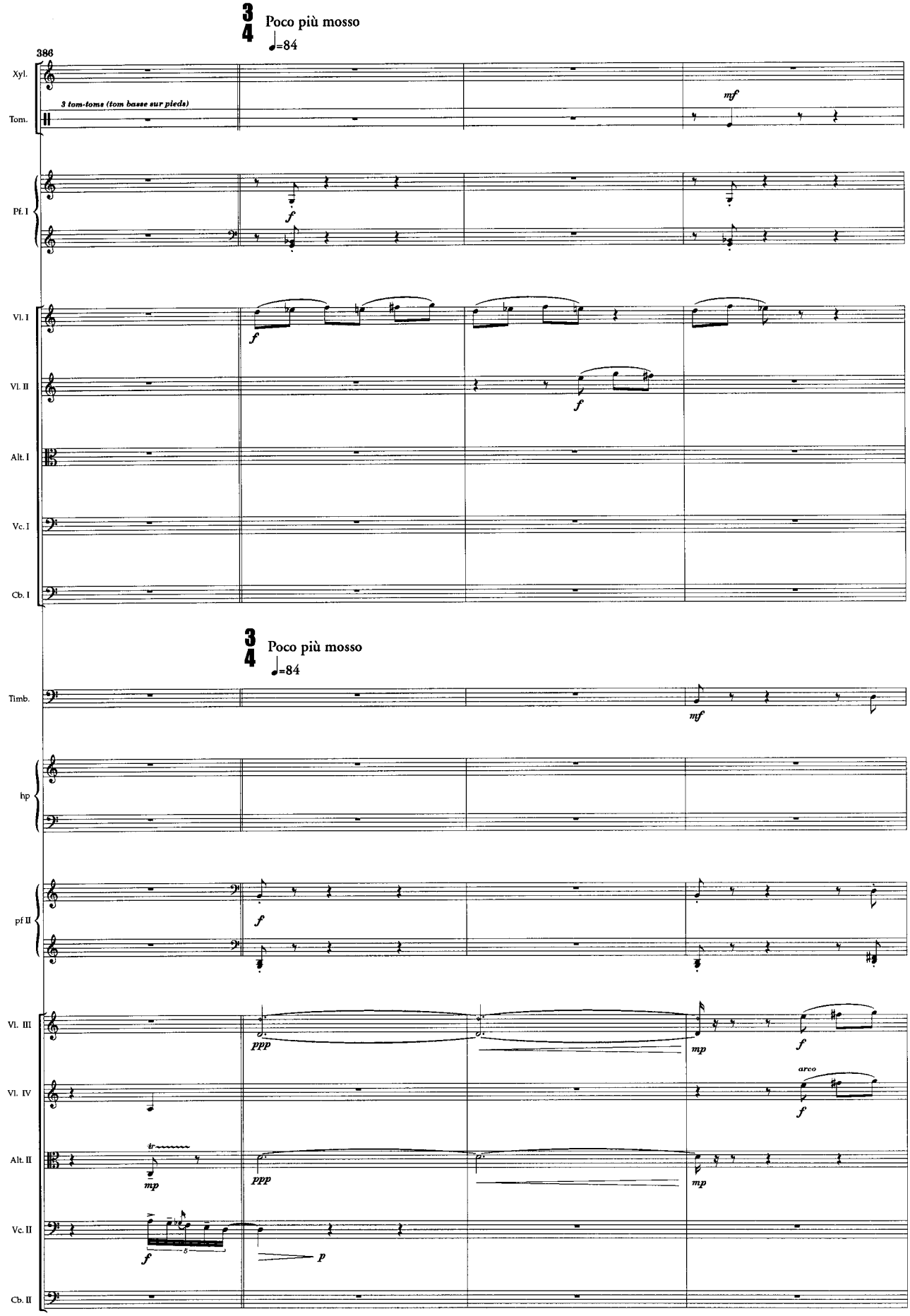

363
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
arco
pizz.

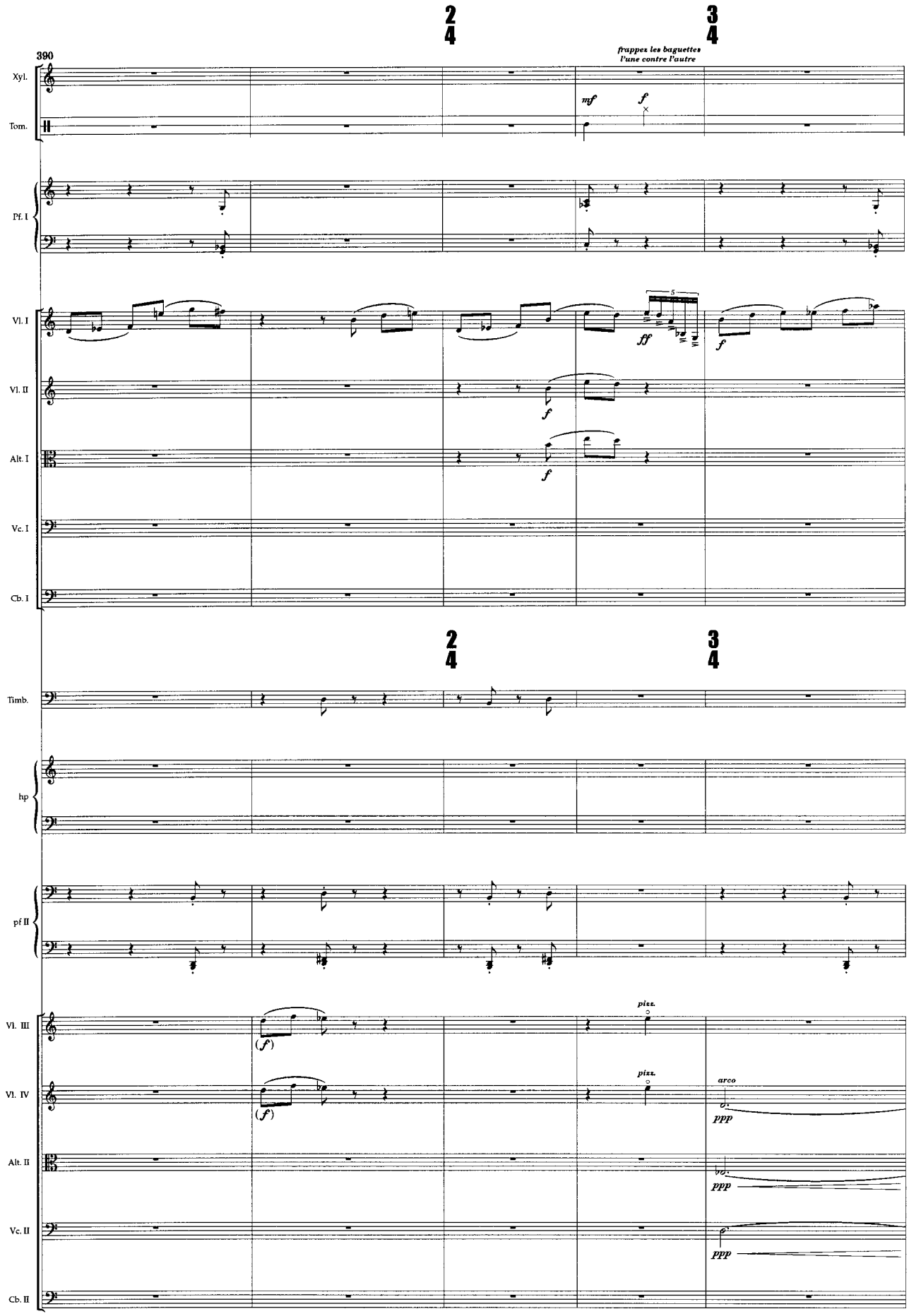

368
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.
arco
solo - en dehors
→ sib

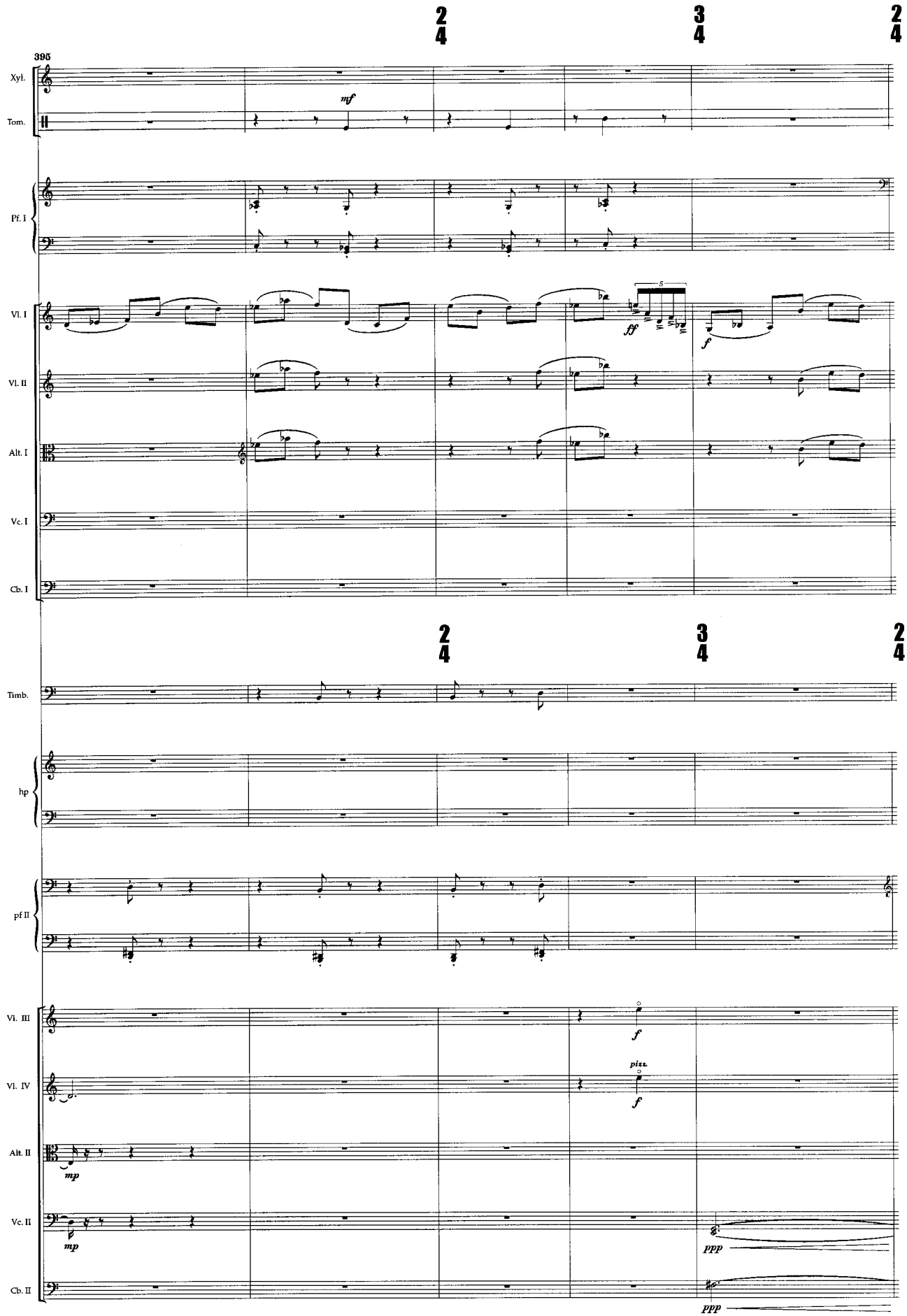

373
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
f
pizz.
p
ff

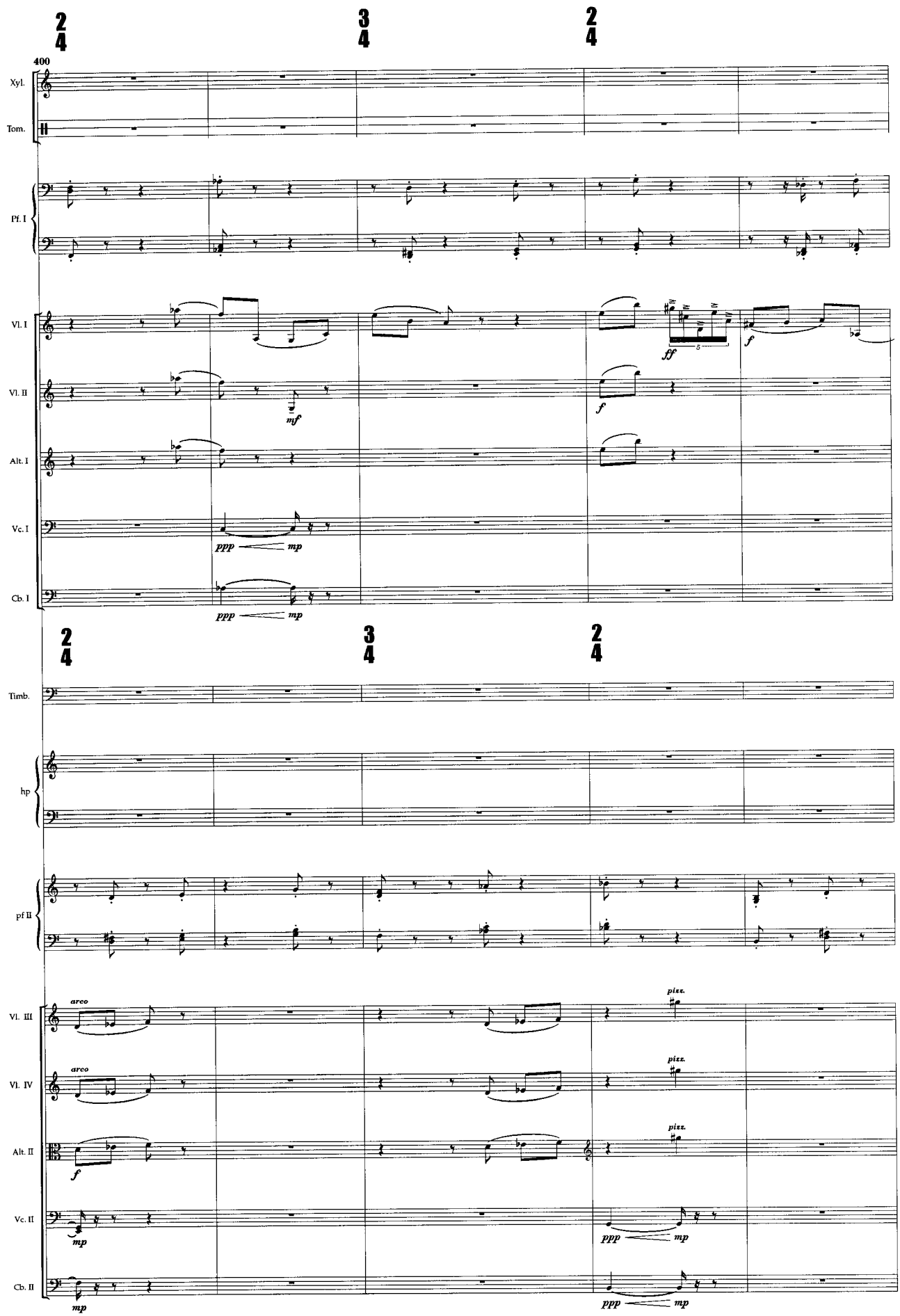

378
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.
f
arco
mf
ff
arco
mf
mf
ff
f
mf

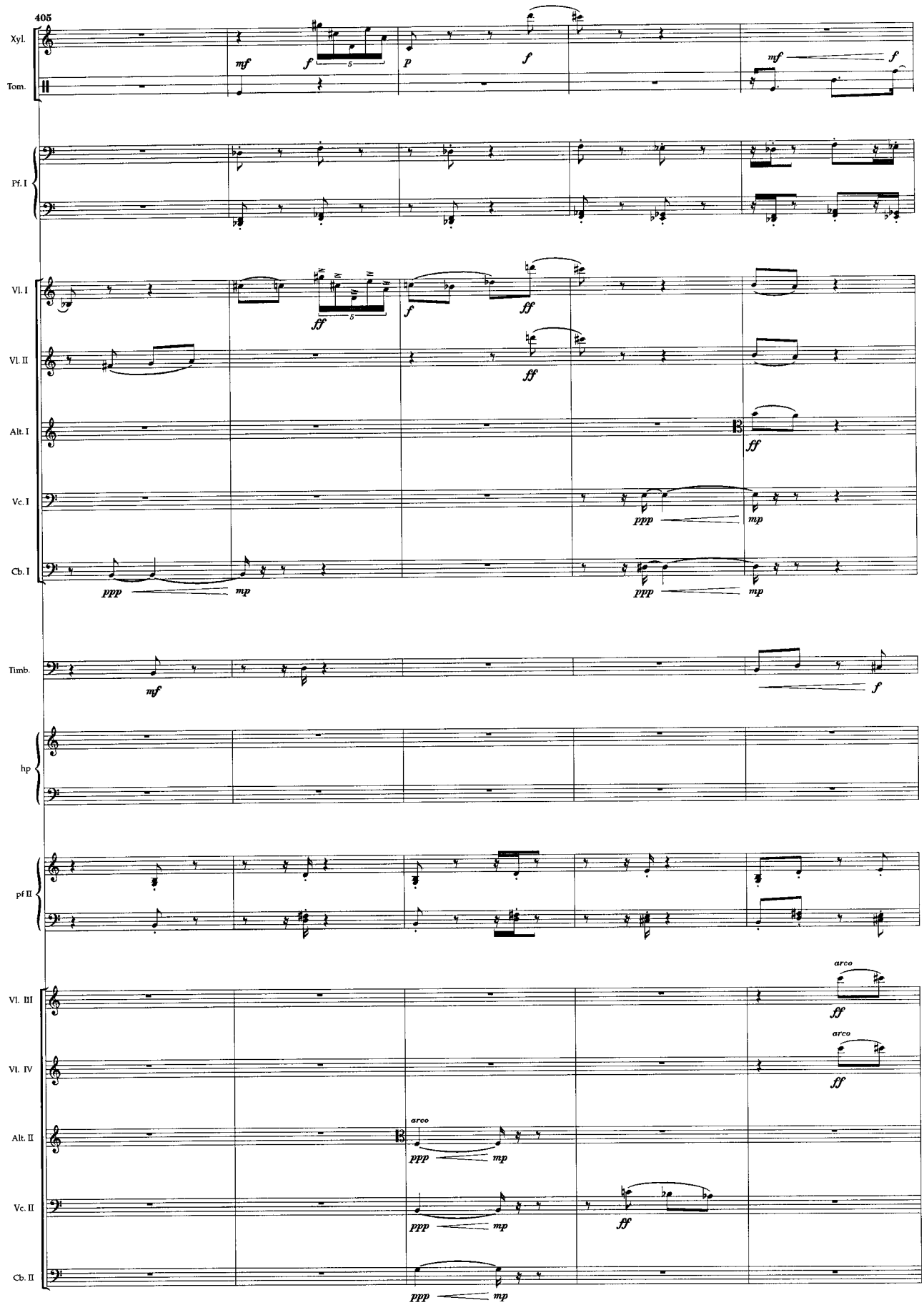

382
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
Hp.
→ mi♭, fa♯, sol♯
→ si♮
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.
ff
f

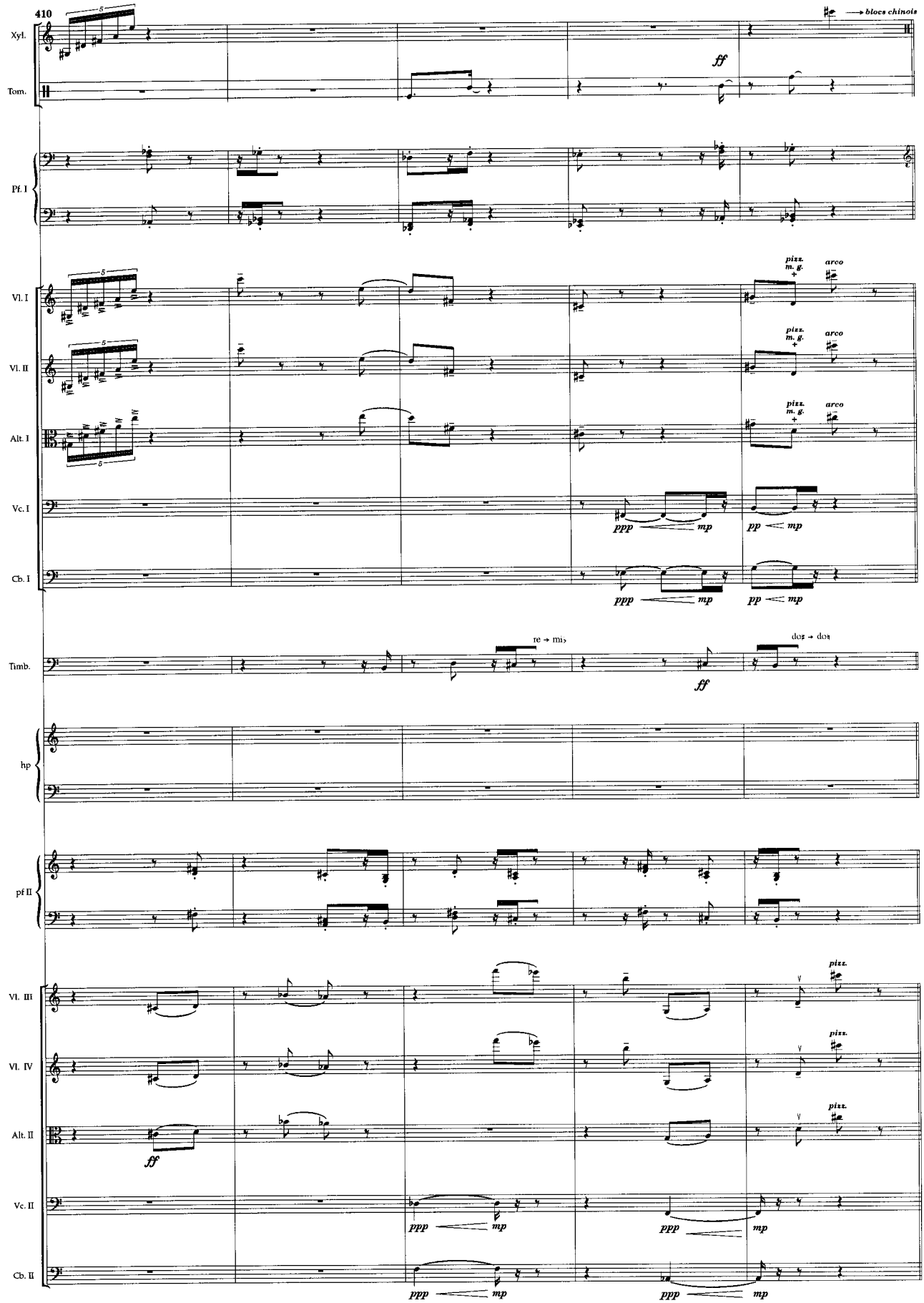

386
3/4 Poco più mosso
♩=84
Xyl.
Tom.
3 tom-toms (tom basse sur pieds)
mf
Pf. I
f
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
3/4 Poco più mosso
♩=84
Timb.
mf
hp
pf II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
ppp
mp
arco
tr
p

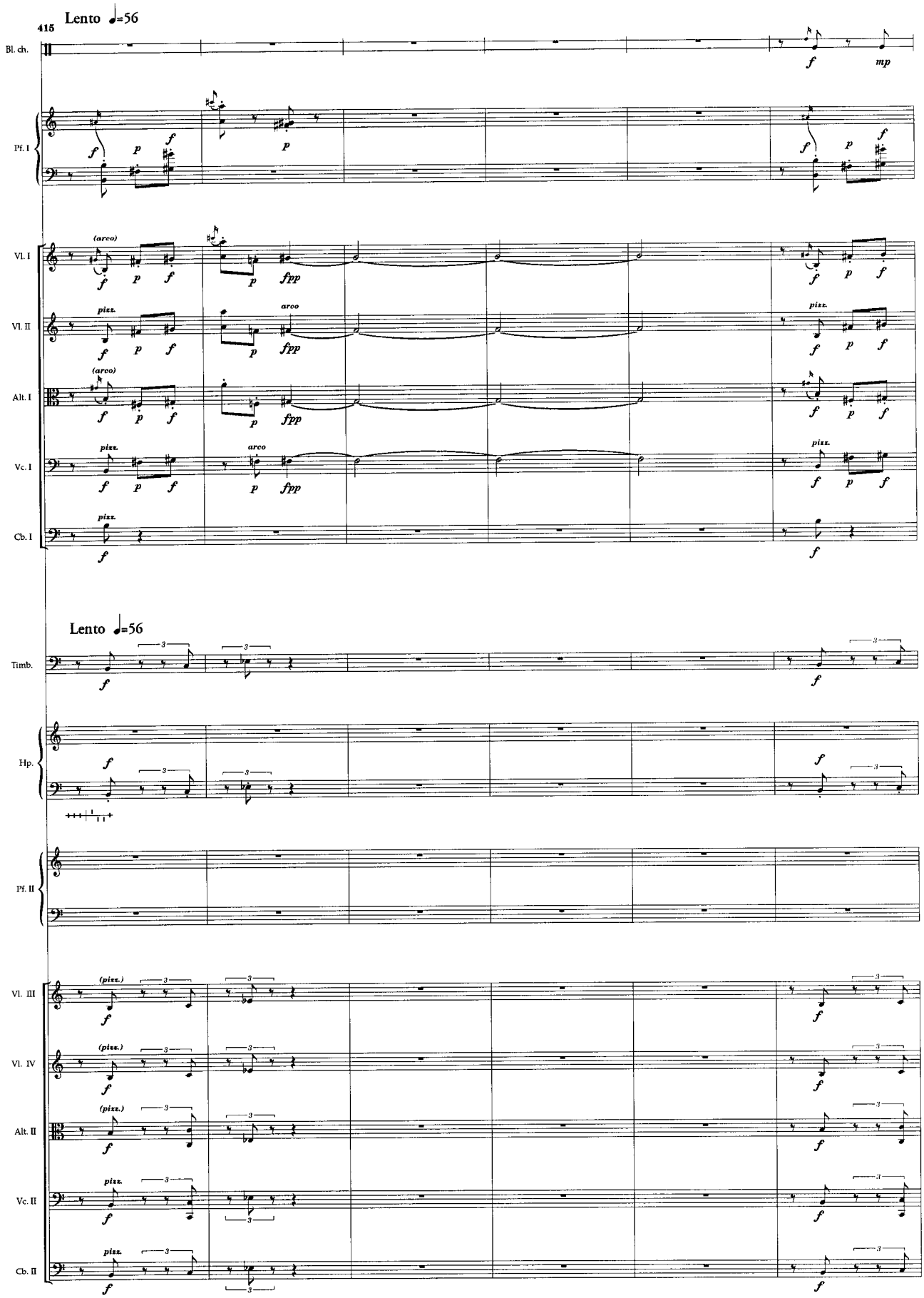

390
2/4
3/4
frappez les baguettes l'une contre l'autre
Xyl.
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
hp
pf II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
mf
f
ff
pizz.
arco
ppp

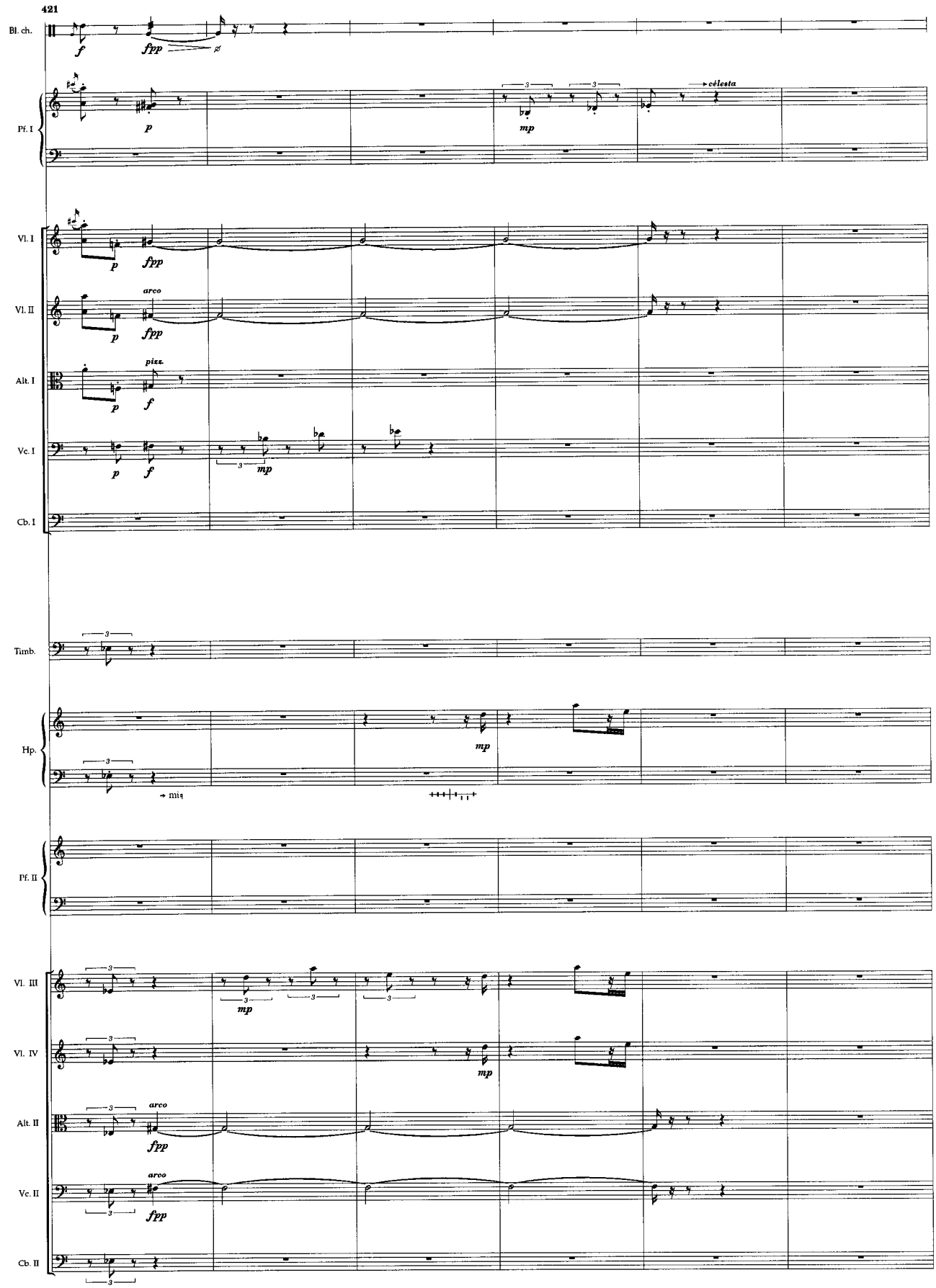

395
2/4
3/4
2/4
Xyl.
Tom.
mf
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
ff
f
Timb.
hp
pf II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.
mp
ppp

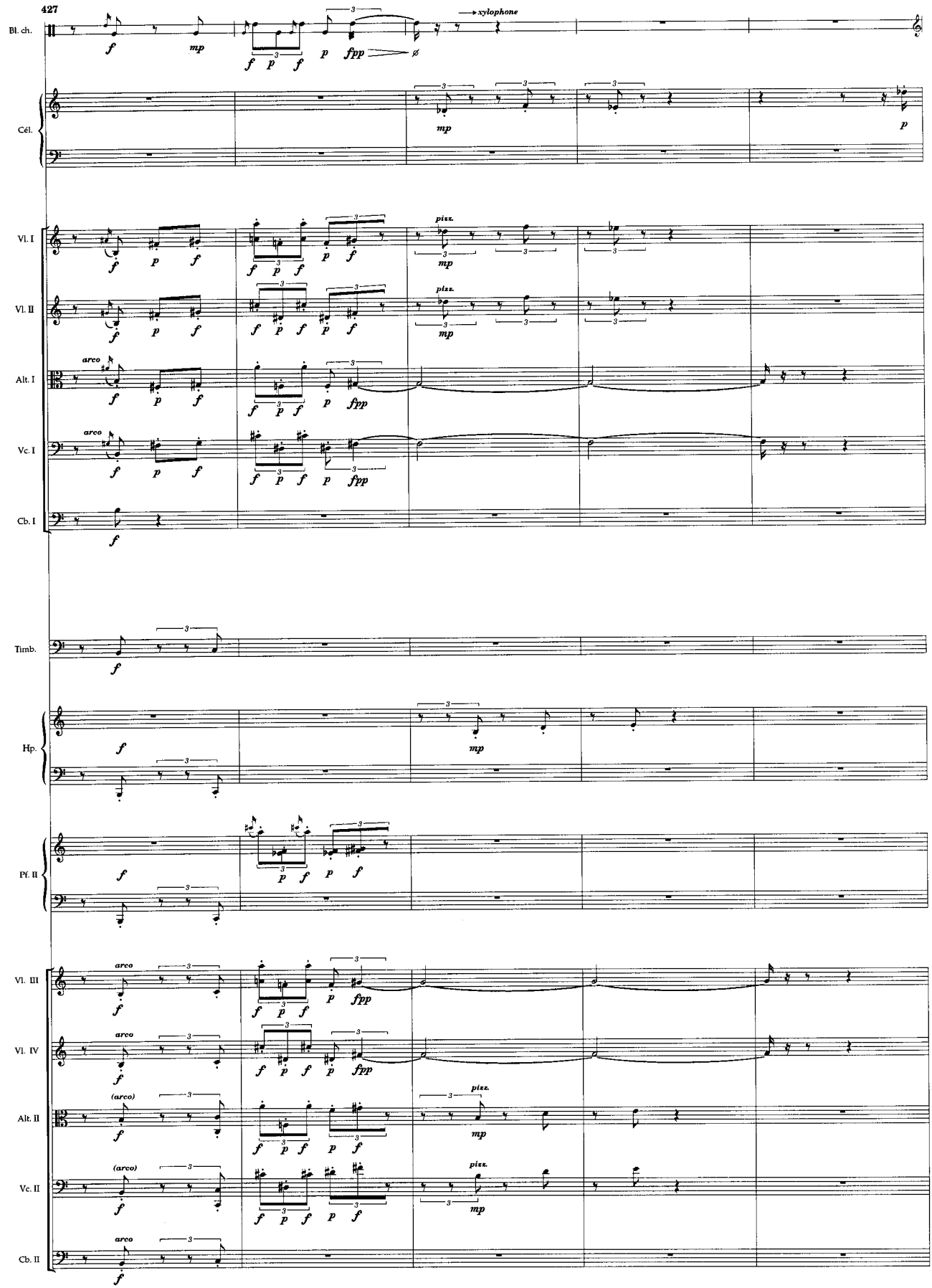

400
Xyl.
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
hp
pf II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
arco
pizz.
ppp
mp
mf
f
ff

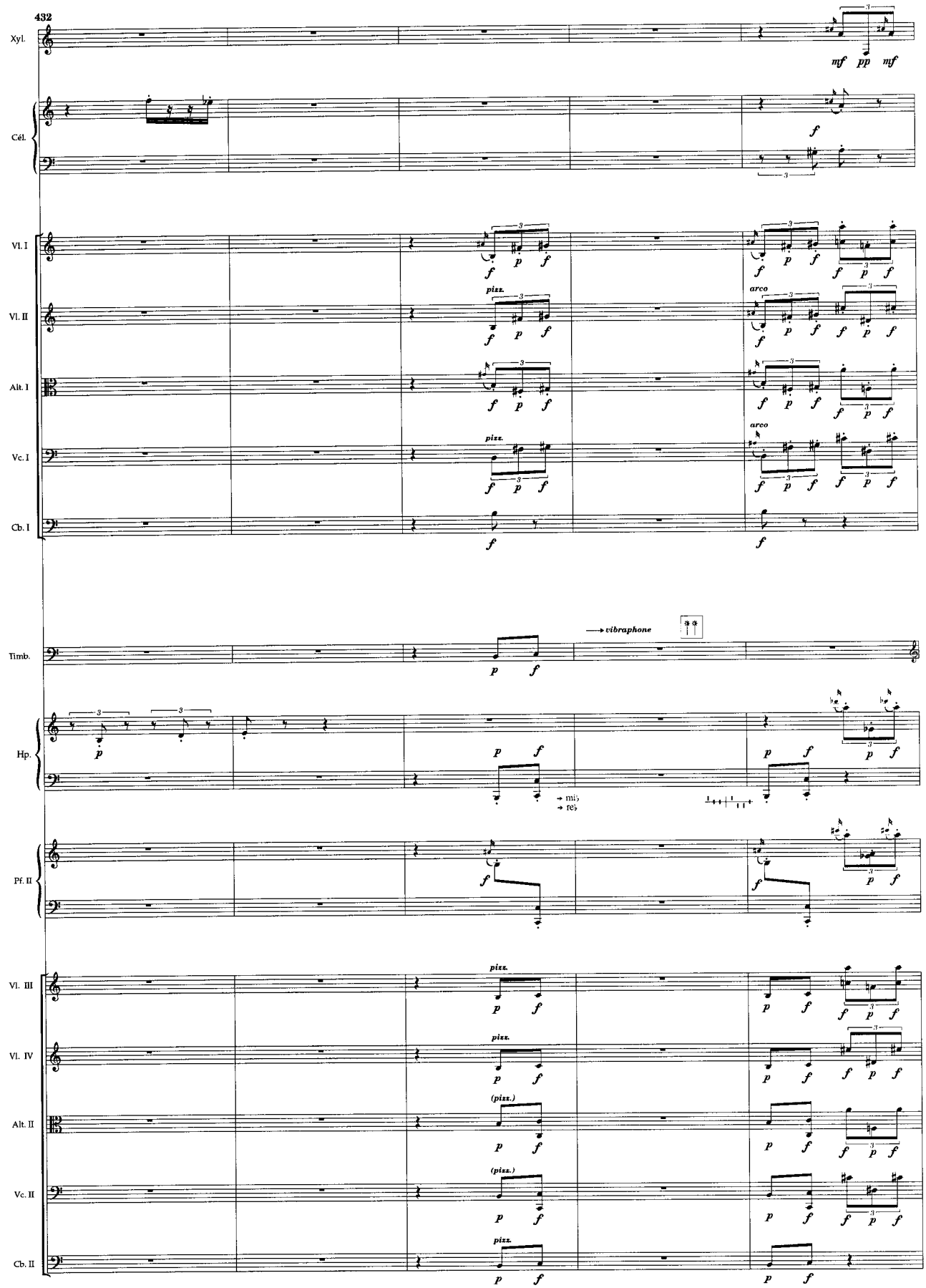

405
Xyl.
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
hp
pf II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
arco

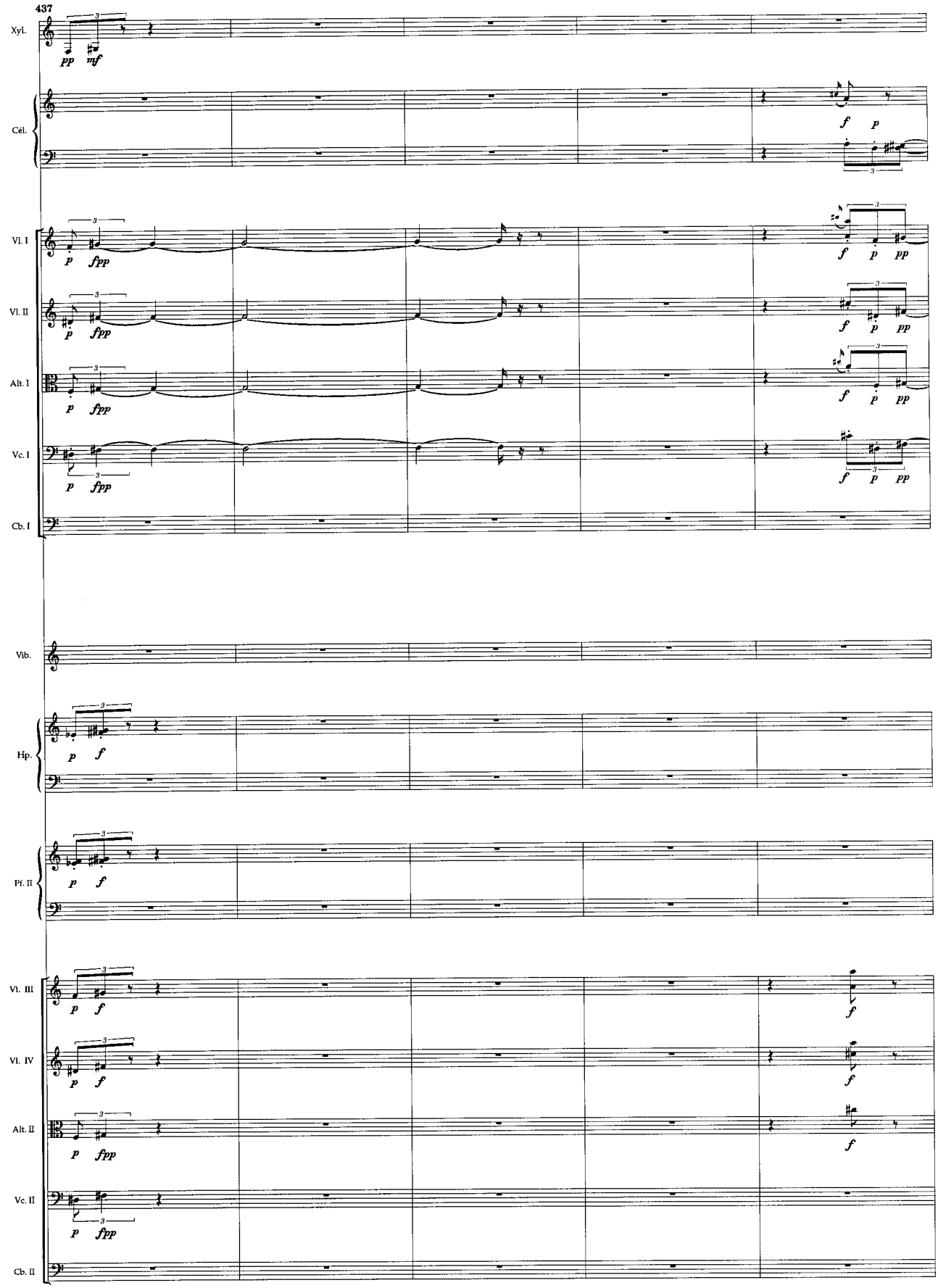

410
Xyl.
Tom.
blocs chinois
ff
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
pizz.
m. g.
arco
ppp
mp
pp
Timb.
re → mi
dor → dor
hp
pf II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

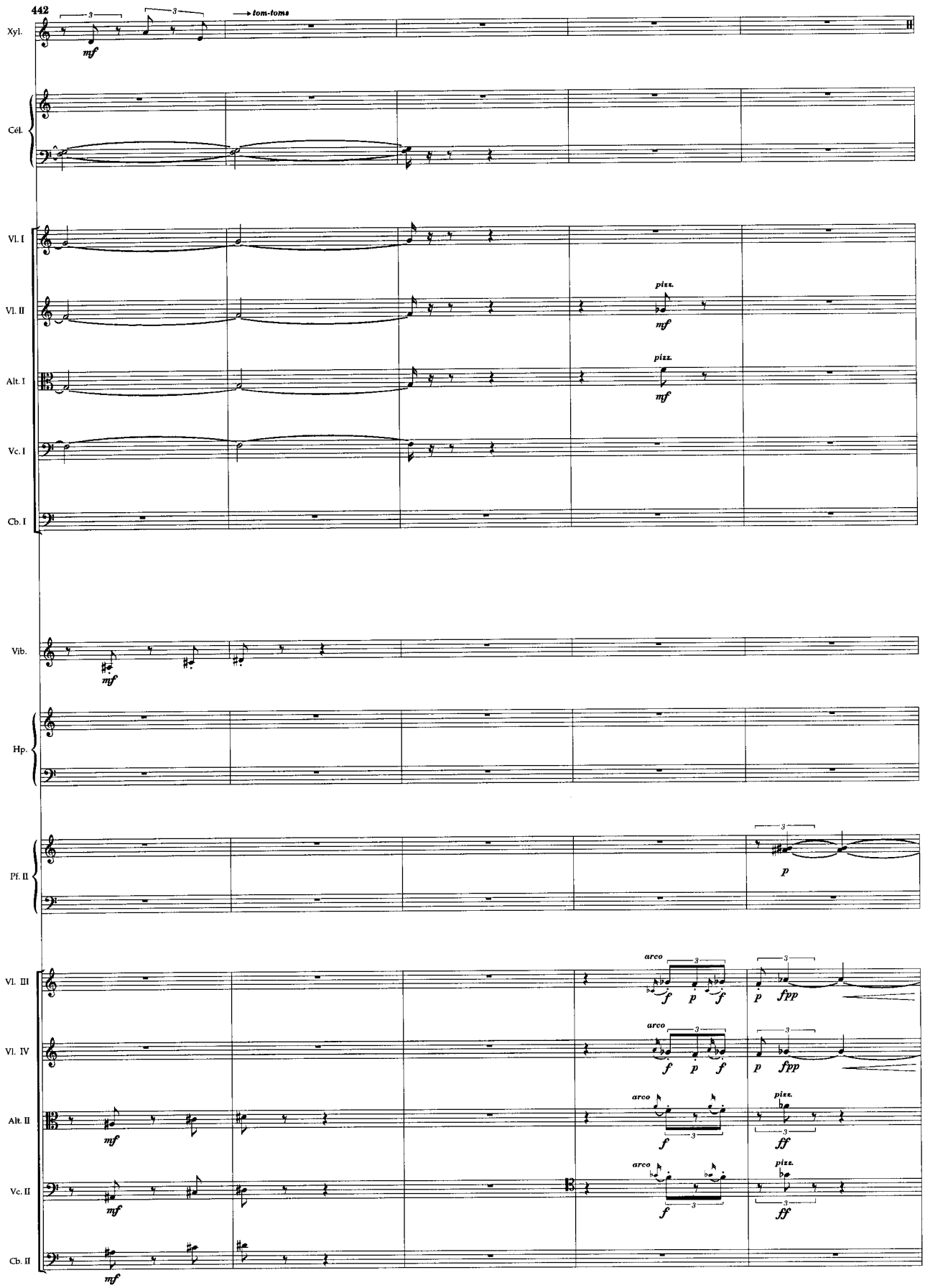

415
Lento ♩=56
Bl. ch.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Lento ♩=56
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

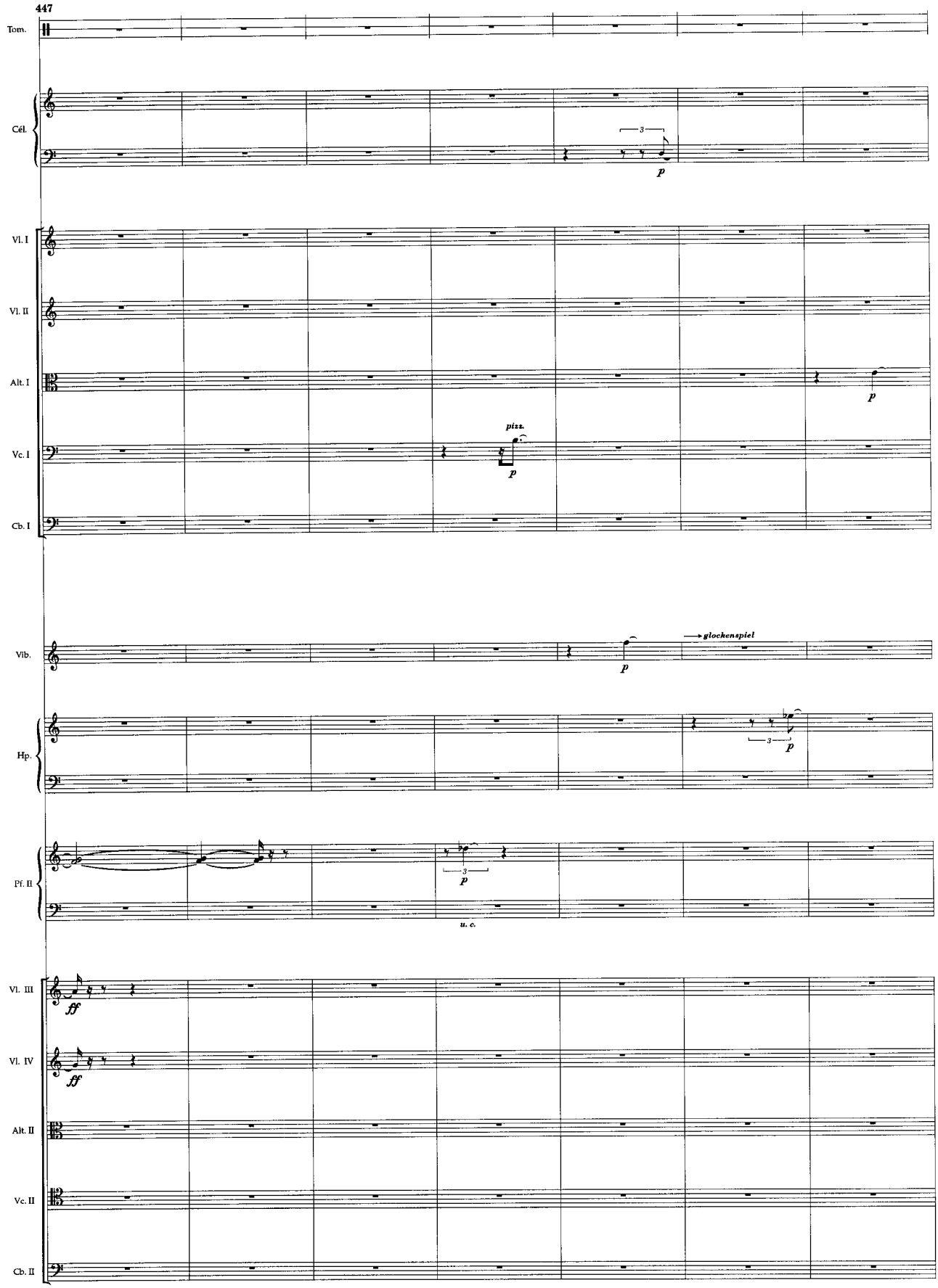

421
Bl. ch.
Pf. I
célesta
Vl. I
Vl. II
arco
Alt. I
pizz.
Vc. I
Cb. I
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

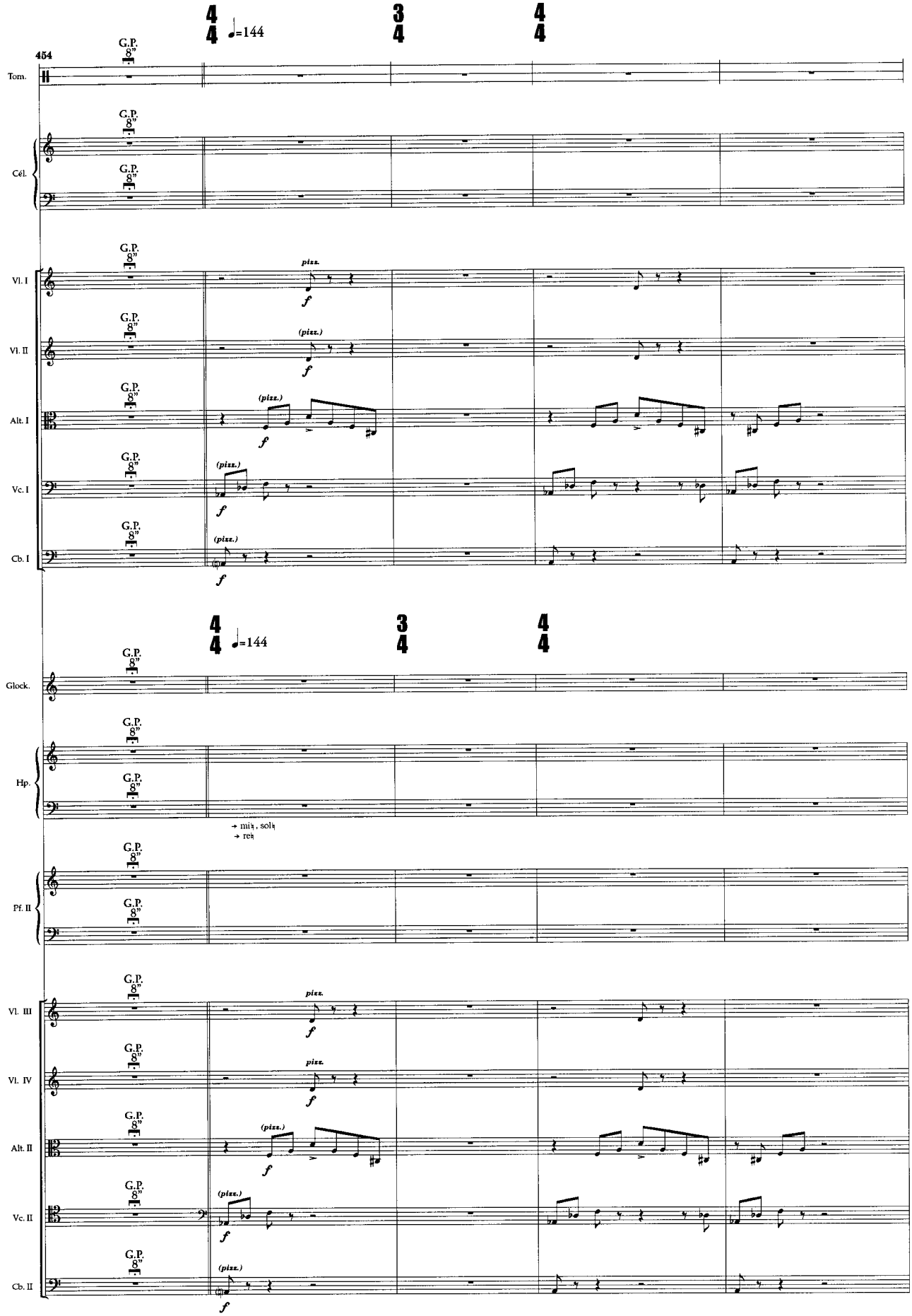

427
Bl. ch.
xylophone
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
arco
(arco)
pizz.

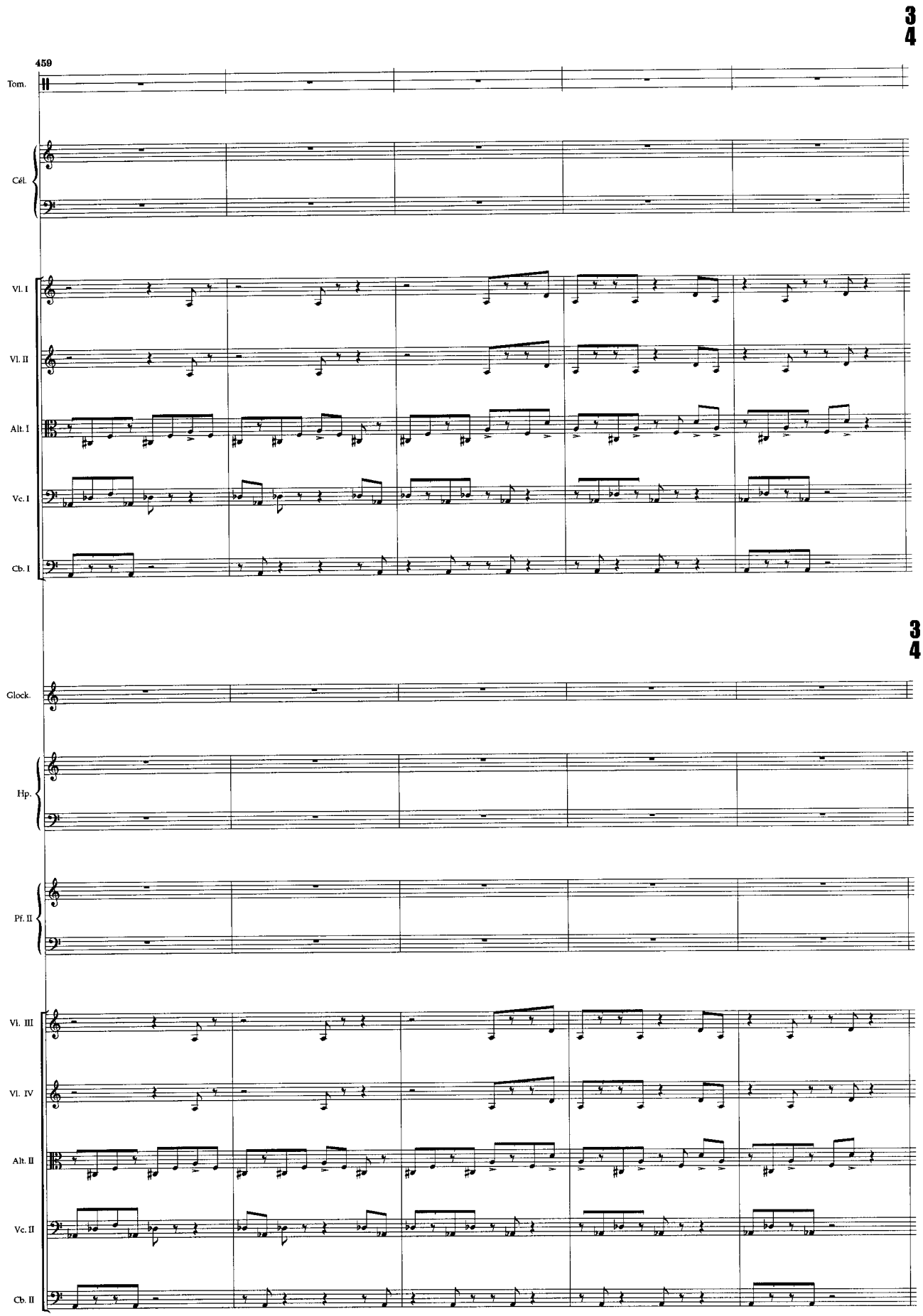

432
Xyl.
mf pp mf
Cél.
f
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
pizz.
arco
Timb.
vibraphone
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(pizz.)

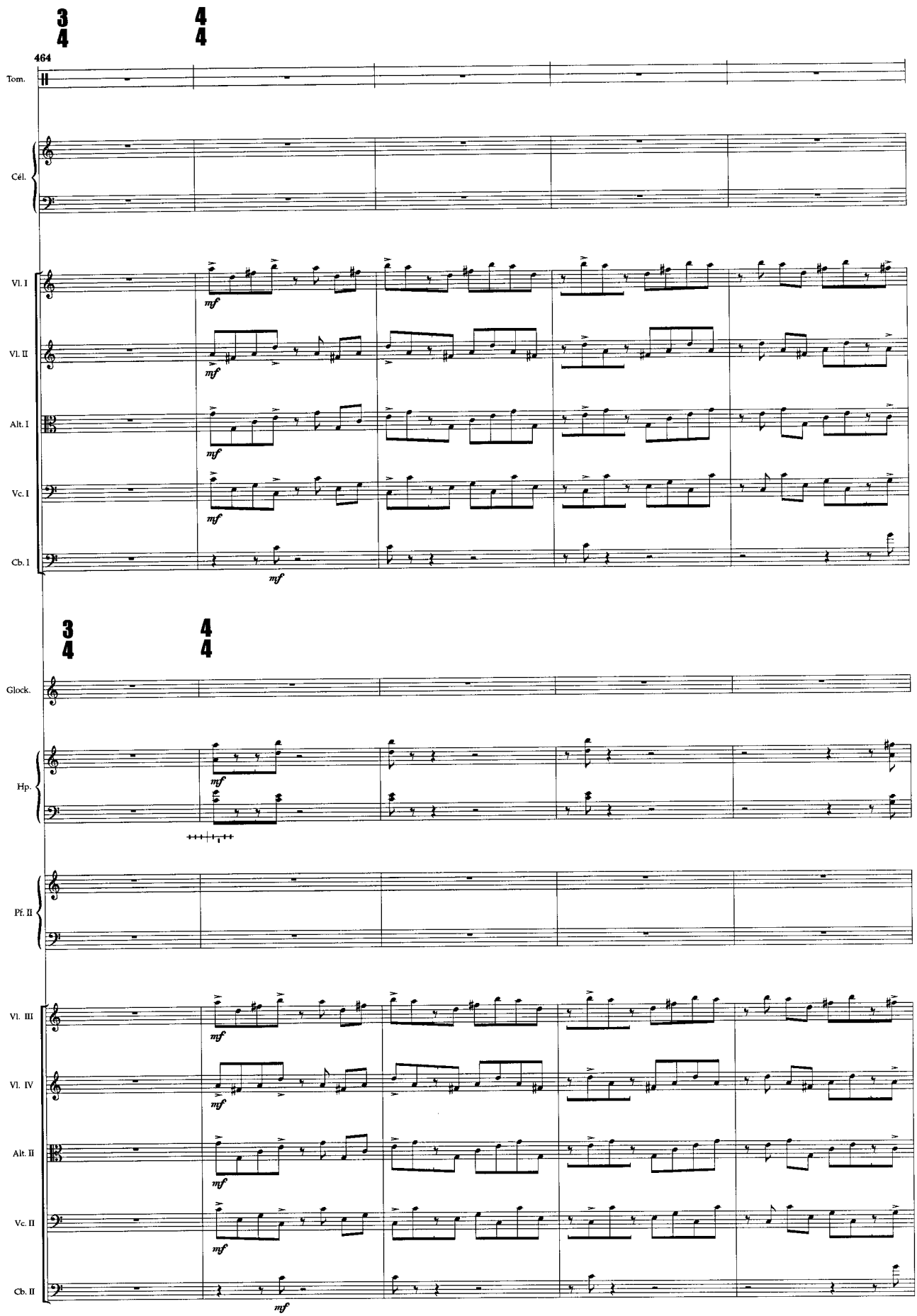

437
Xyl.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Vib.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

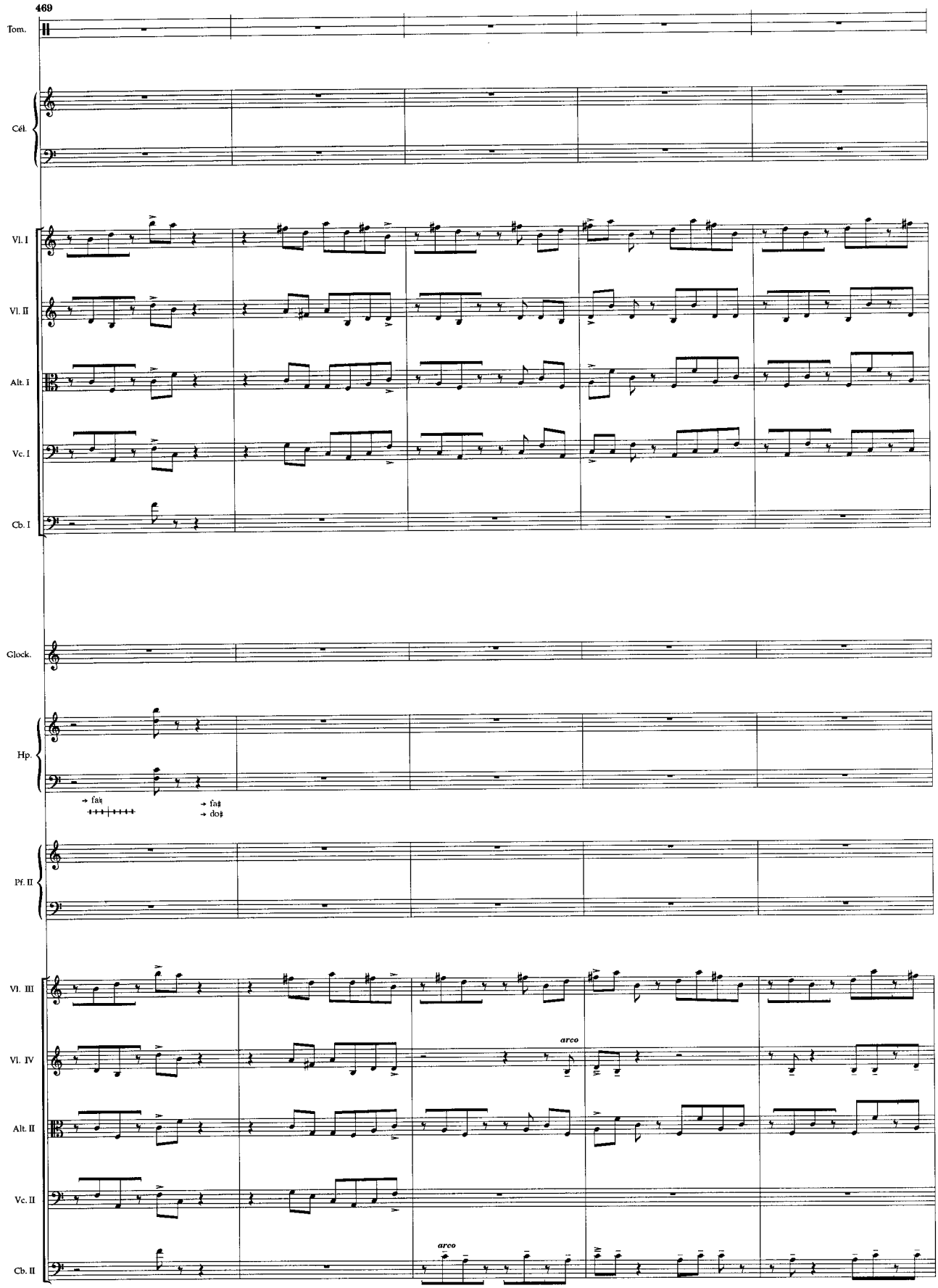

442
Xyl.
tom-toms
mf
Cél.
Vl. I
Vl. II
pizz.
mf
Alt. I
pizz.
mf
Vc. I
Cb. I
Vib.
mf
Hp.
Pf. II
p
Vl. III
arco
f p f
p fpp
Vl. IV
arco
f p f
p fpp
Alt. II
mf
arco
f
pizz.
ff
Vc. II
mf
arco
f
pizz.
ff
Cb. II
mf

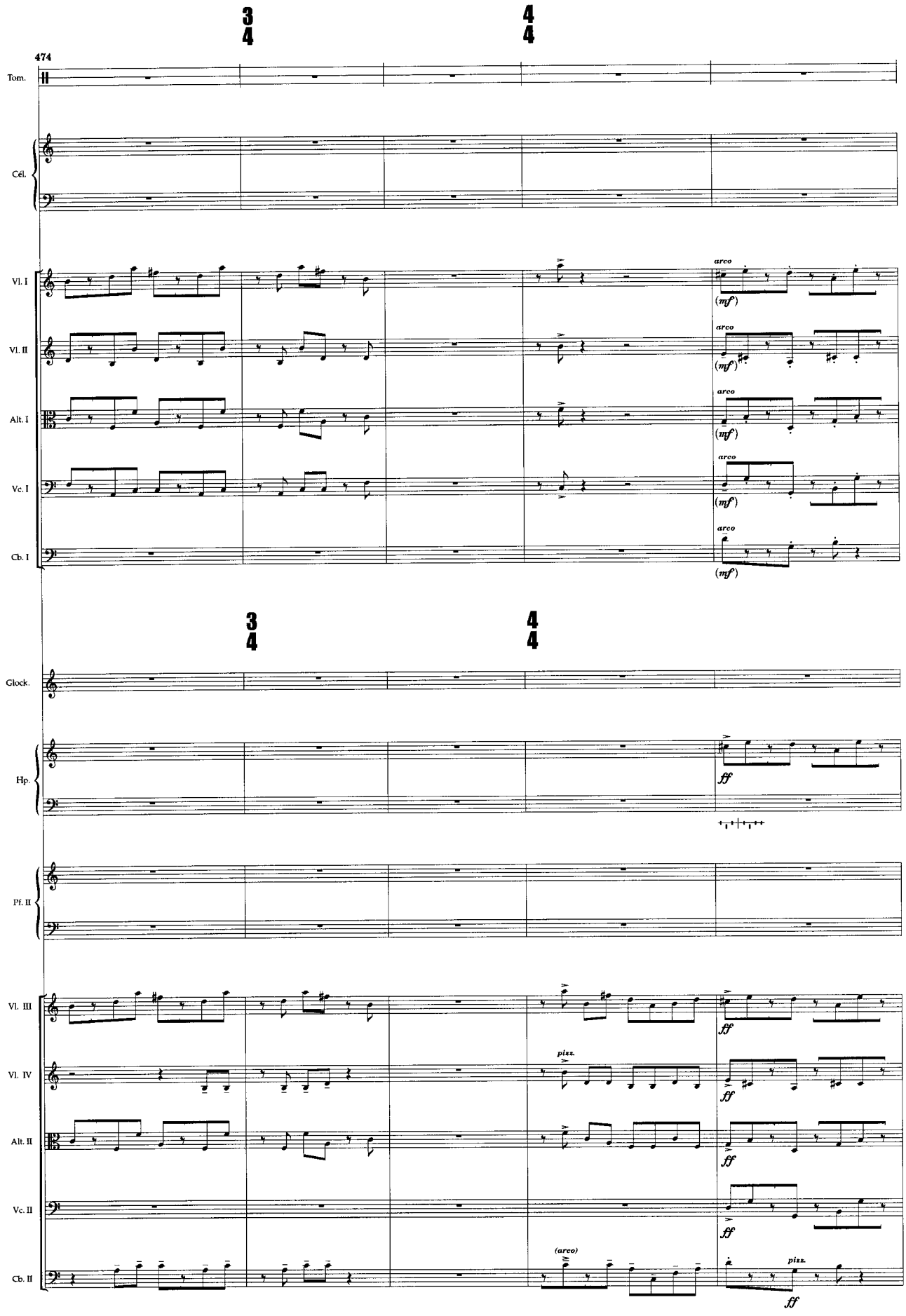

447
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Vib.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
p
pizz.
glockenspiel
ff
u. c.

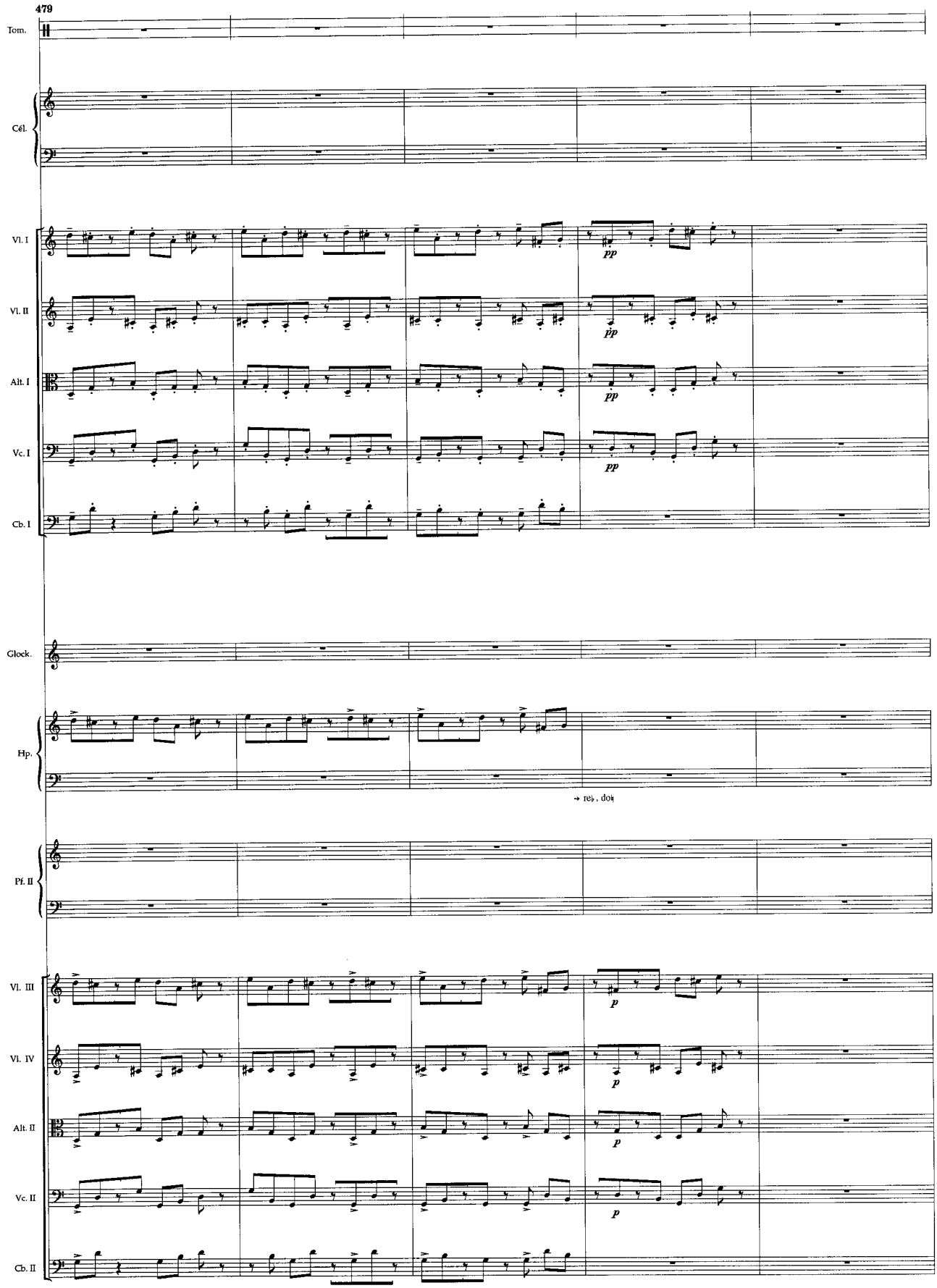

454
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
G.P.
8"
♩=144
pizz.
(pizz.)
f
→ mi♮, sol♮
→ re♮

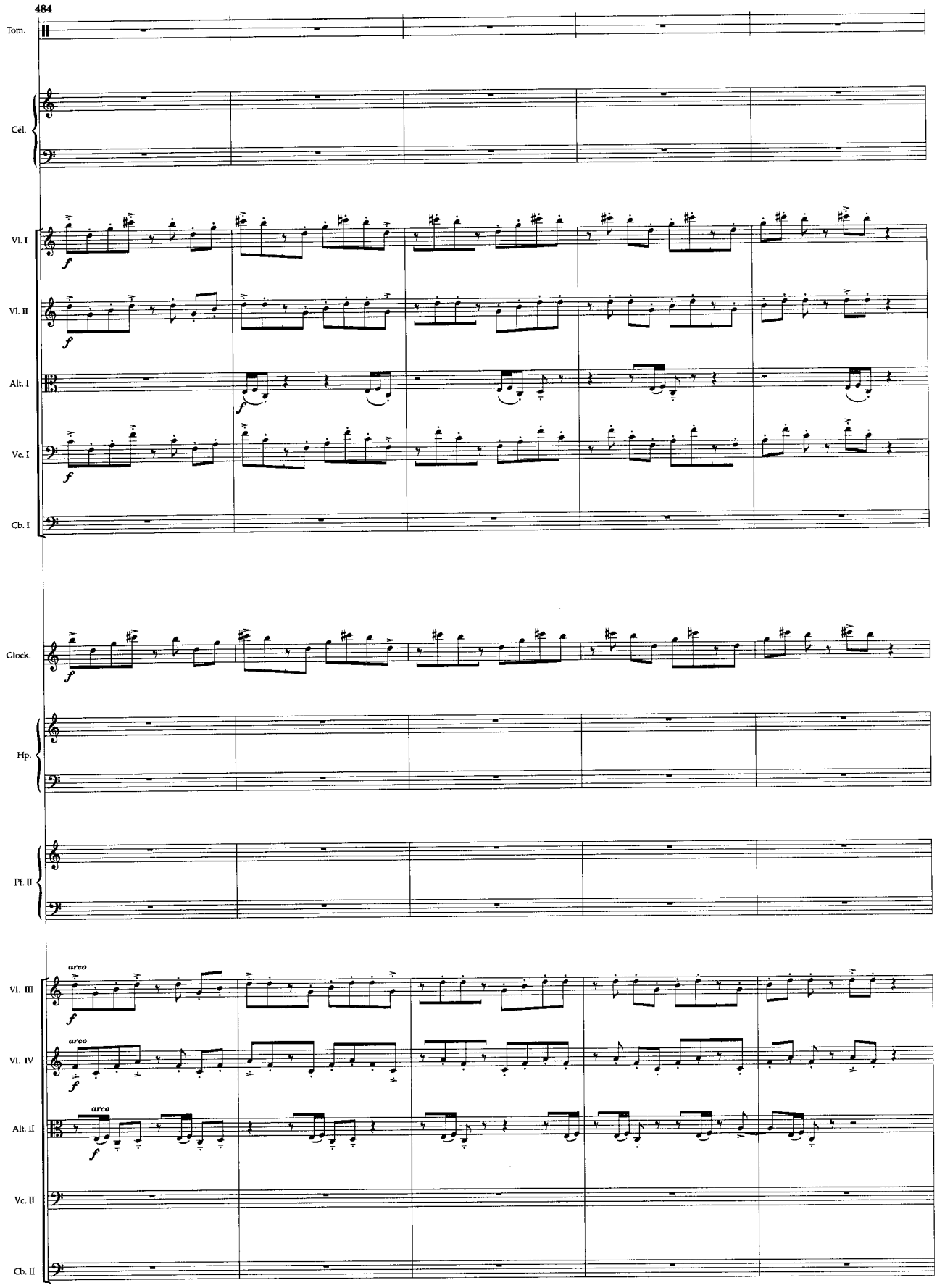

459
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

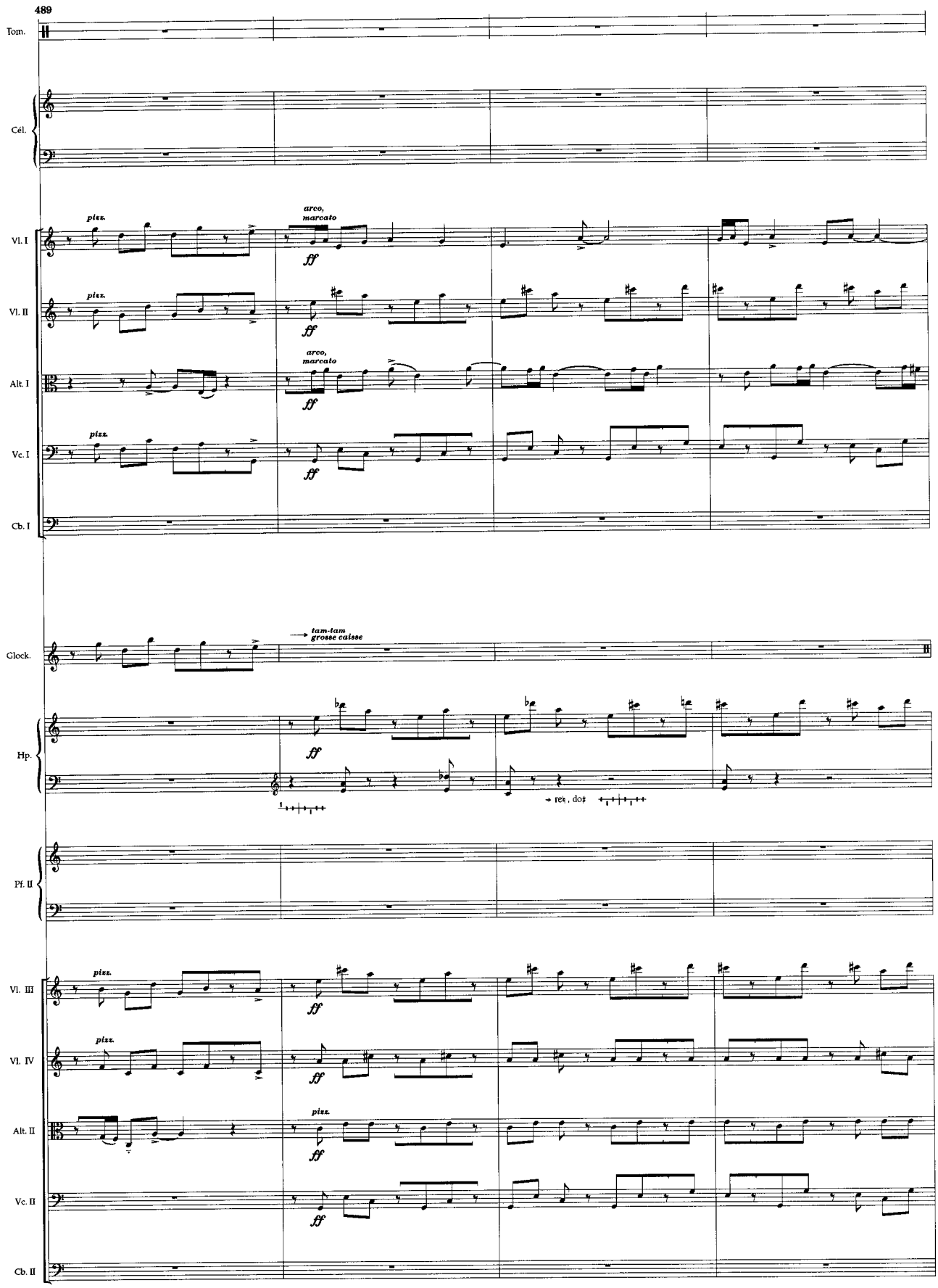

464
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
mf

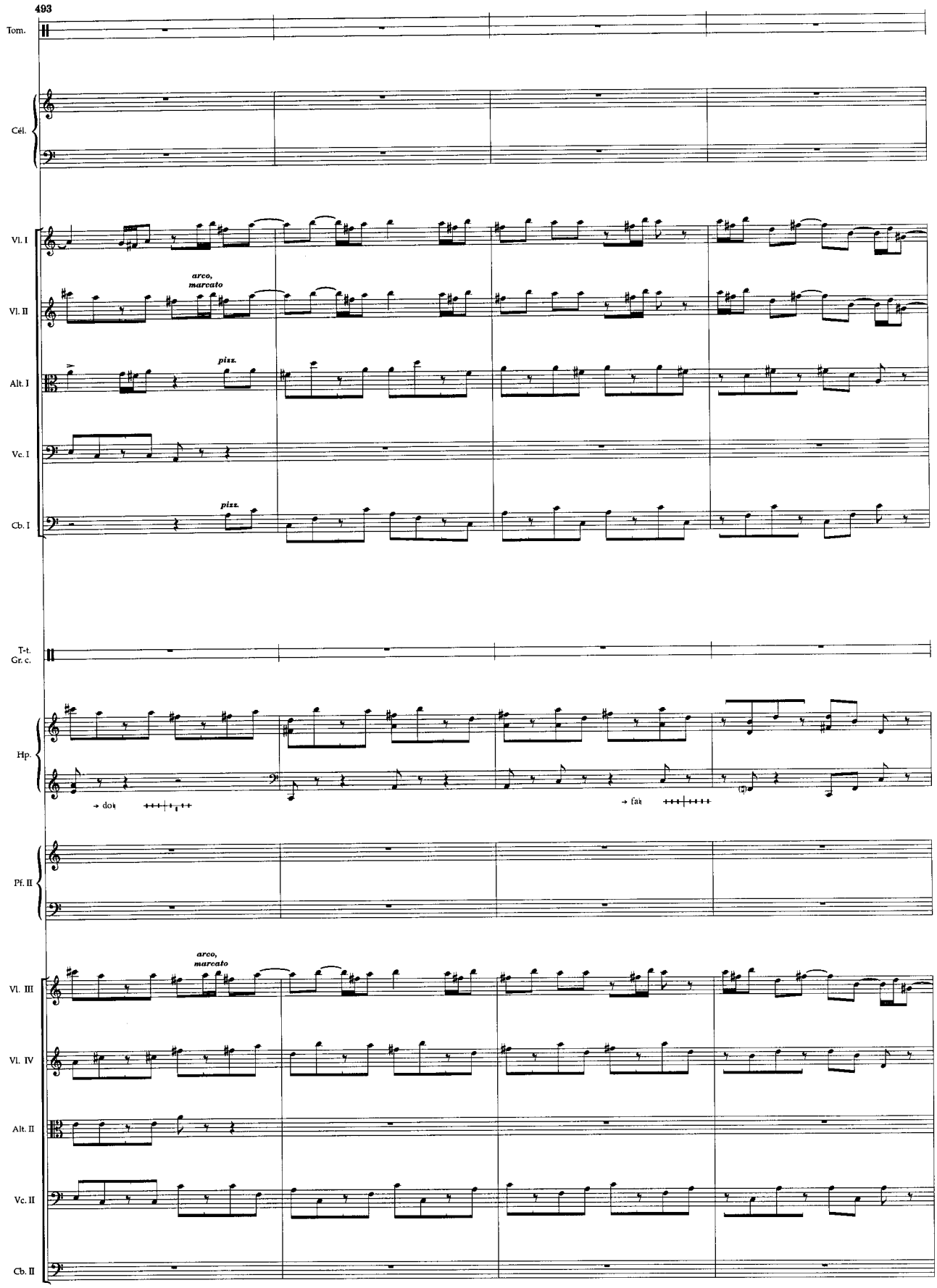

469
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Glock.
Hp.
→ fa♮
→ fa♯
→ do♯
Pf. II
Vl. III
Vl. IV
arco
Alt. II
Vc. II
Cb. II
arco

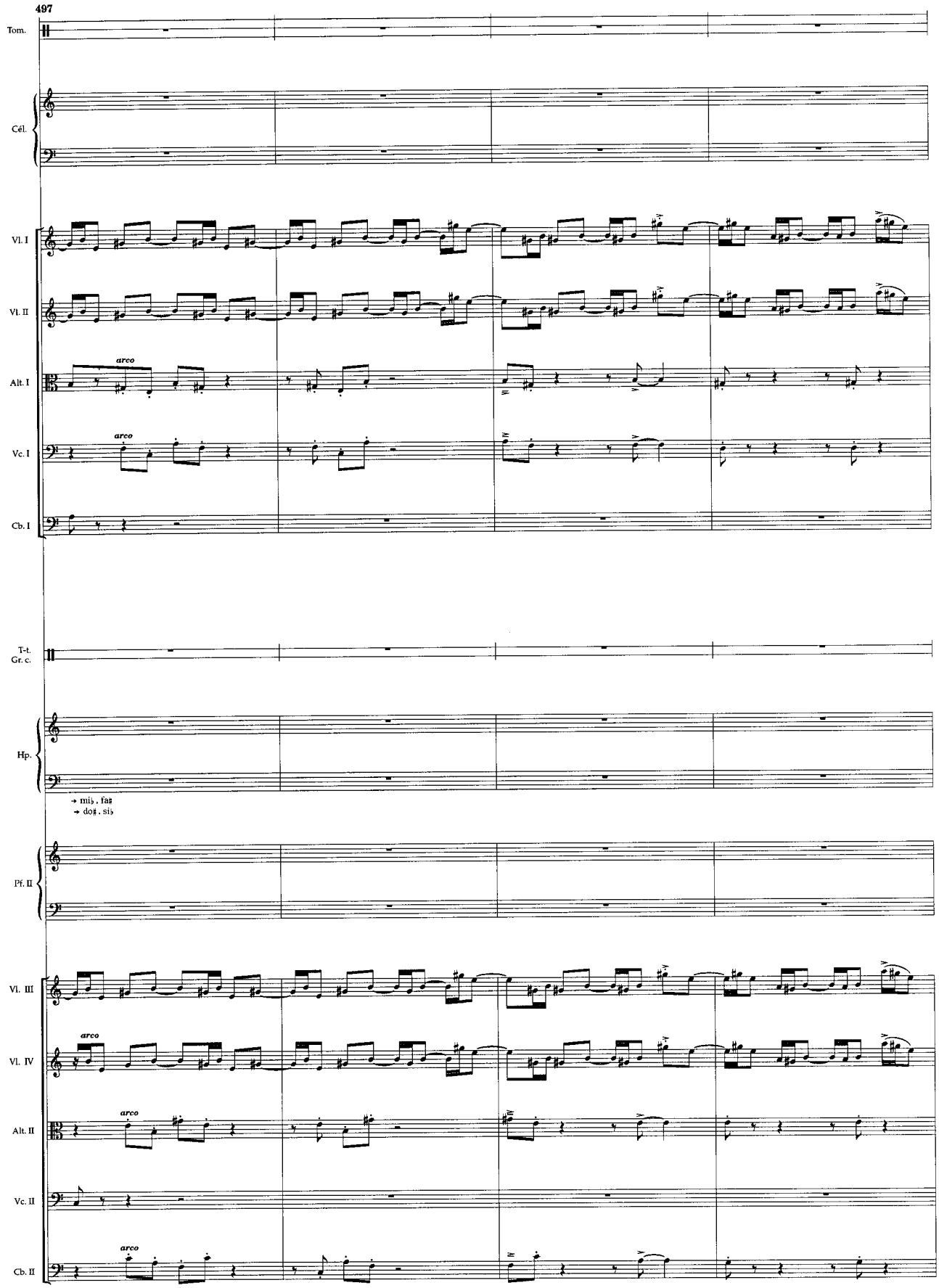

474
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
arco
(mf)
Glock.
Hp.
Pf. II
ff
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.
(arco)

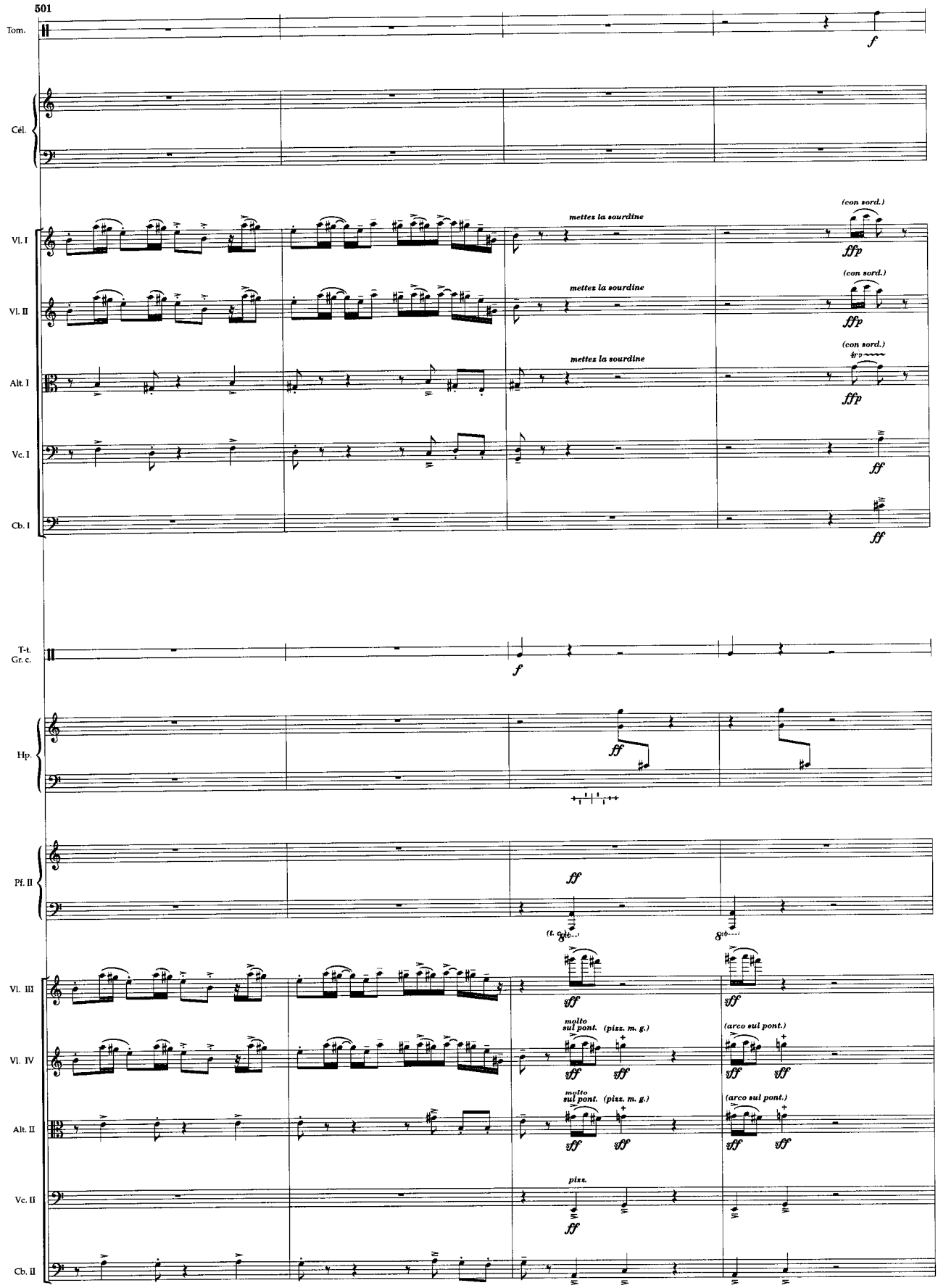

479
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
pp
pp
pp
pp
Glock.
Hp.
→ re♭, do♯
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
p
p
p
p

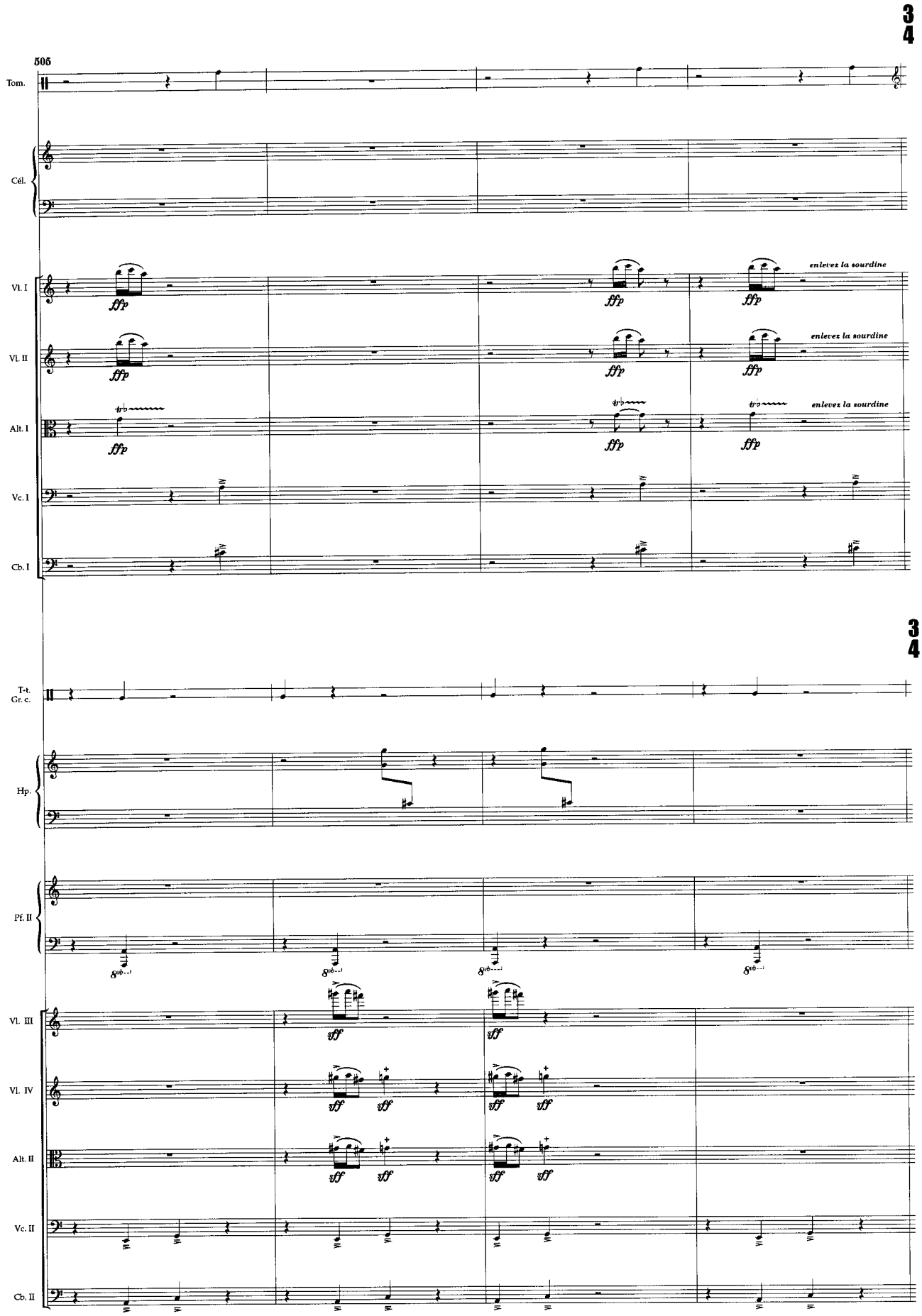

484
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
f
arco

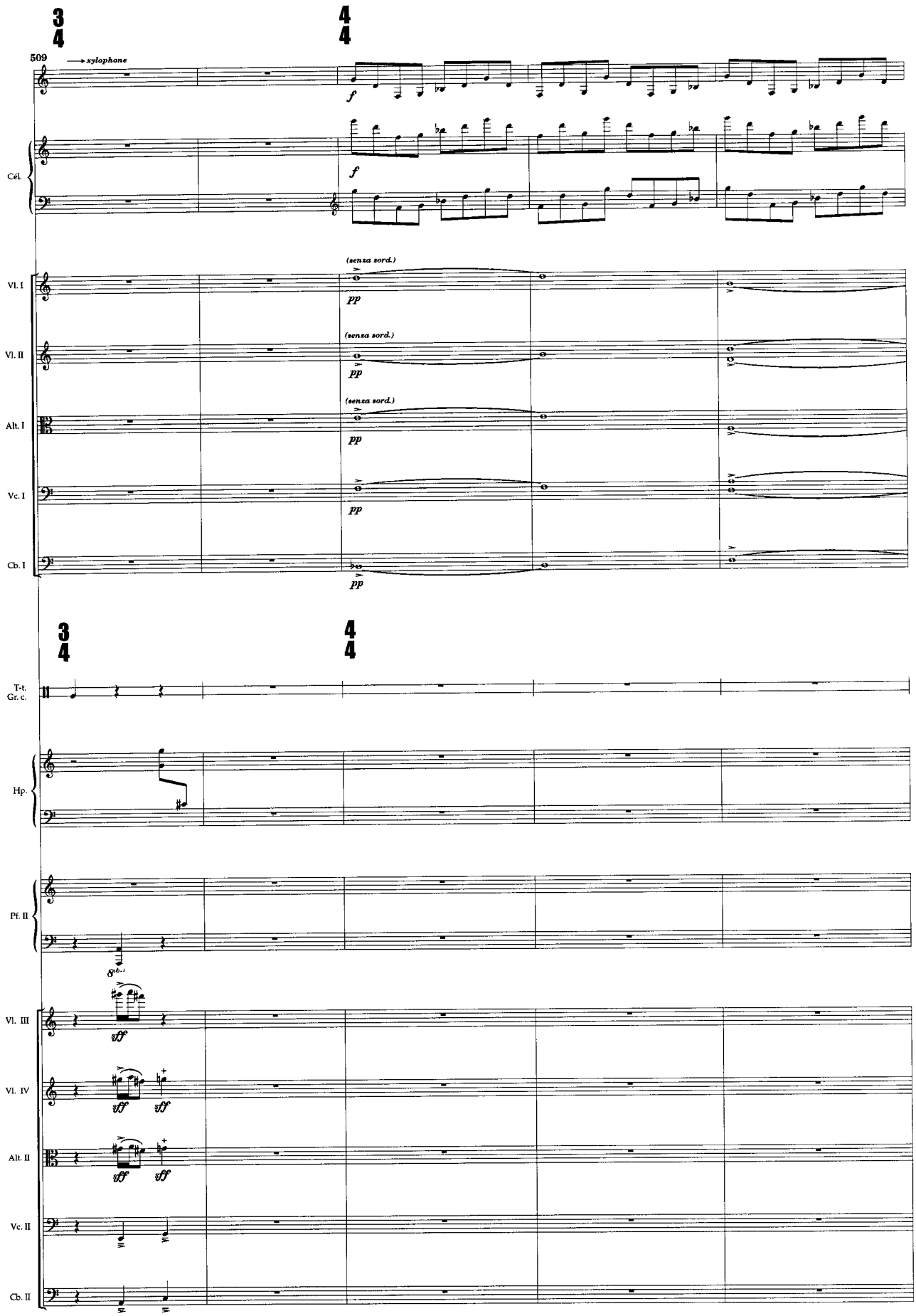

489
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Glock.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.
arco, marcato
ff
tam-tam grosse caisse
→ reb, do♯

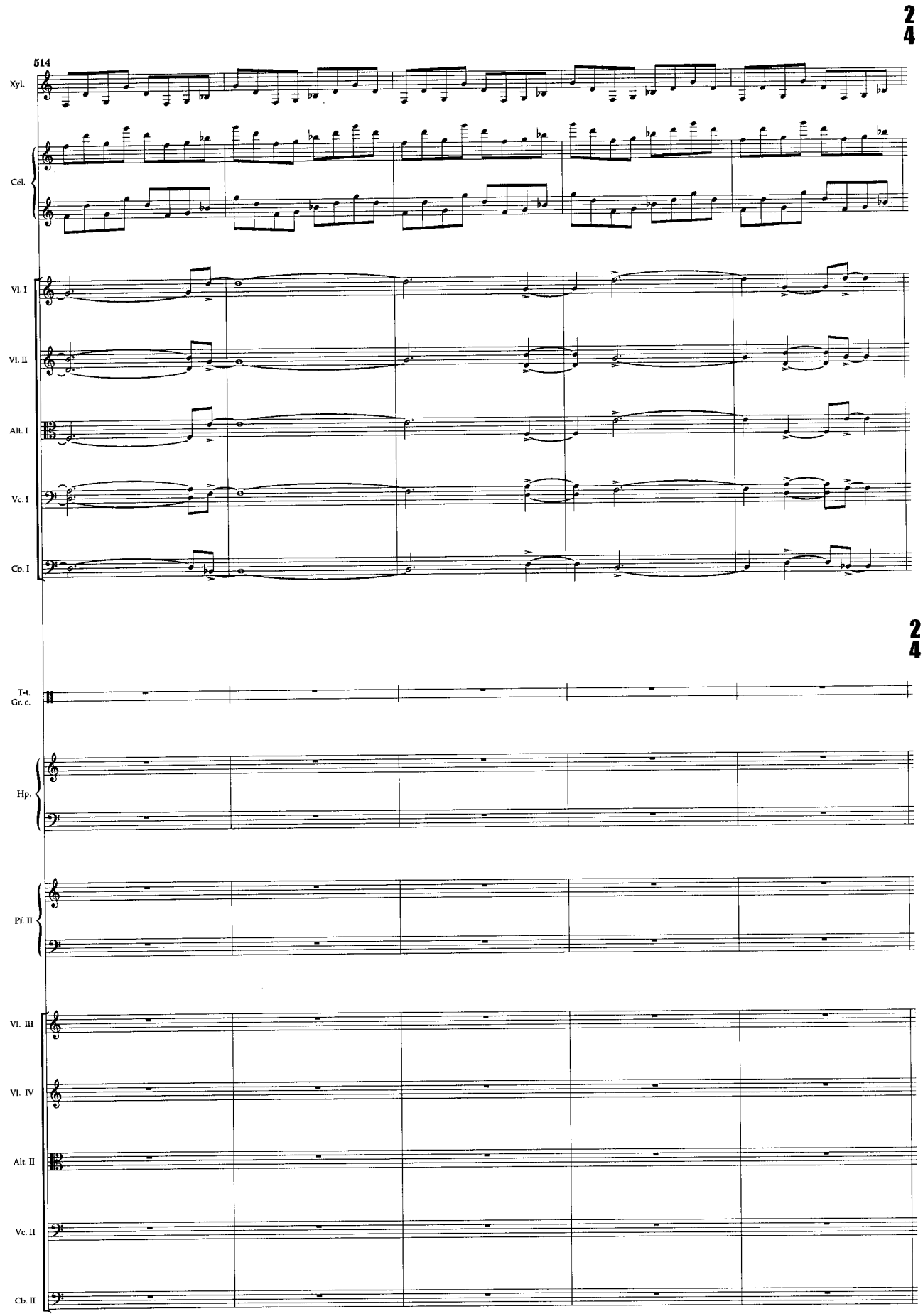

493
Tom.
Cél.
Vl. I
Vl. II
arco, marcato
Alt. I
pizz.
Vc. I
Cb. I
pizz.
T-t.
Gr. c.
Hp.
→ doit
→ fait
Pf. II
Vl. III
arco, marcato
Vl. IV
Alt. II
Vc. II
Cb. II

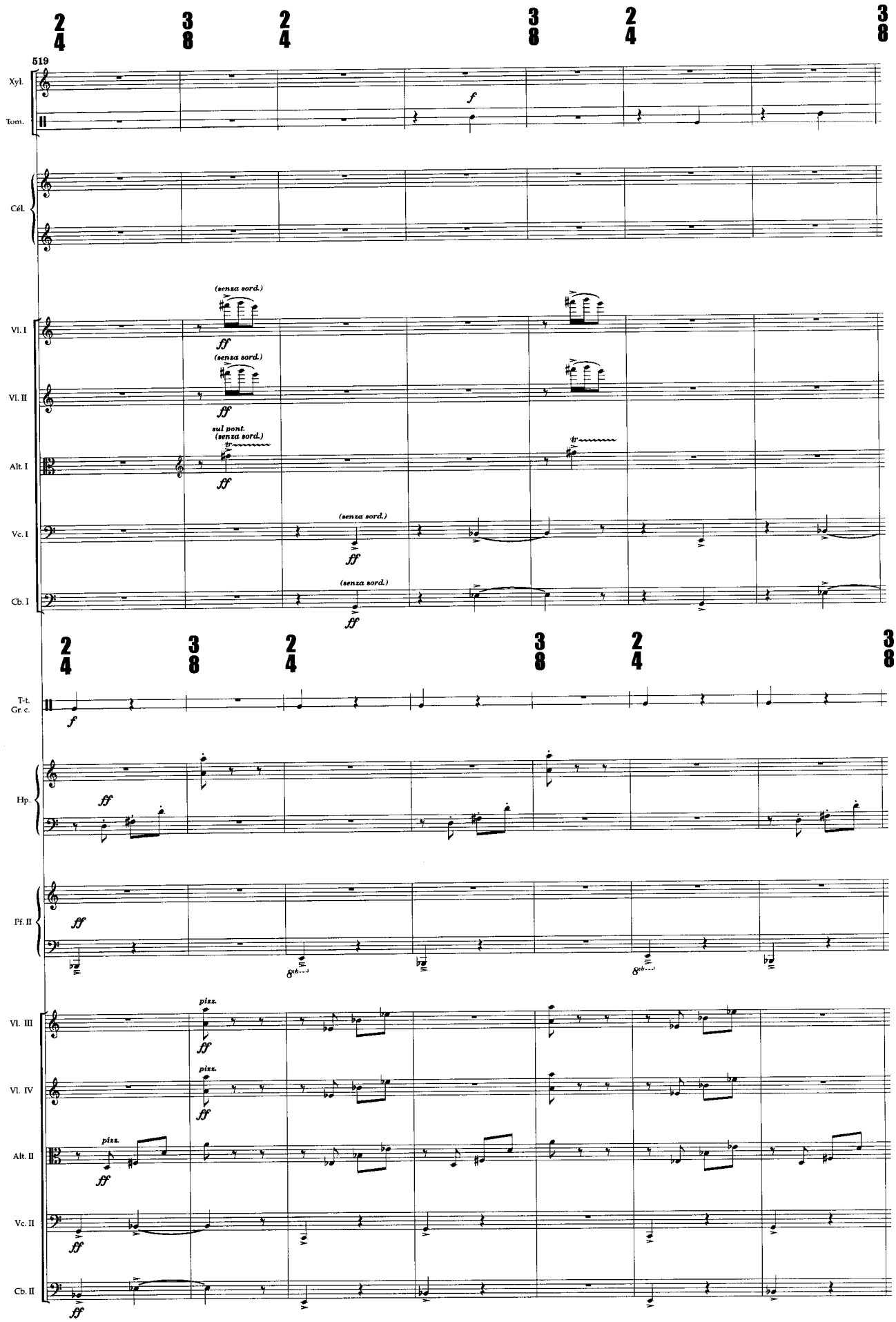

497
Tom.
Cél.
Vl. I
Vl. II
Alt. I
arco
Vc. I
arco
Cb. I
T-t.
Gr. c.
Hp.
→ mi♭ , fa♯
→ do♯ , si♭
Pf. II
Vl. III
Vl. IV
arco
Alt. II
arco
Vc. II
Cb. II
arco

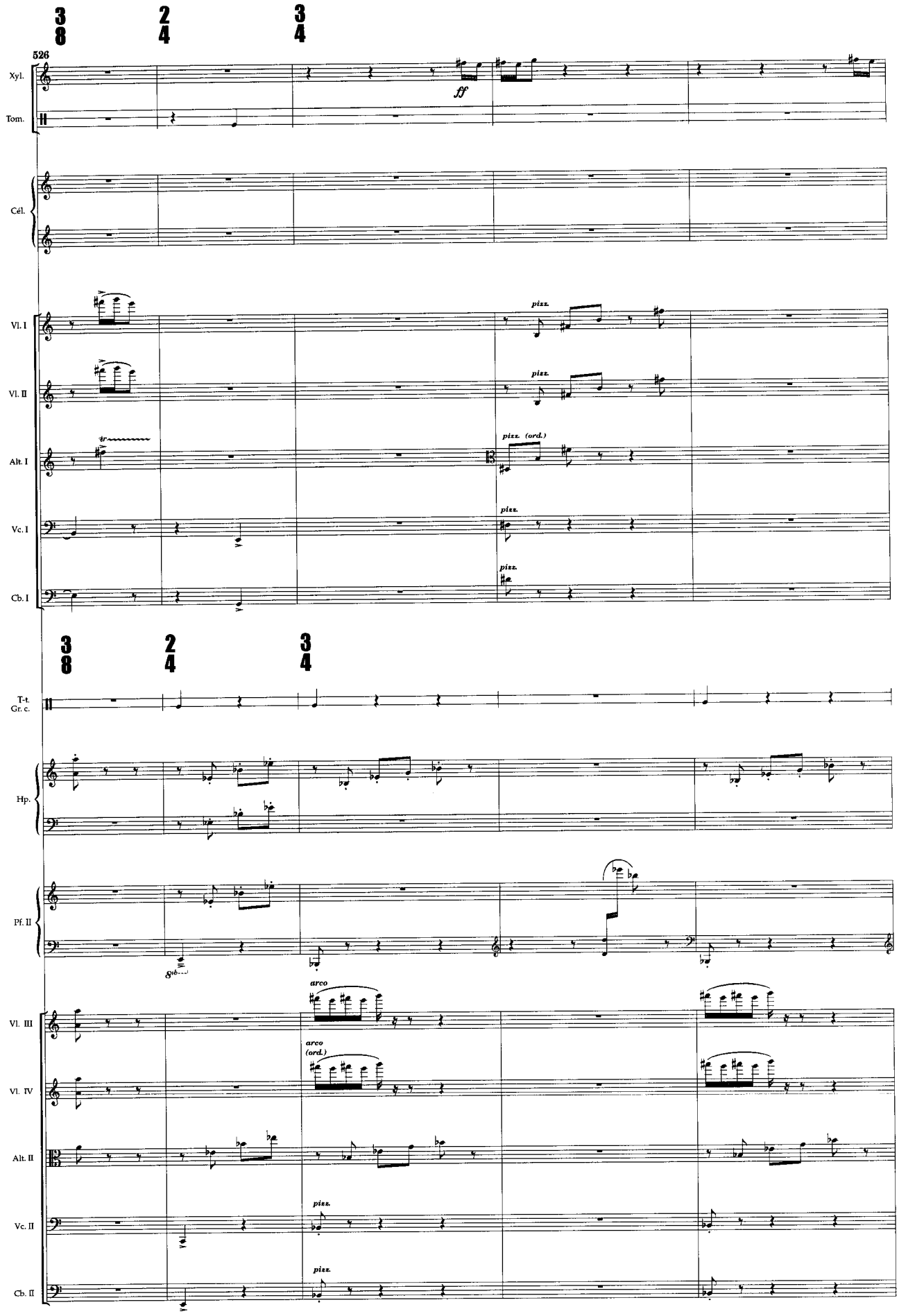

501
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
mettez la sourdine
(con sord.)
molto sul pont.
(pizz. m. g.)
(arco sul pont.)
pizz.

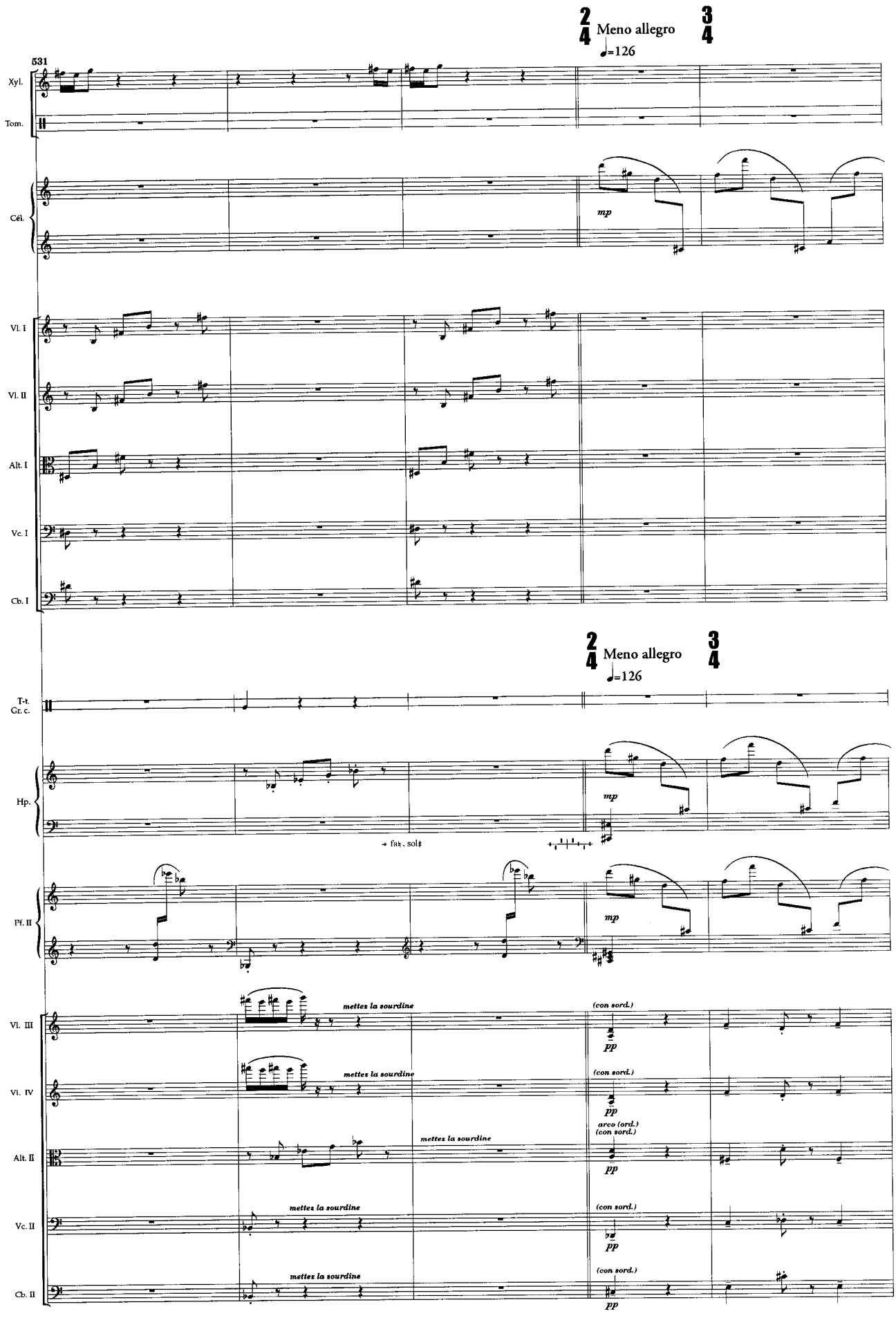

505
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
enlevez la sourdine
enlevez la sourdine
enlevez la sourdine
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

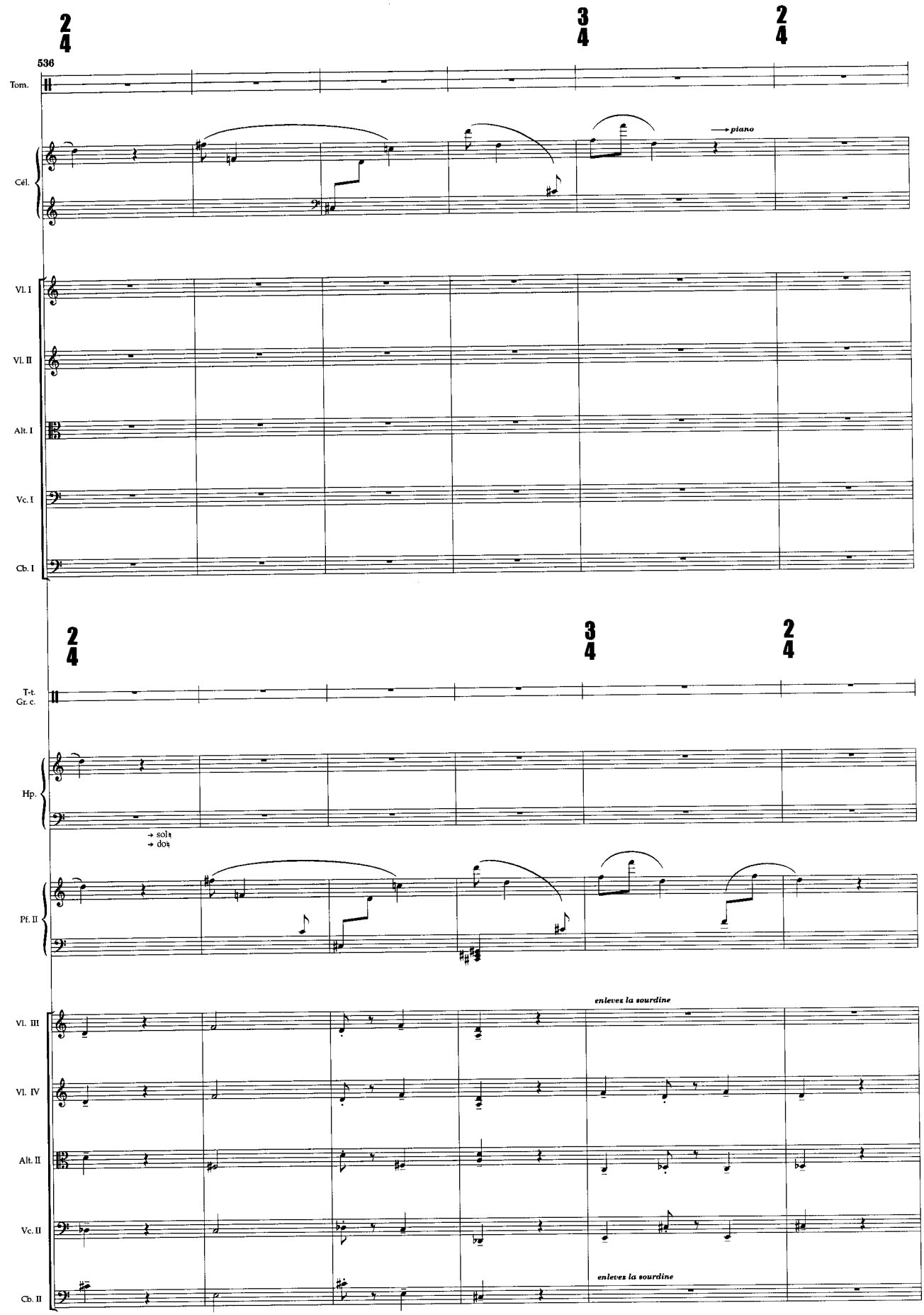

509
xylophone
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(senza sord.)
pp
f
ff

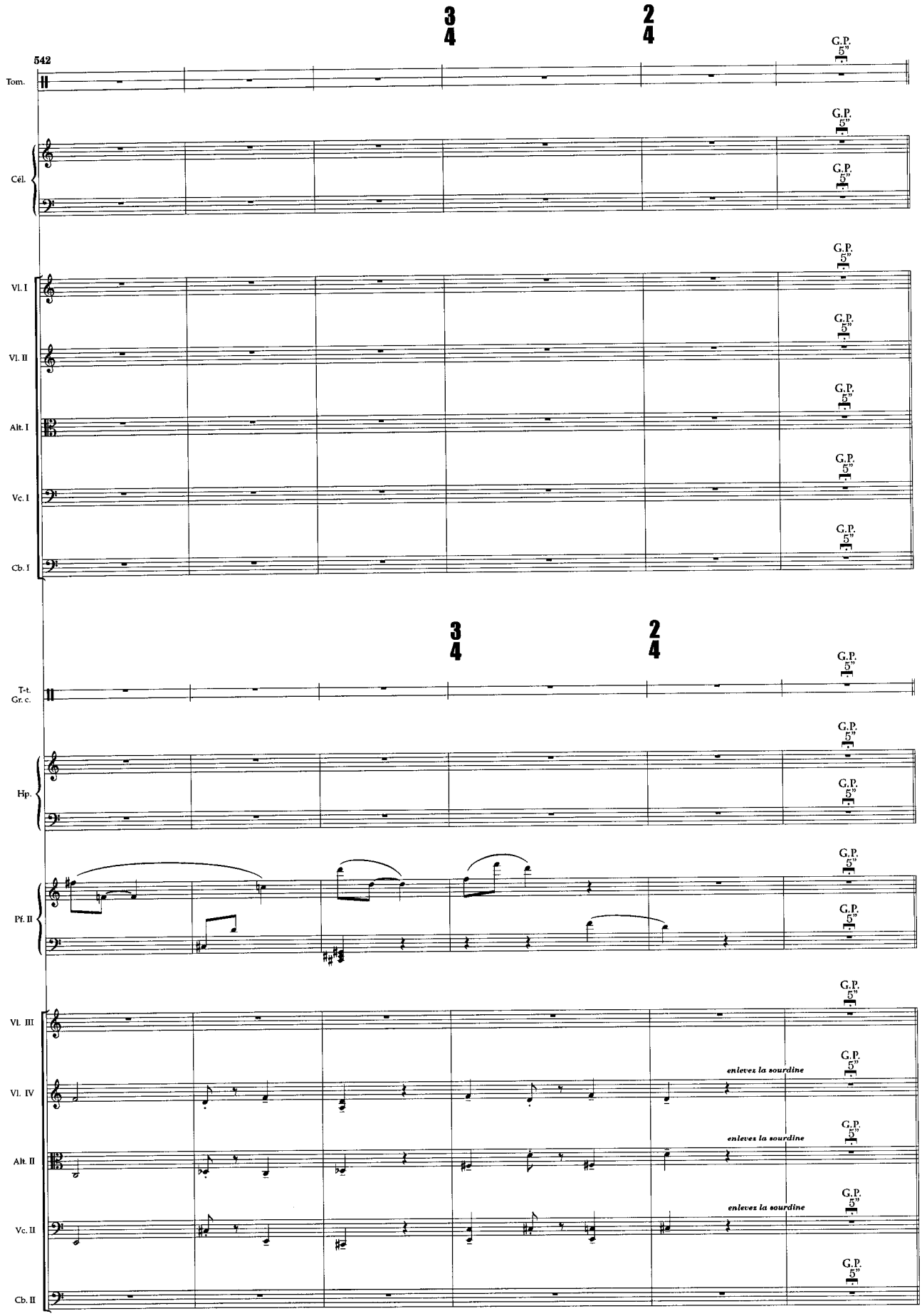

514
Xyl.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

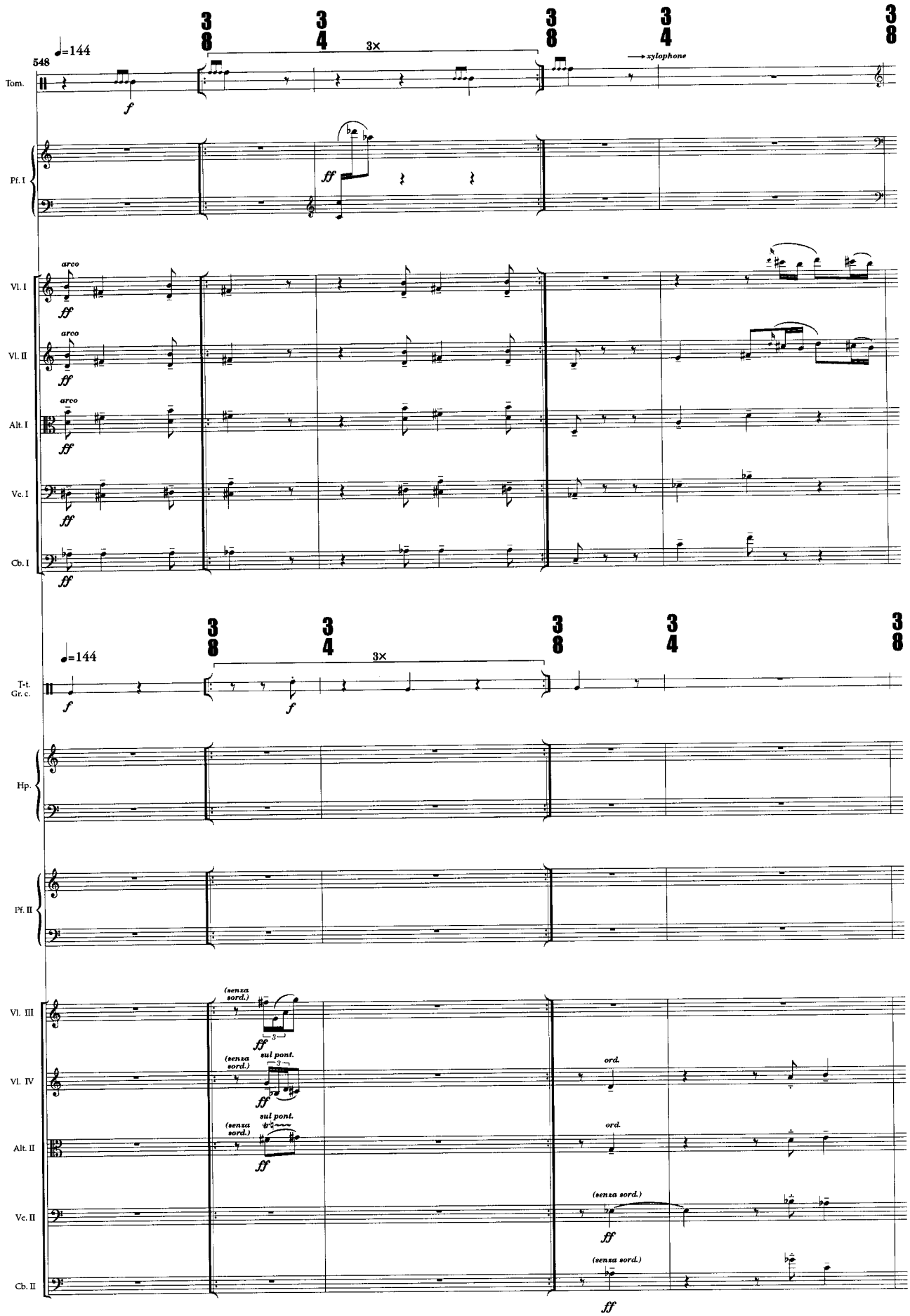

519
Xyl.
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(senza sord.)
sul pont.
(senza sord.)
pizz.

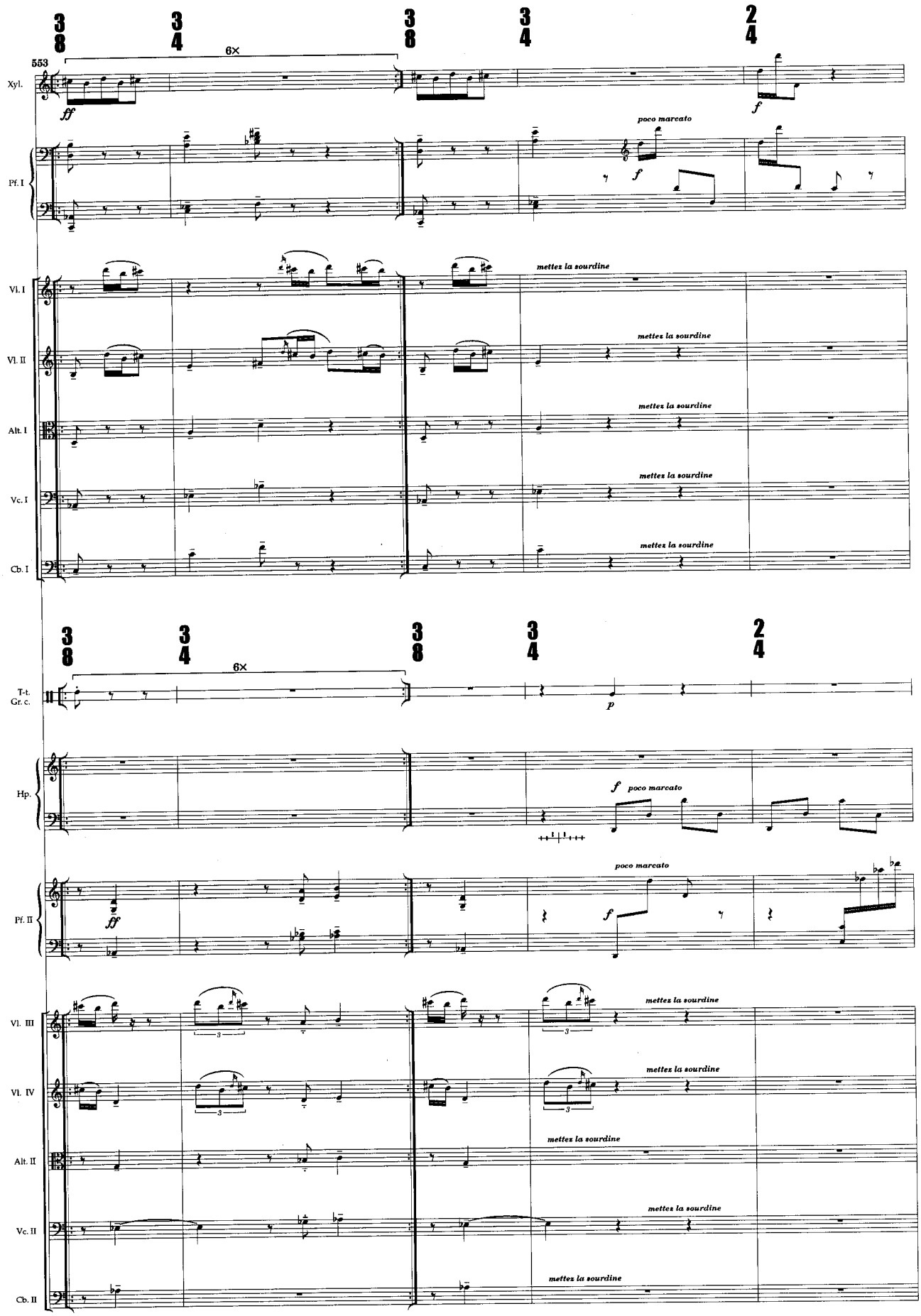

526
Xyl.
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
ff
pizz.
pizz. (ord.)
arco
arco (ord.)

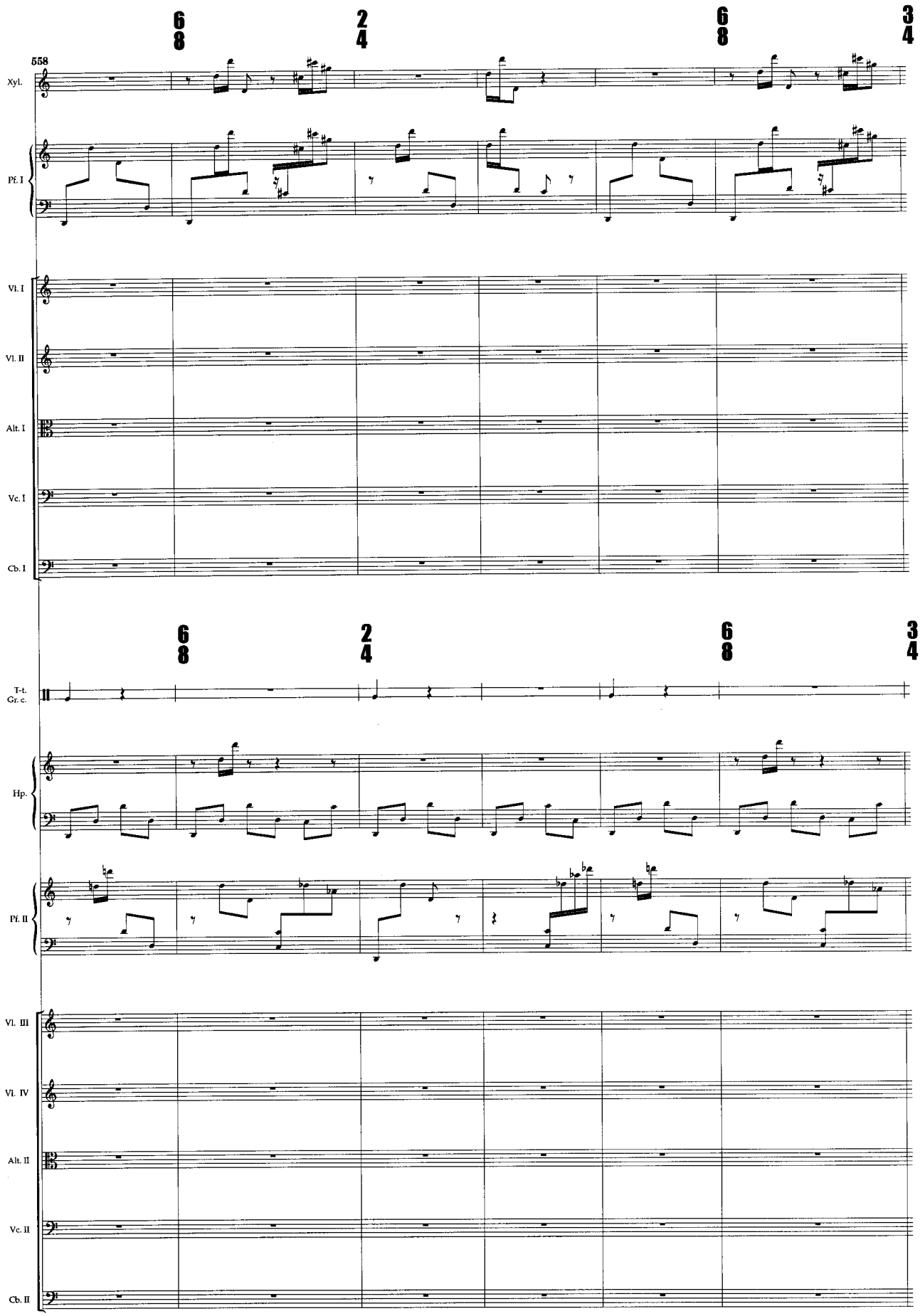

2/4 Meno allegro 3/4
♩=126
531
Xyl.
Tom.
Cél.
mp
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
2/4 Meno allegro 3/4
♩=126
T-t.
Gr. c.
Hp.
mp
→ fa♮, sol♯
Pf. II
mp
Vl. III
mettez la sourdine
(con sord.)
pp
Vl. IV
mettez la sourdine
(con sord.)
pp
Alt. II
mettez la sourdine
arco (ord.)
(con sord.)
pp
Vc. II
mettez la sourdine
(con sord.)
pp
Cb. II
mettez la sourdine
(con sord.)
pp

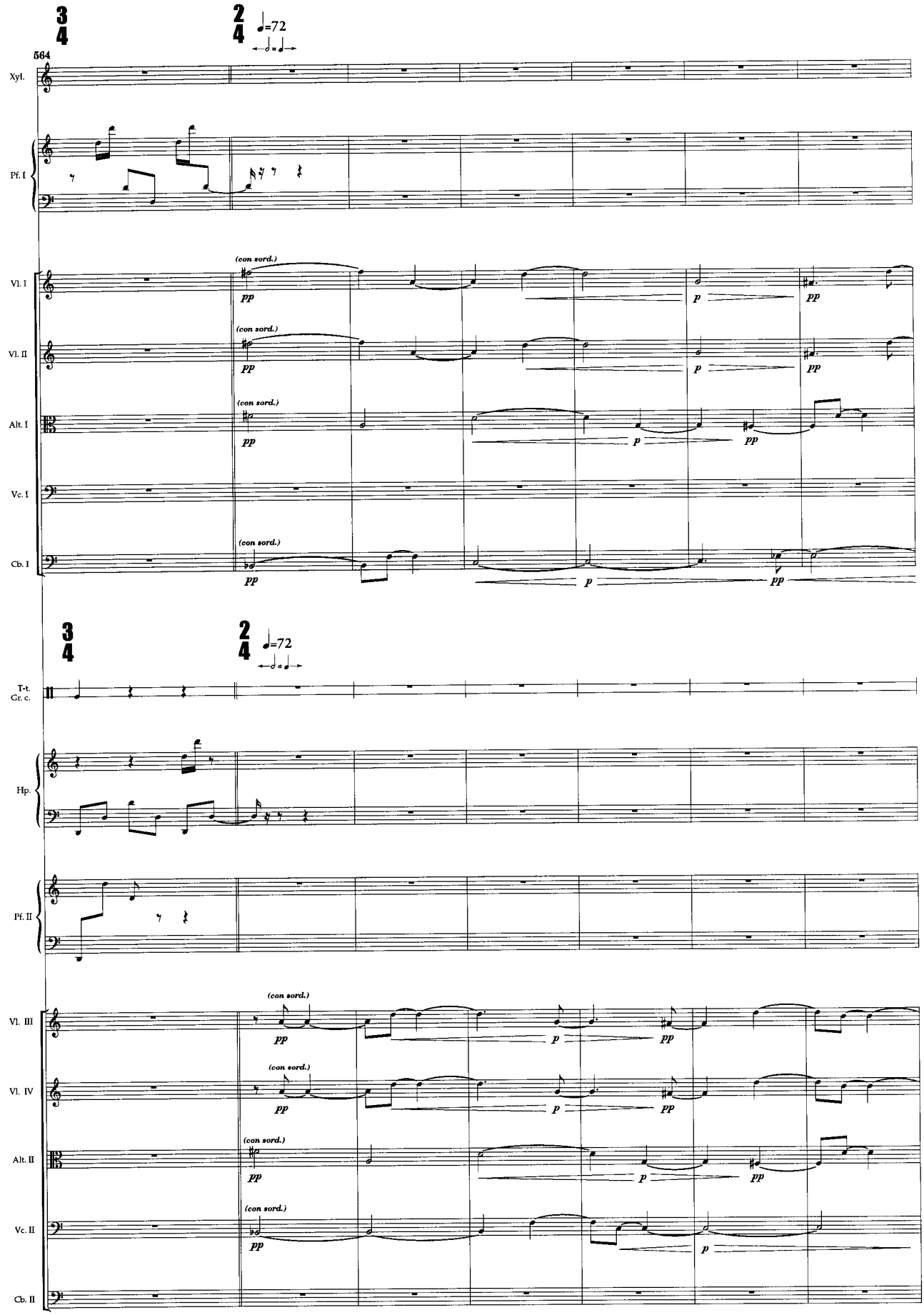

536
Tom.
Cél.
piano
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
→ sol♮
→ do♮
Pf. II
enlevez la sourdine
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
enlevez la sourdine

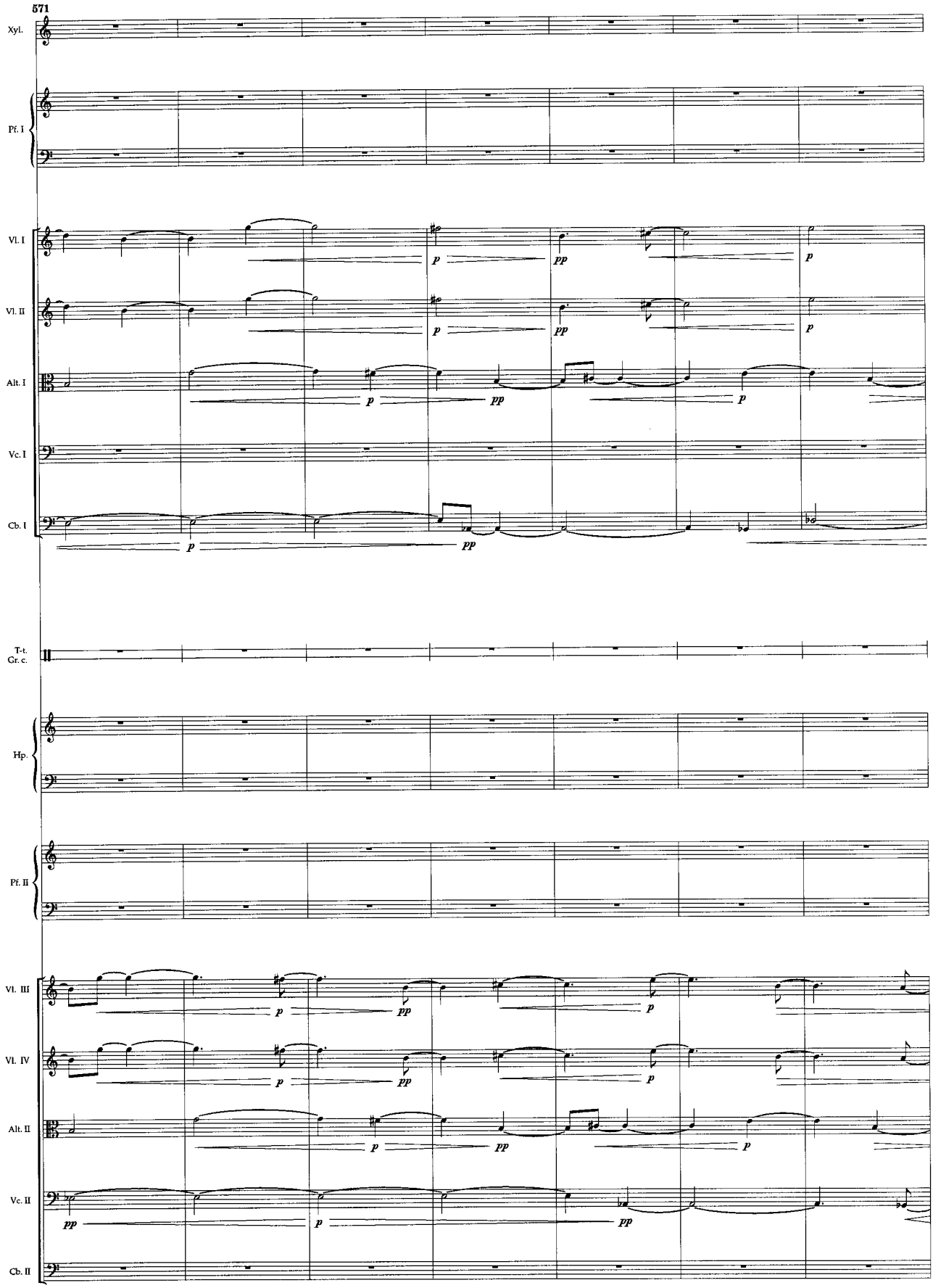

542
Tom.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
G.P.
5"
enlevez la sourdine

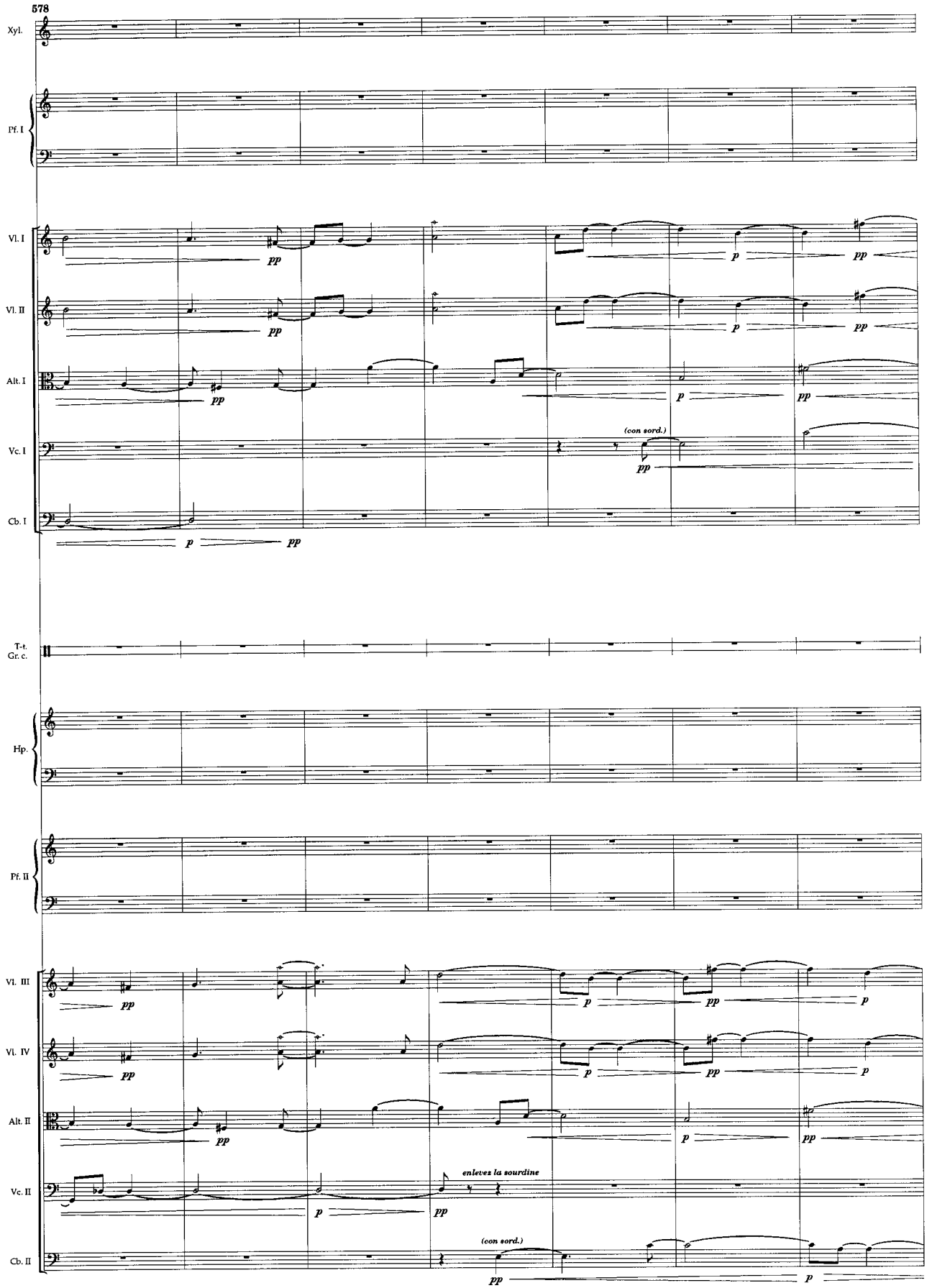

548
♩=144
3×
→xylophone
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
arco
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(senza sord.)
sul pont.
ord.

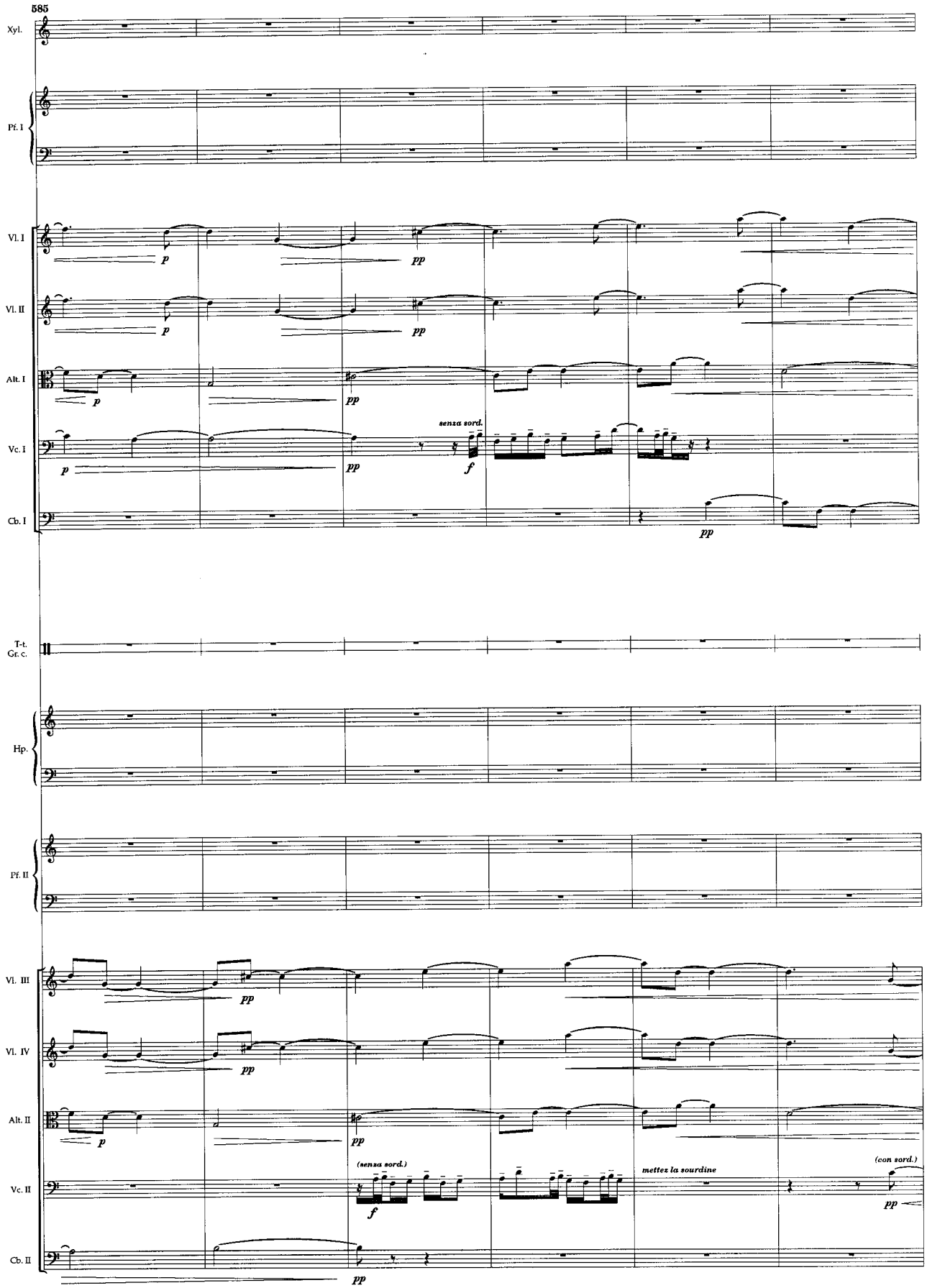

553
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
6×
poco marcato
mettez la sourdine

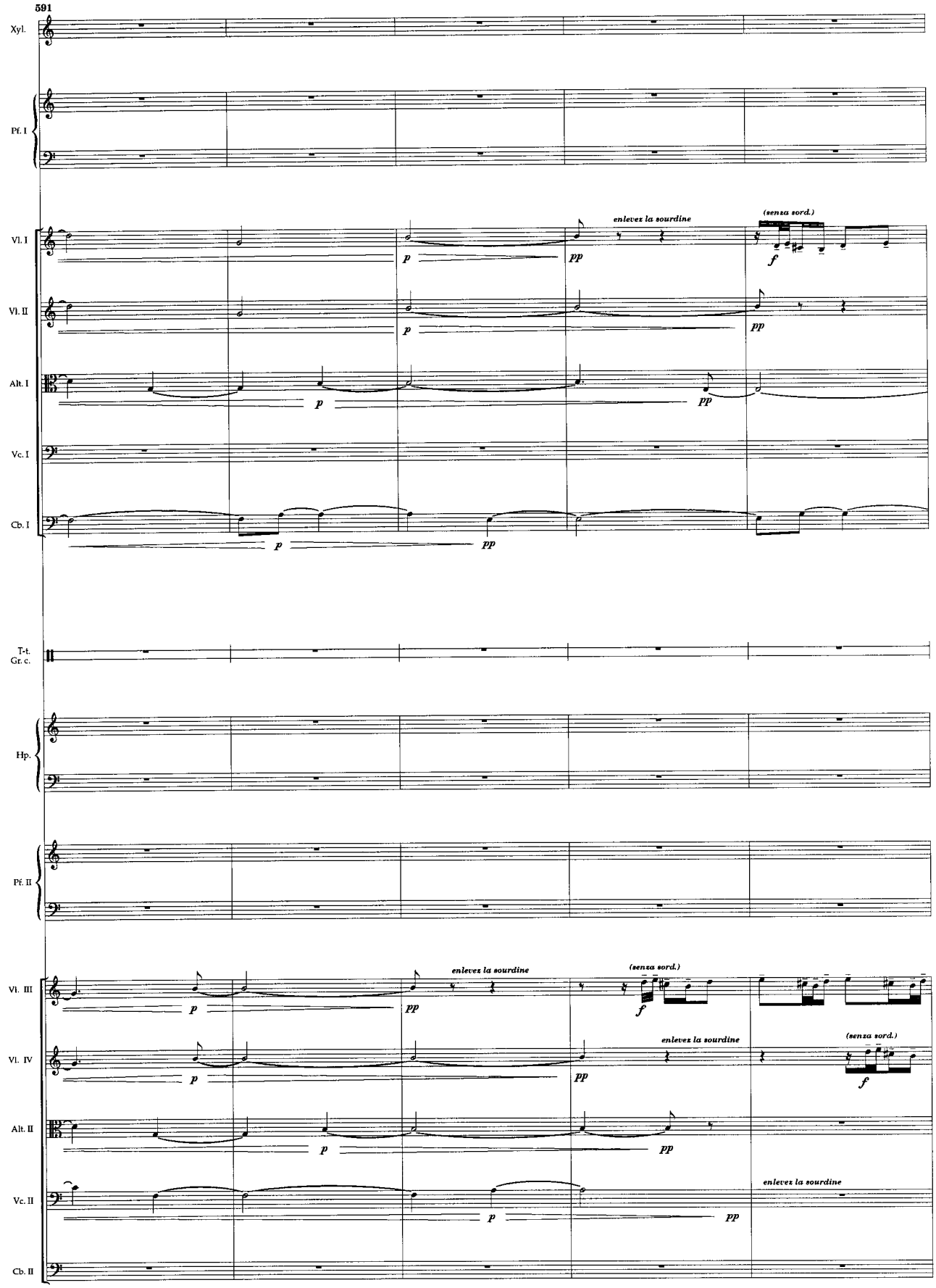

558
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

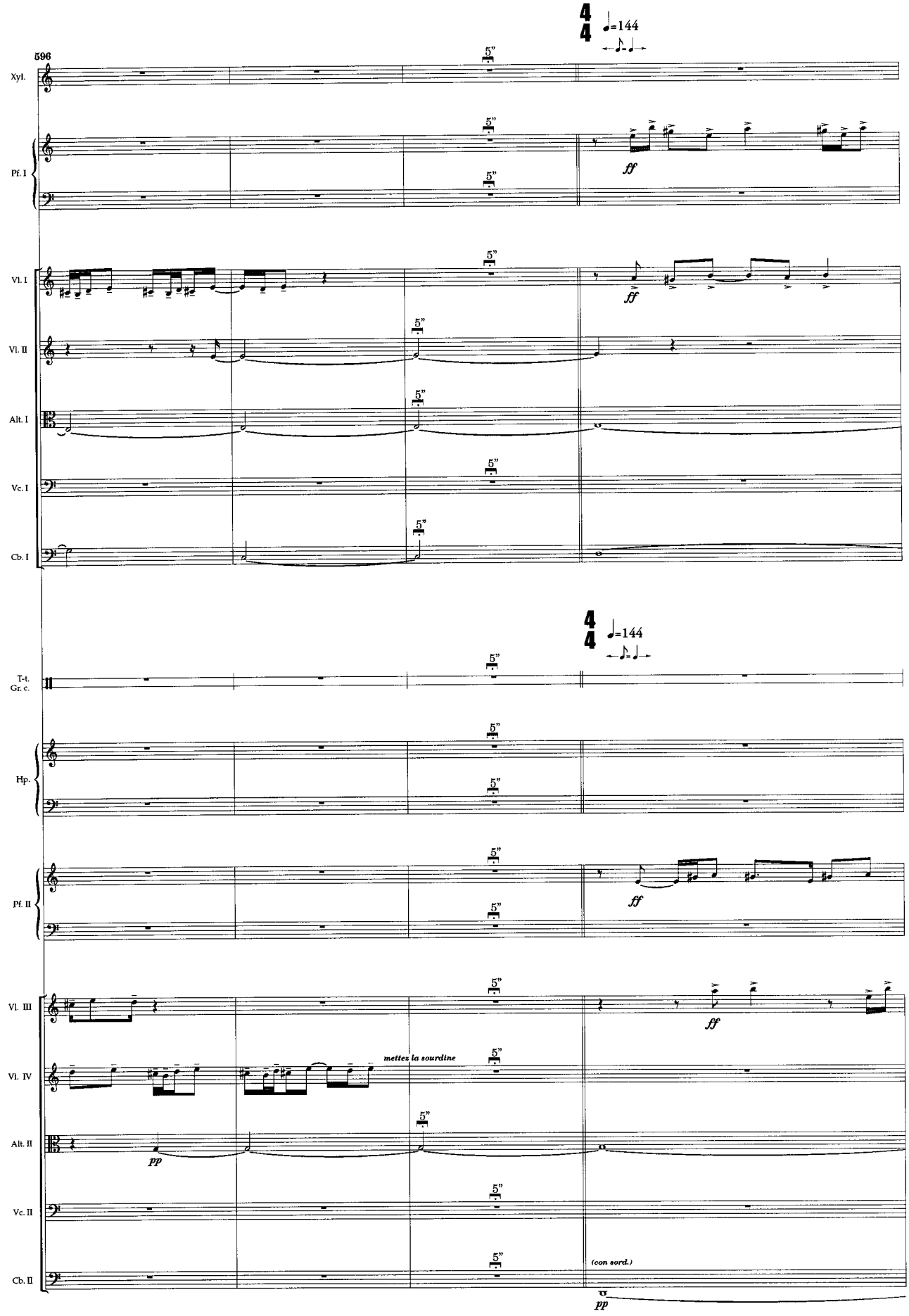

564
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(con sord.)
pp
p
=72

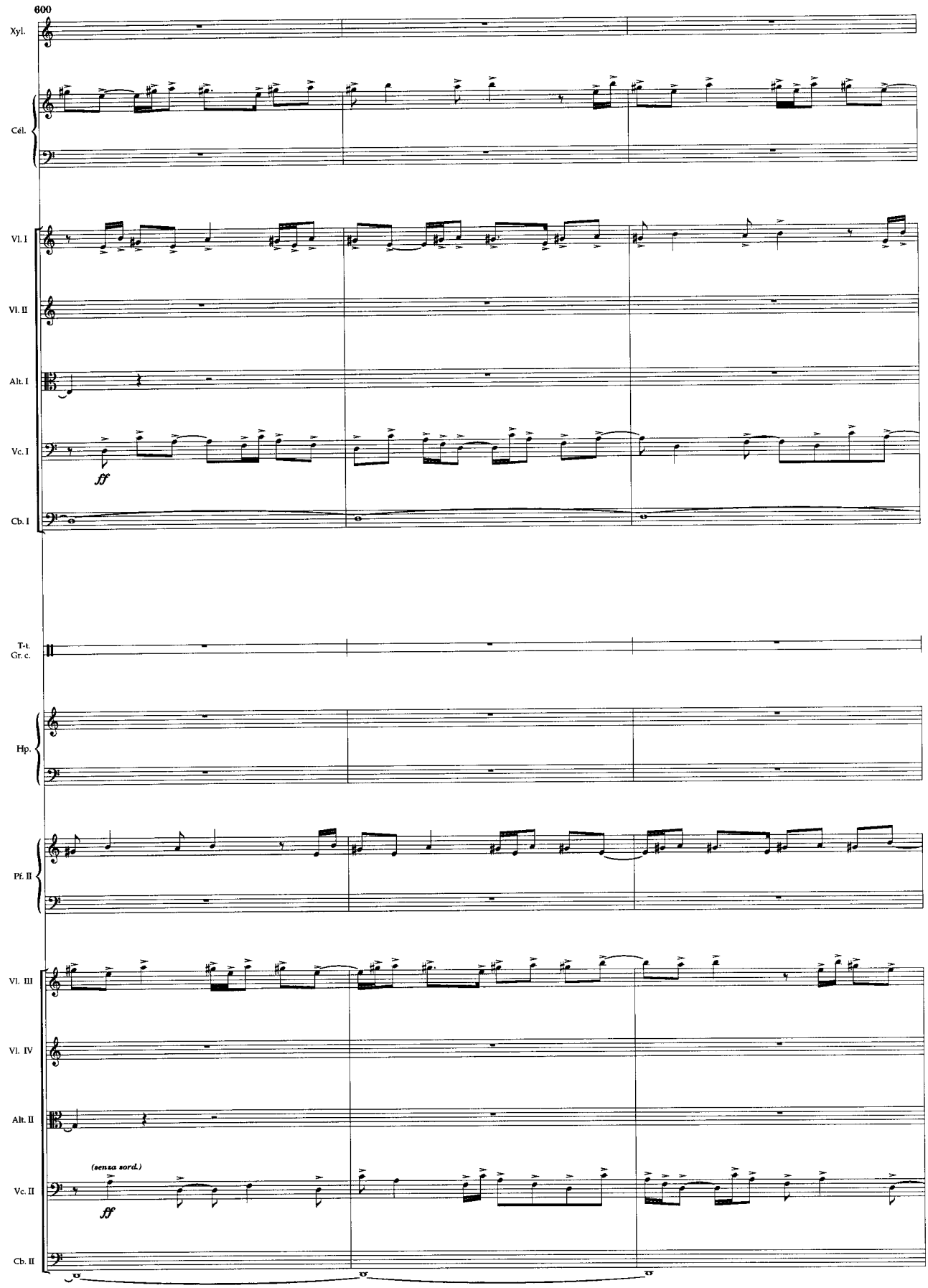

571
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
p
pp

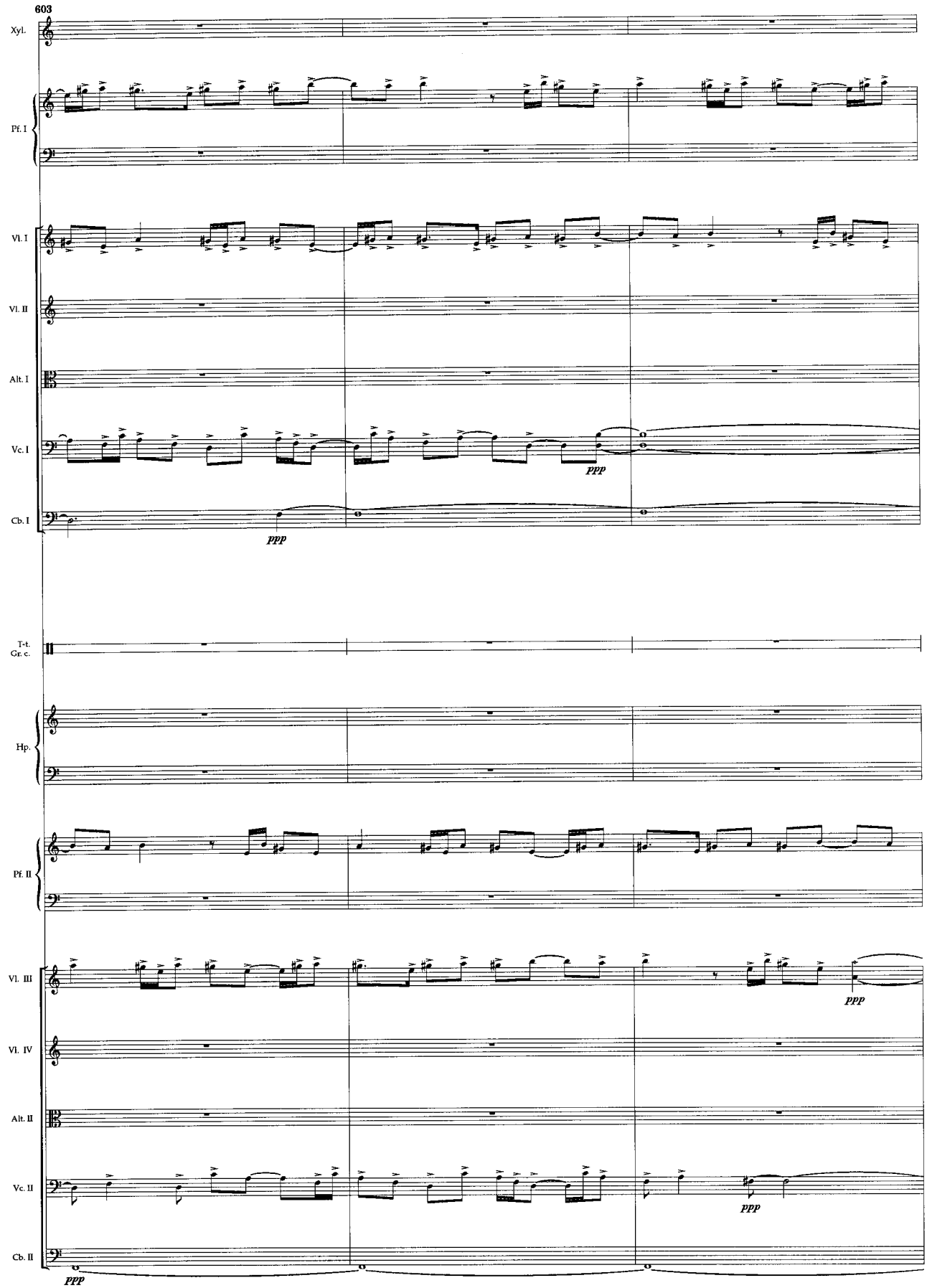

578
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pp
p
(con sord.)
enlevez la sourdine

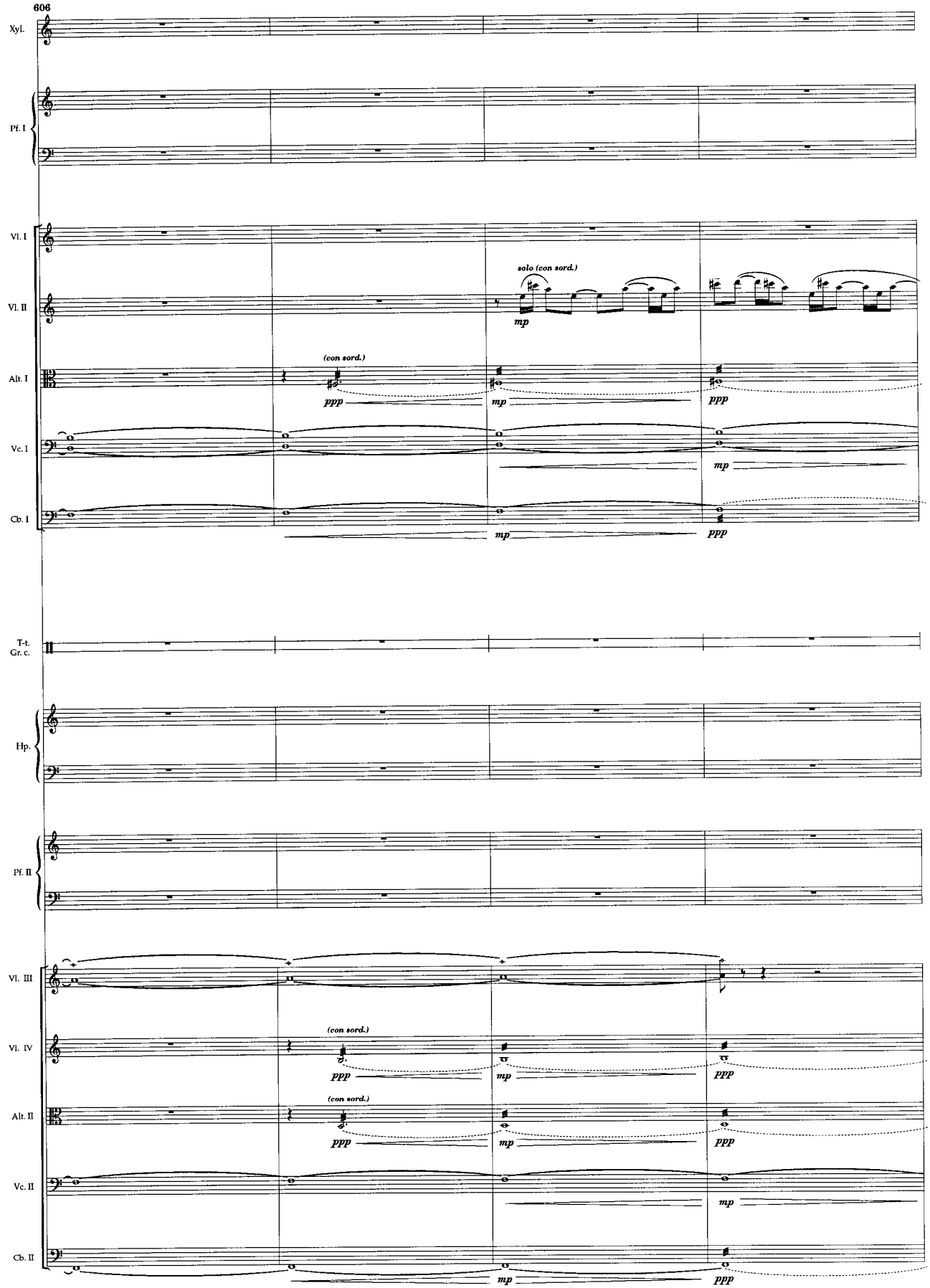

585
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
p
pp
senza sord.
f
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(senza sord.)
mettez la sourdine
(con sord.)

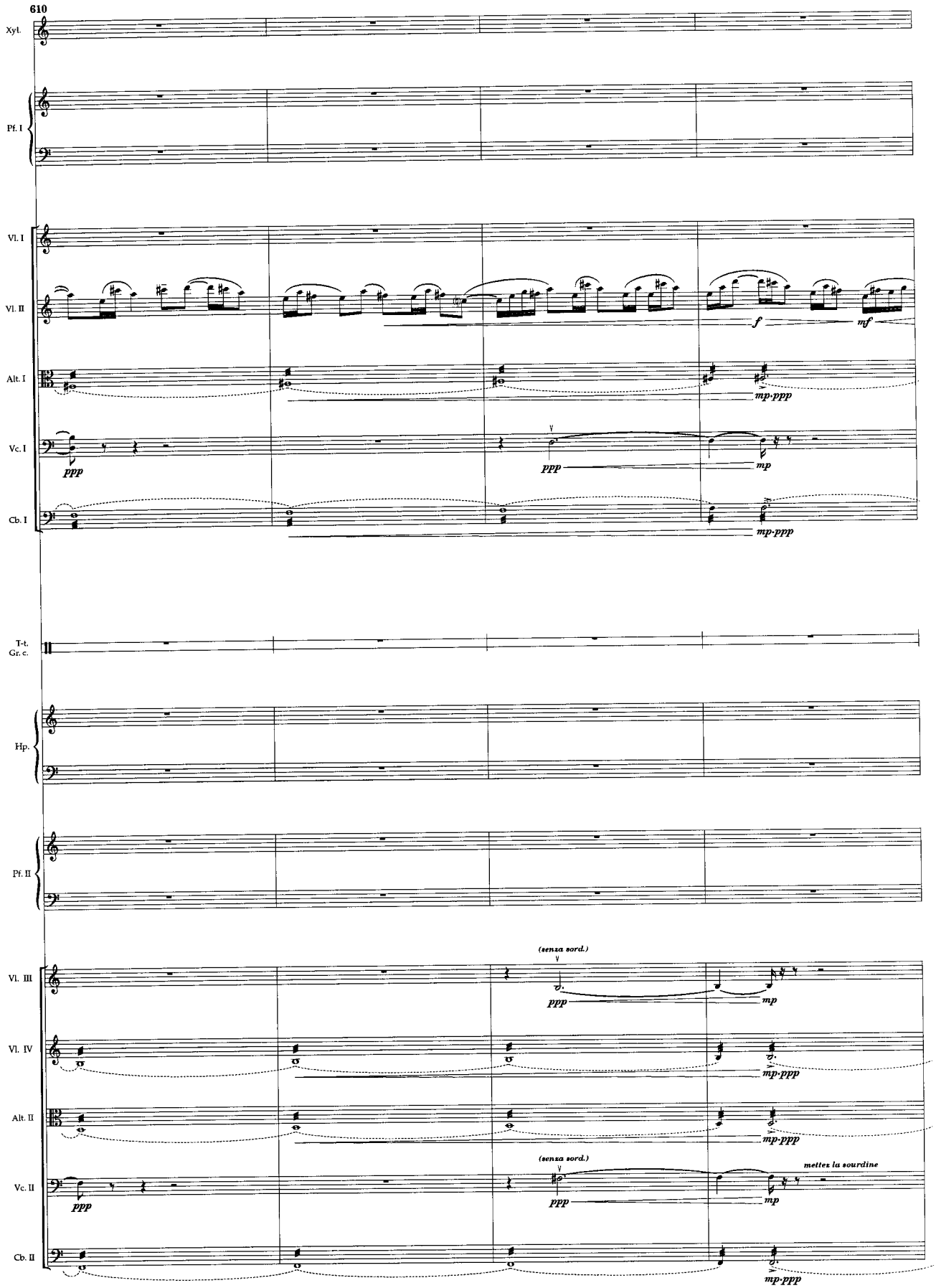

591
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
enlevez la sourdine
(senza sord.)
p
pp
f

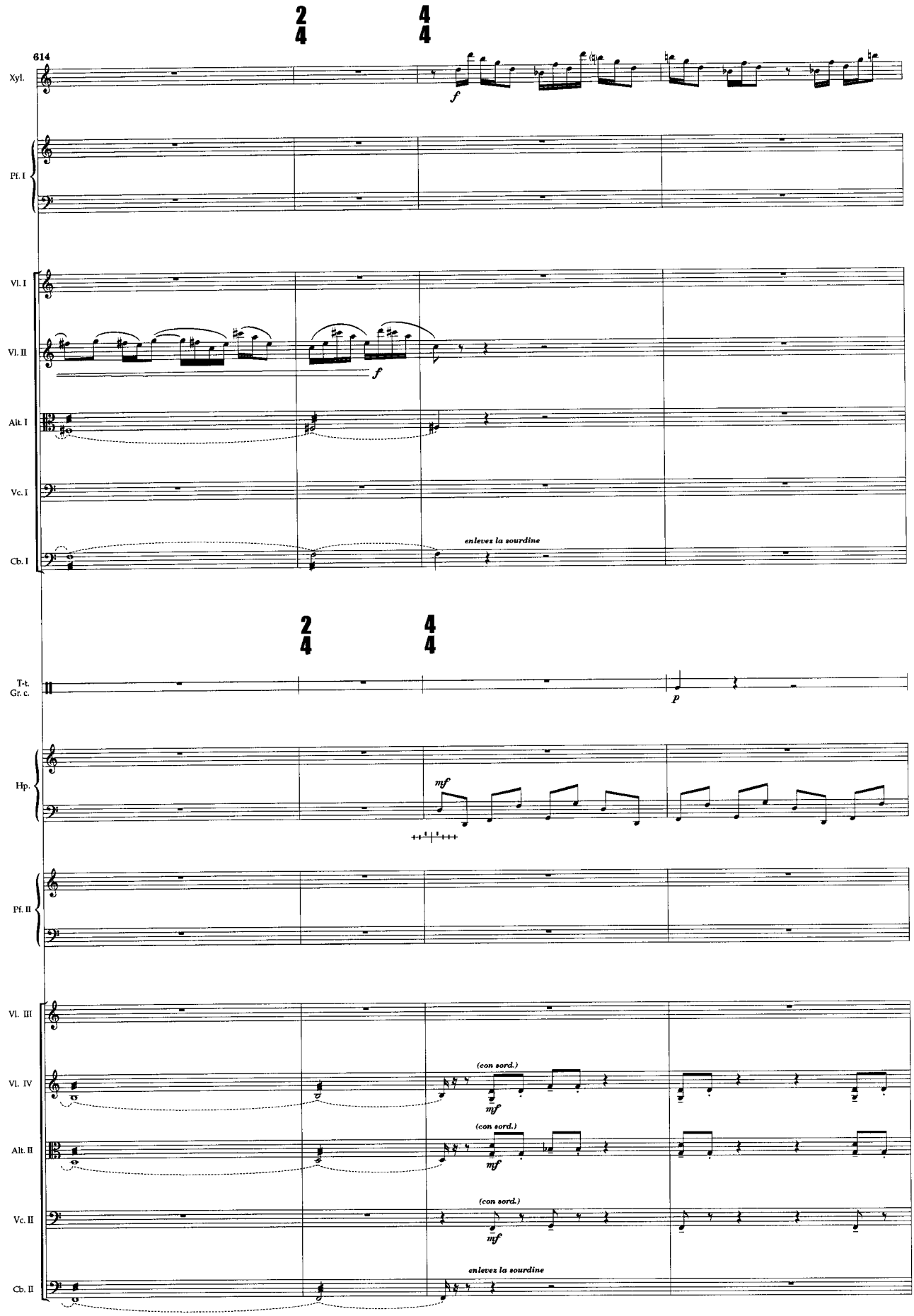

596
4/4 ♩=144
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
5"
ff
pp
mettez la sourdine
(con sord.)

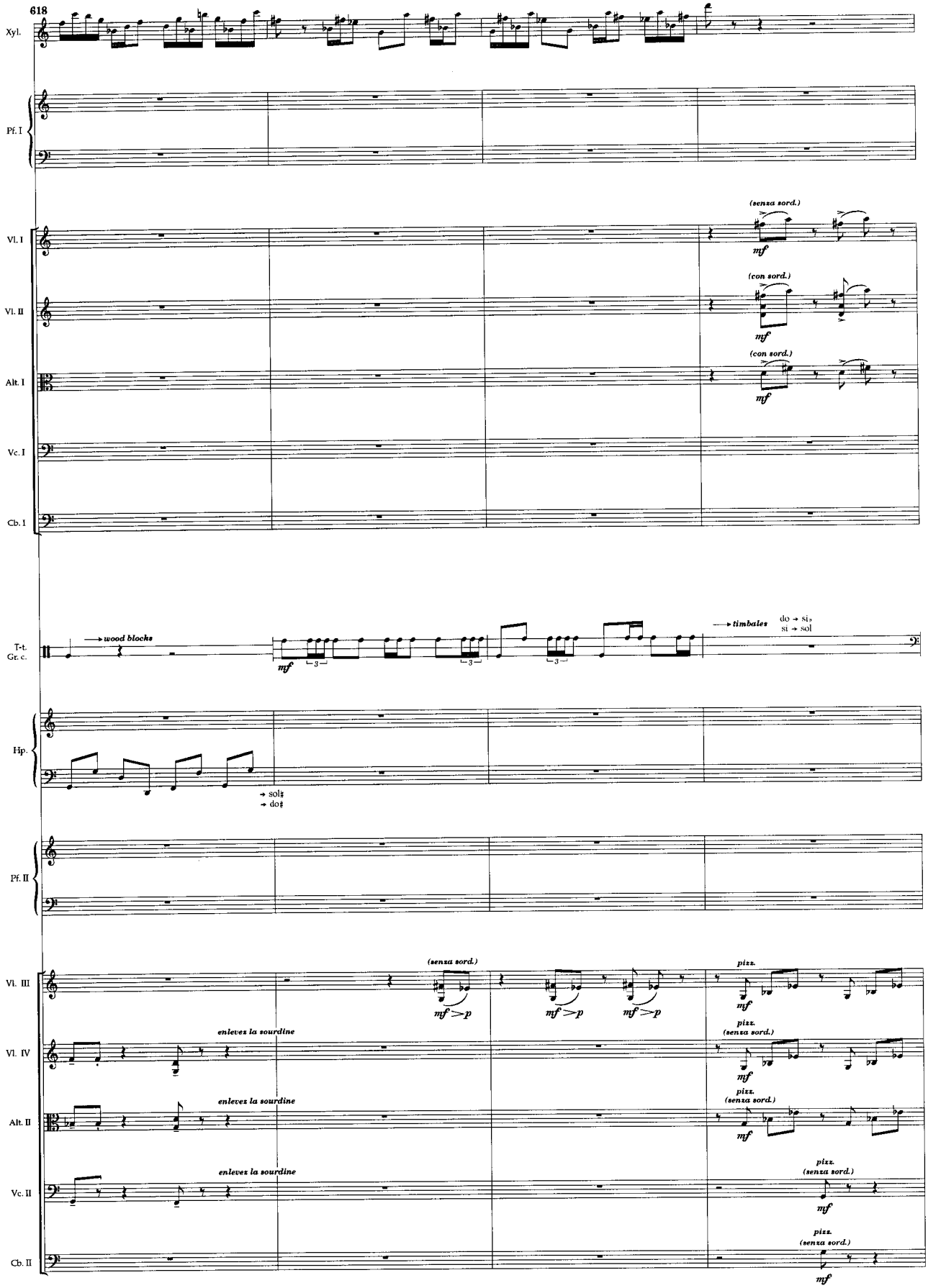

600
Xyl.
Cél.
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
ff
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(senza sord.)
ff

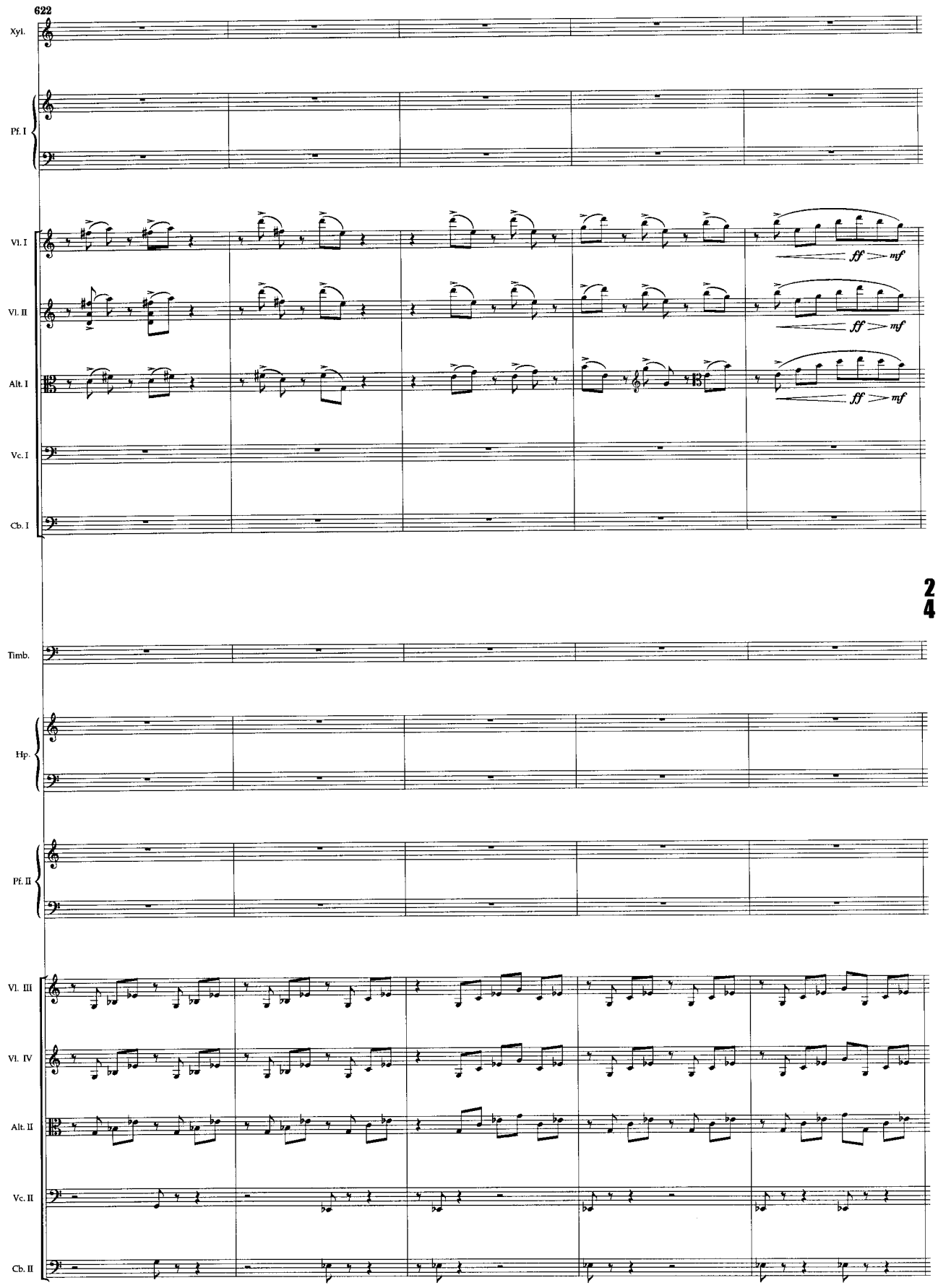

603
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
ppp
ppp
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
ppp
ppp
ppp

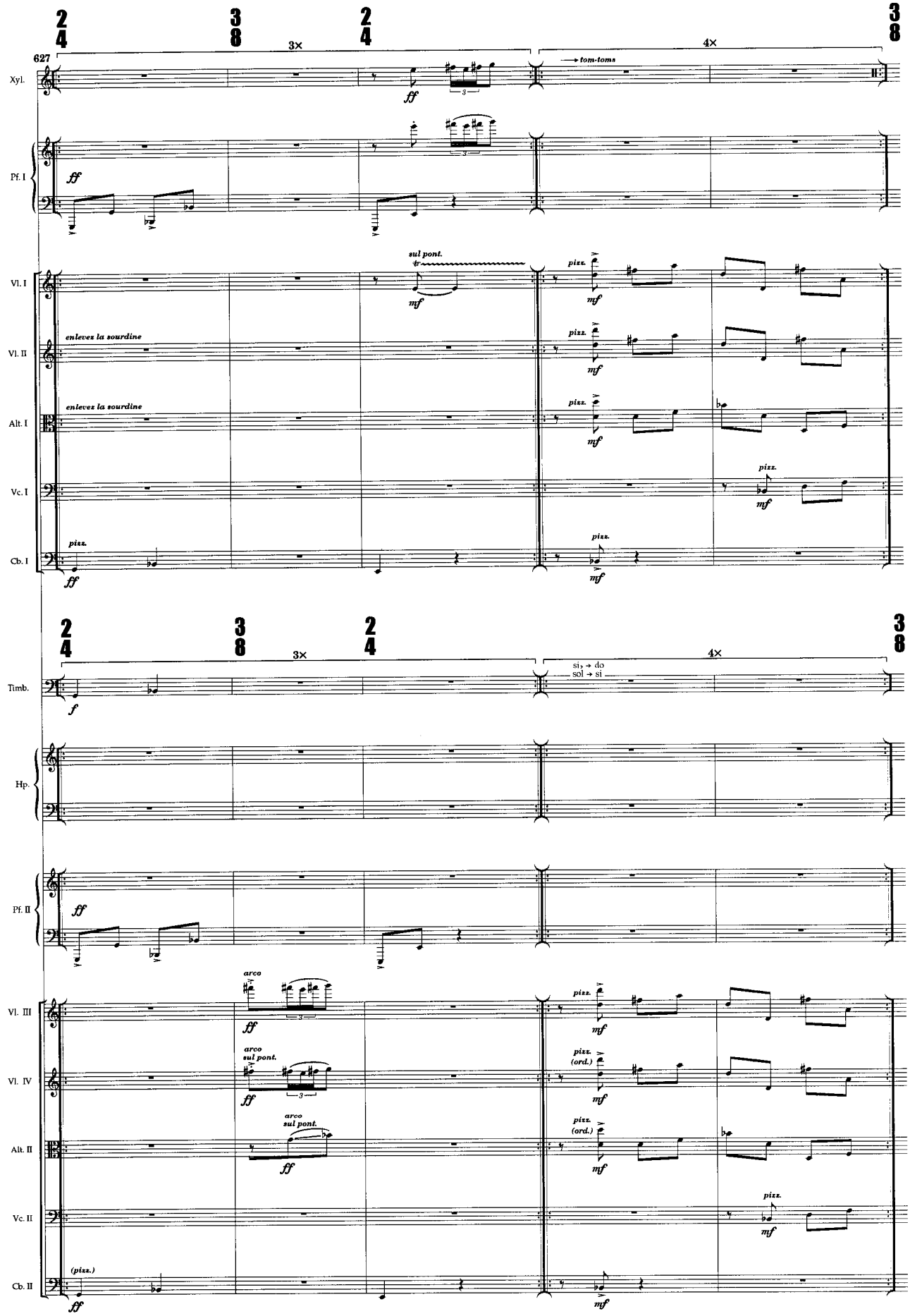

606
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
solo (con sord.)
(con sord.)
mp
ppp

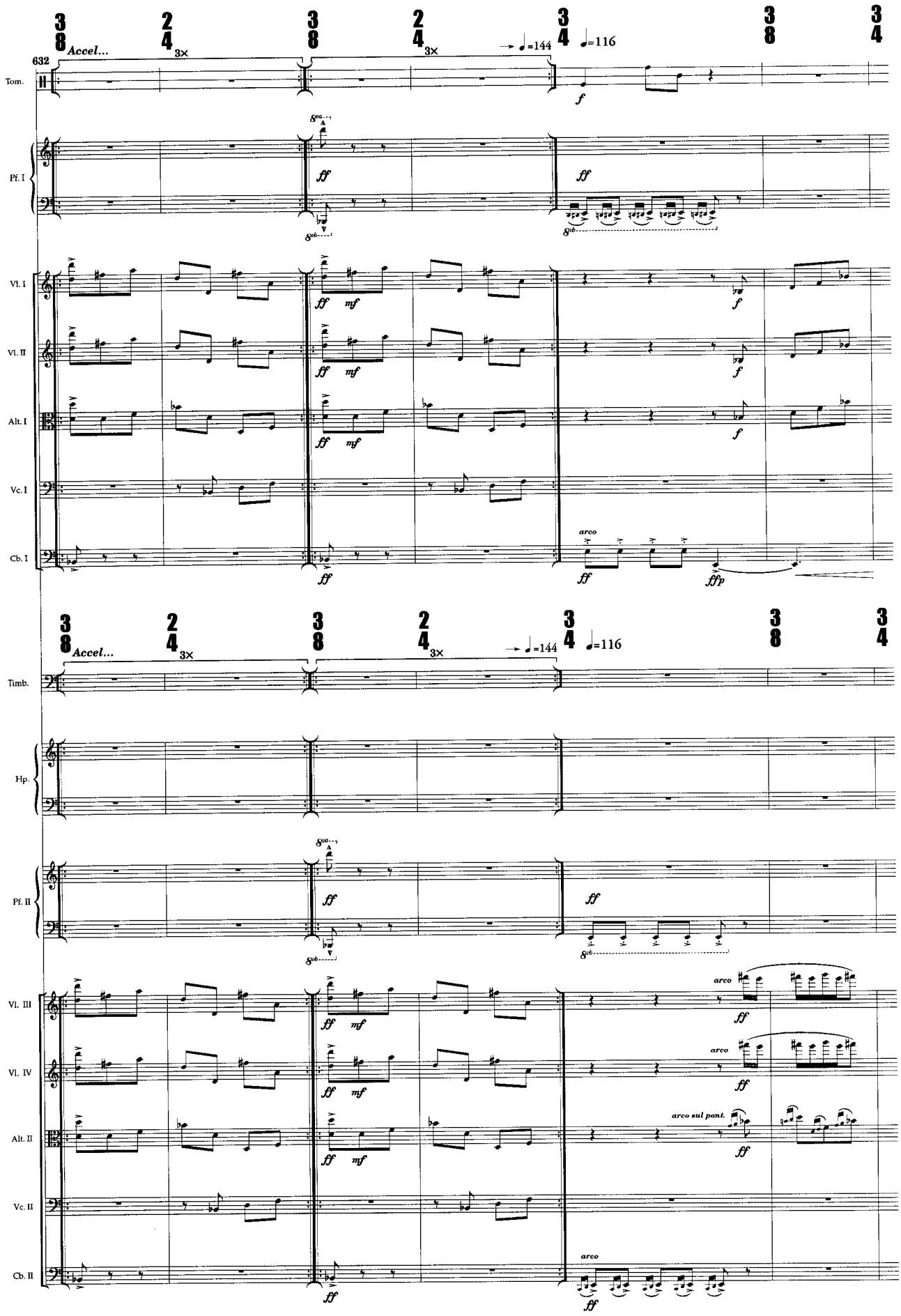

610
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
ppp
f
mf
mp·ppp
mp
(senza sord.)
mettez la sourdine

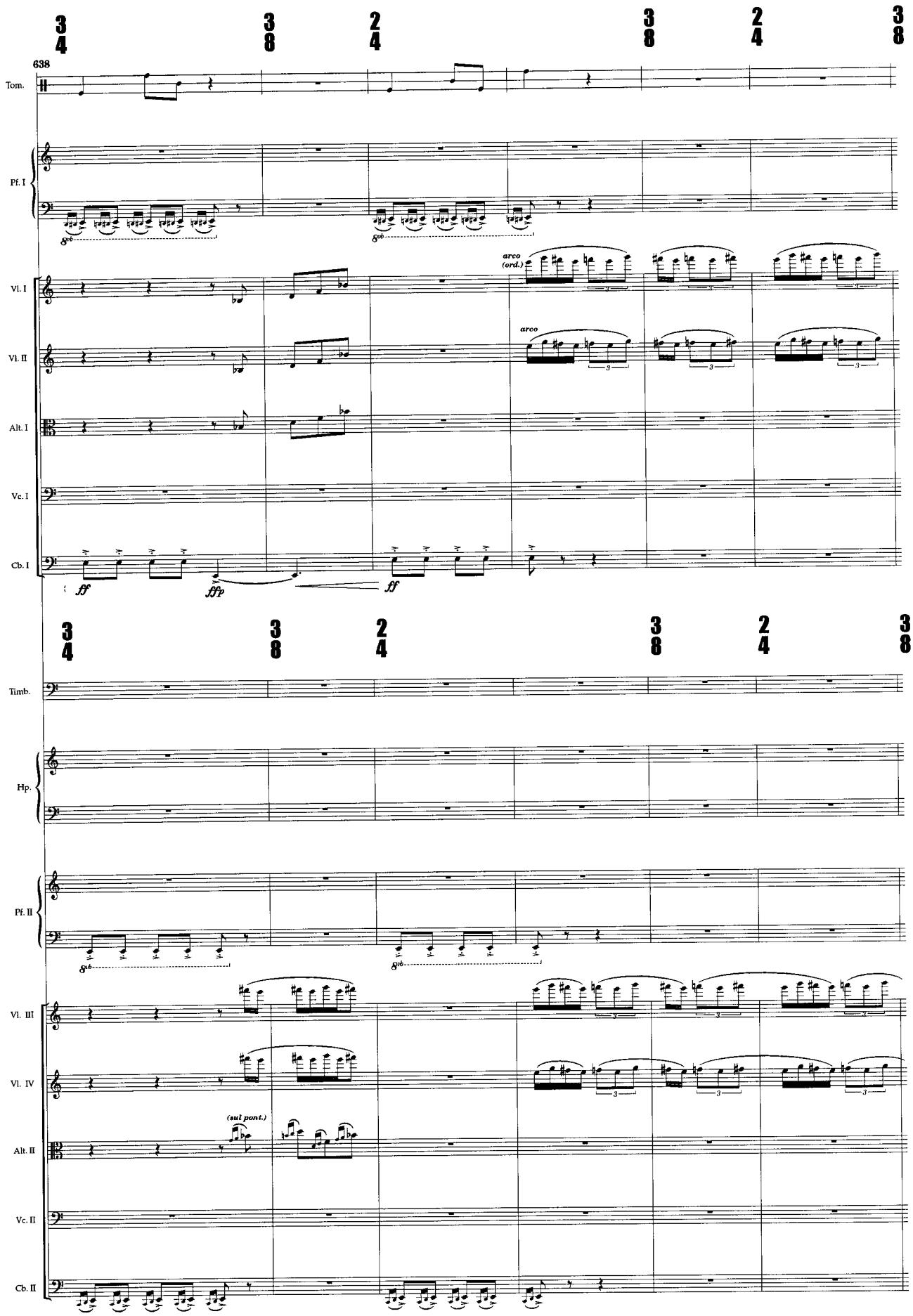

614
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
enlevez la sourdine
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(con sord.)
(con sord.)
(con sord.)
enlevez la sourdine

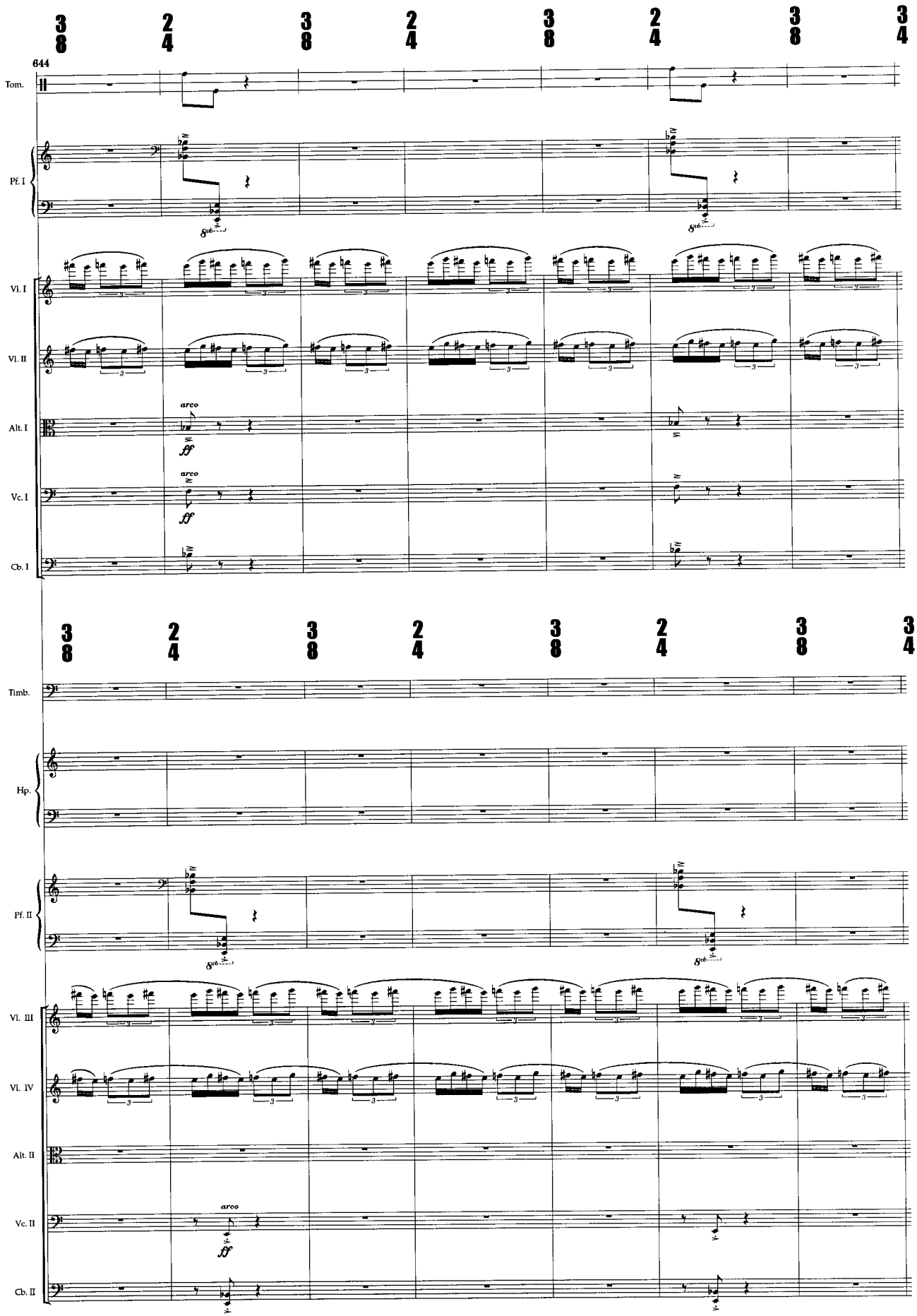

618
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
(senza sord.)
mf
(con sord.)
mf
(con sord.)
mf
T-t.
Gr. c.
→ wood blocks
mf
→ timbales
do → si♭
si → sol
Hp.
→ sol♯
→ do♯
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(senza sord.)
mf >p
mf >p
mf >p
pizz.
mf
enlevez la sourdine
enlevez la sourdine
enlevez la sourdine
pizz.
(senza sord.)
mf
pizz.
(senza sord.)
mf
pizz.
(senza sord.)
mf
pizz.
(senza sord.)
mf

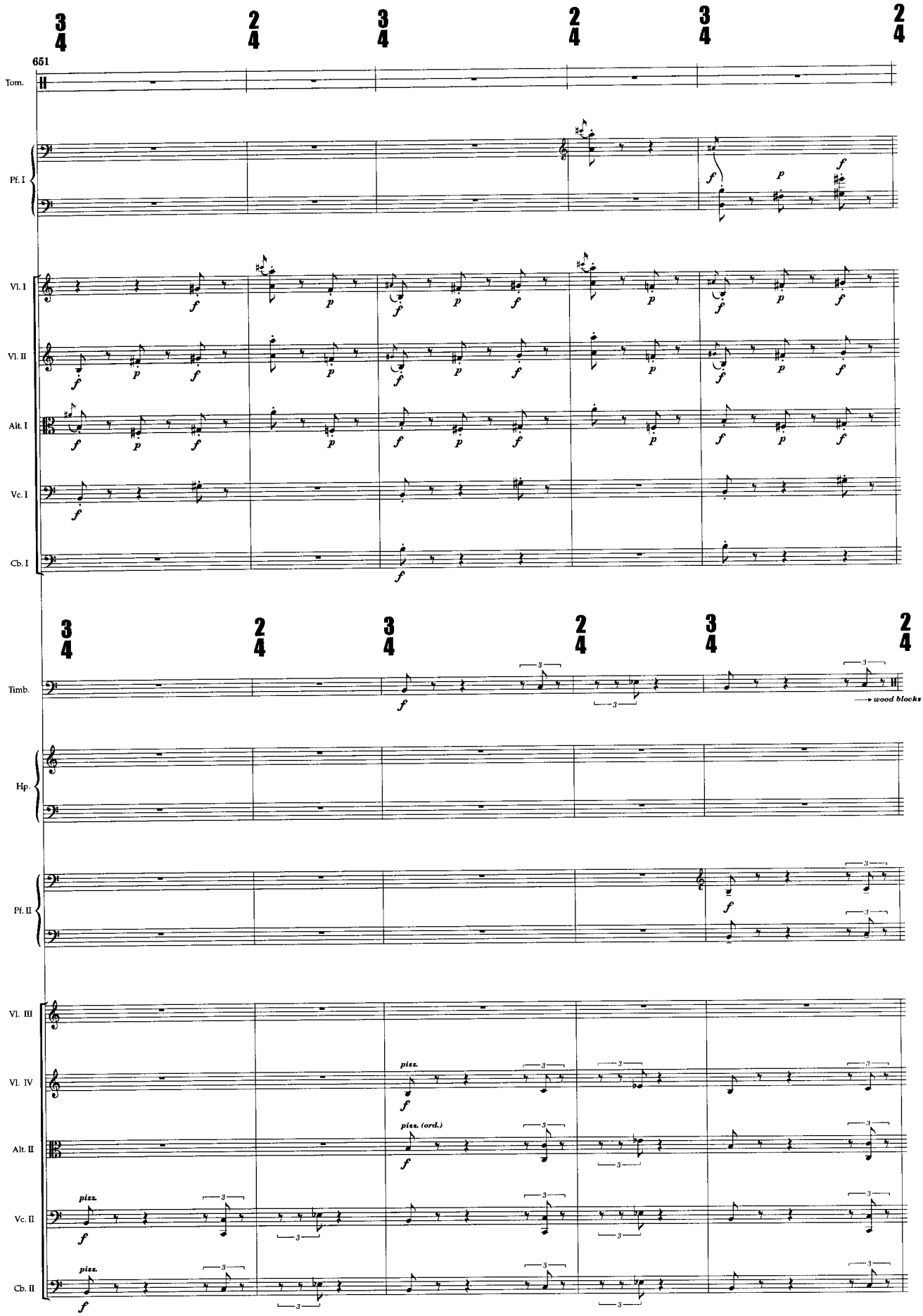

2
4
622
Xyl.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
ff > mf
ff > mf
ff > mf
2
4
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

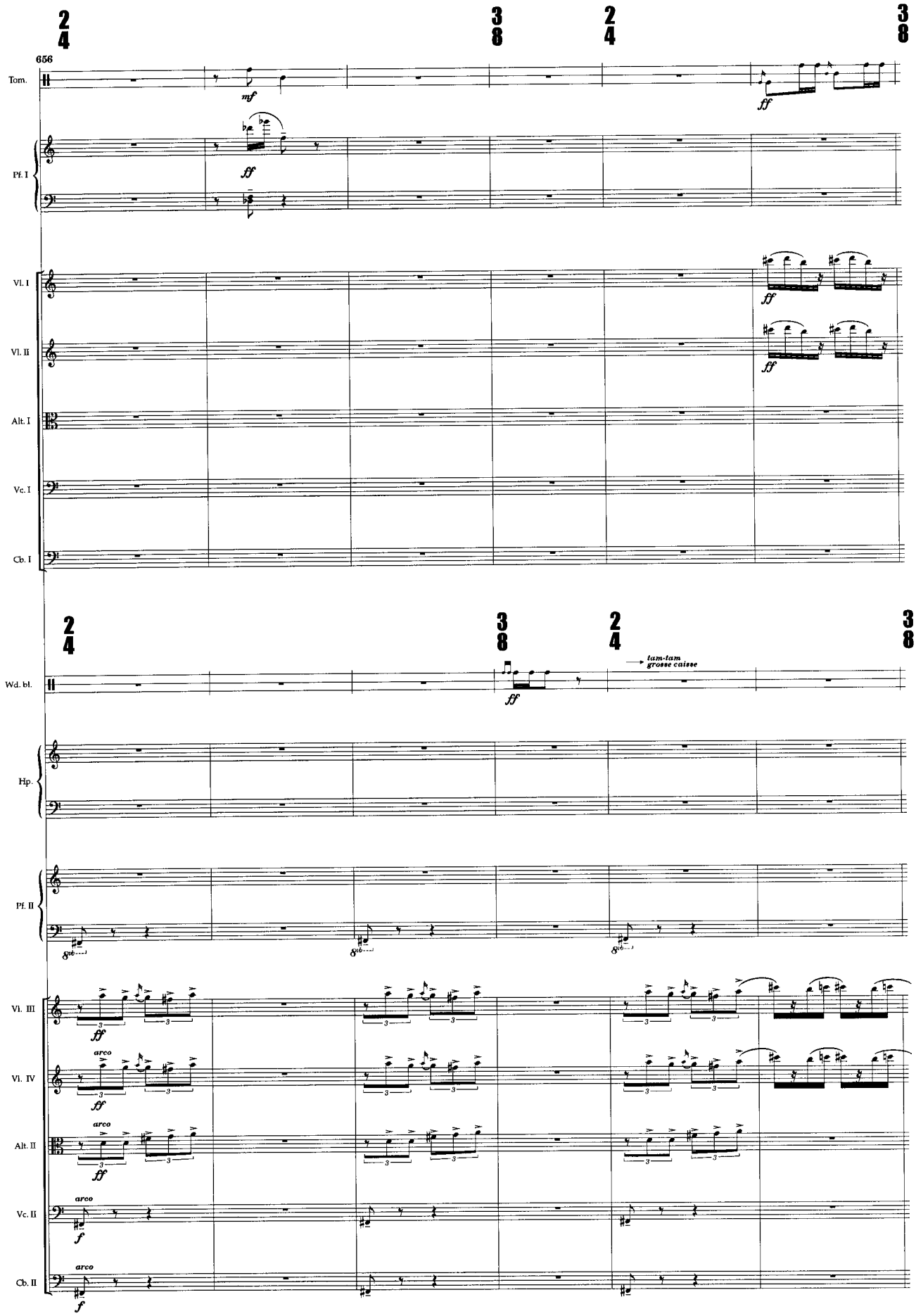

627
Xyl.
3×
4×
→ tom-toms
Pf. I
Vl. I
sul pont.
pizz.
Vl. II
enlevez la sourdine
Alt. I
Vc. I
Cb. I
Timb.
si♭ → do
sol → si
Hp.
Pf. II
Vl. III
arco
Vl. IV
arco
sul pont.
pizz.
(ord.)
Alt. II
Vc. II
Cb. II
(pizz.)

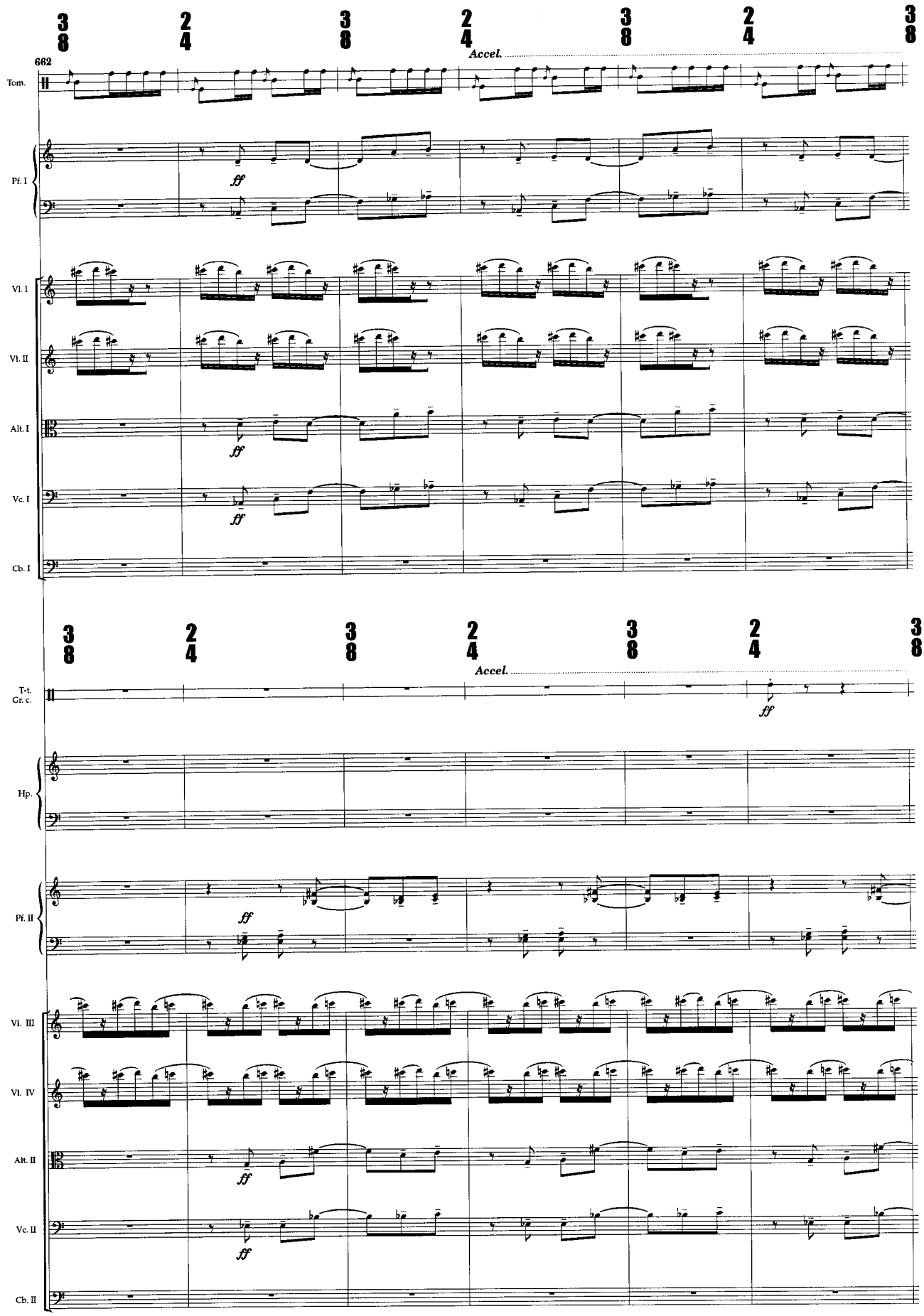

632
Accel...
3×
3×
♩=144
♩=116
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
arco
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
arco sul pont.

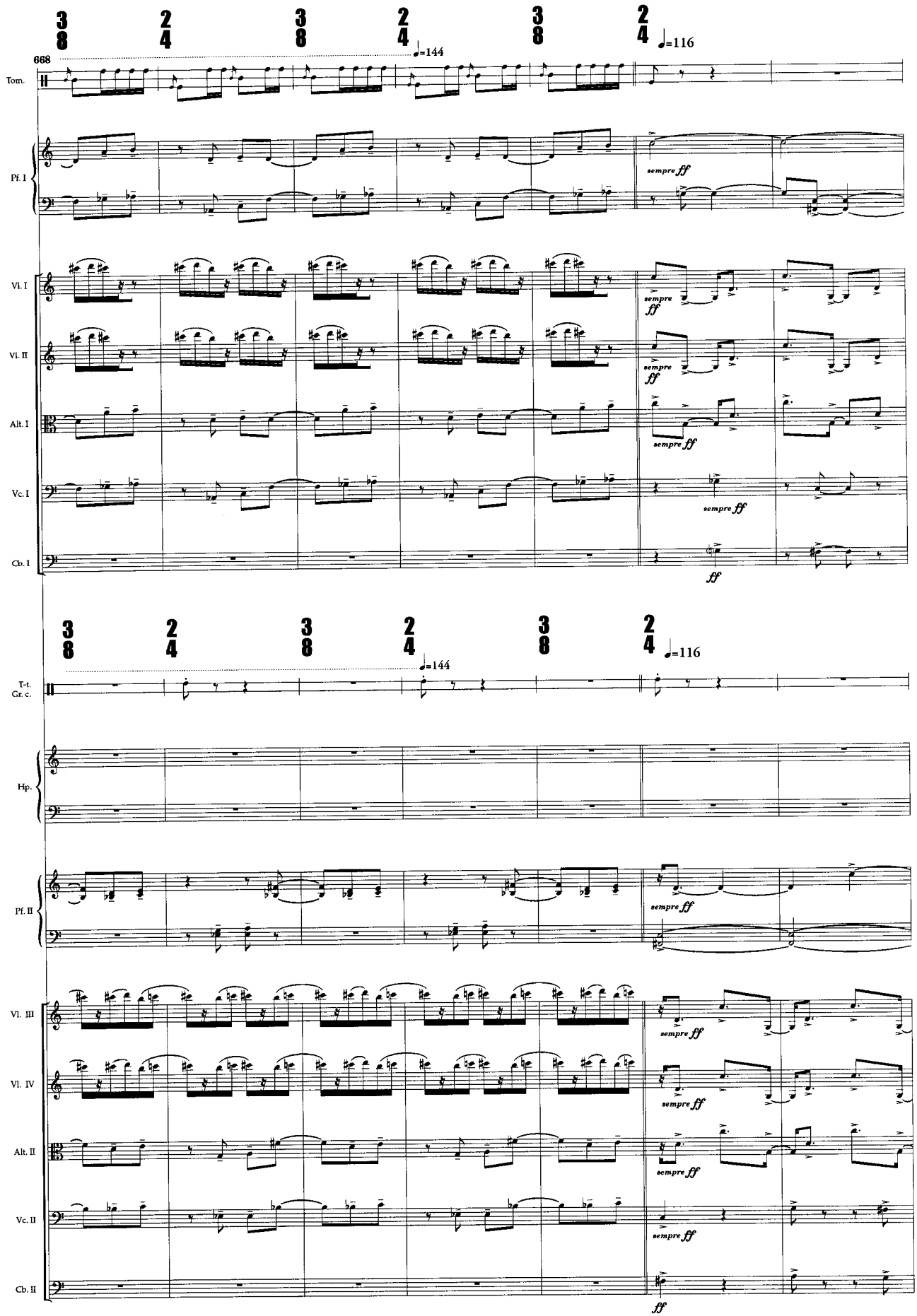

638
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
arco (ord.)
arco
ff
fffp
ff
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
(sul pont.)

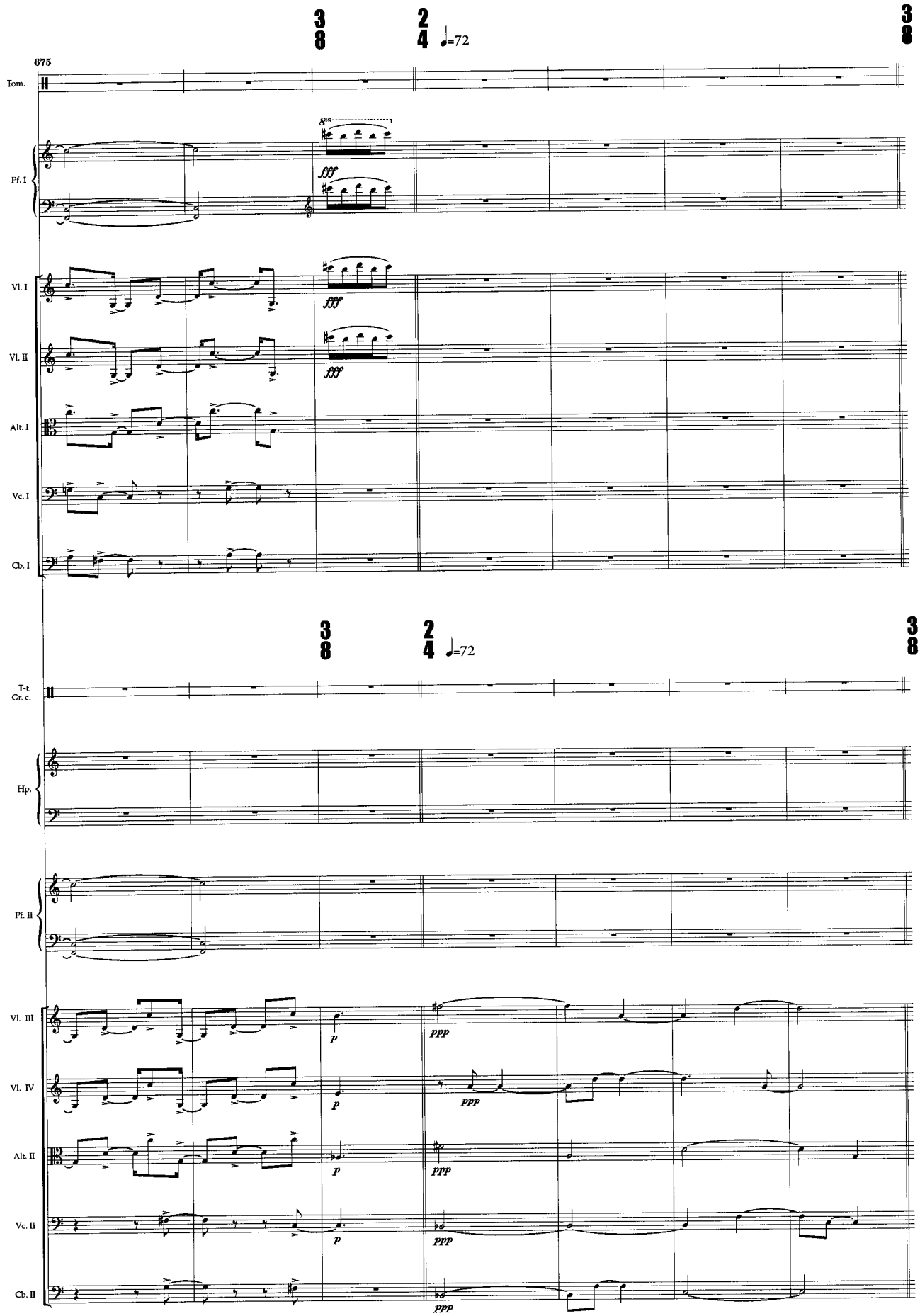

644
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
arco
ff
Timb.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II

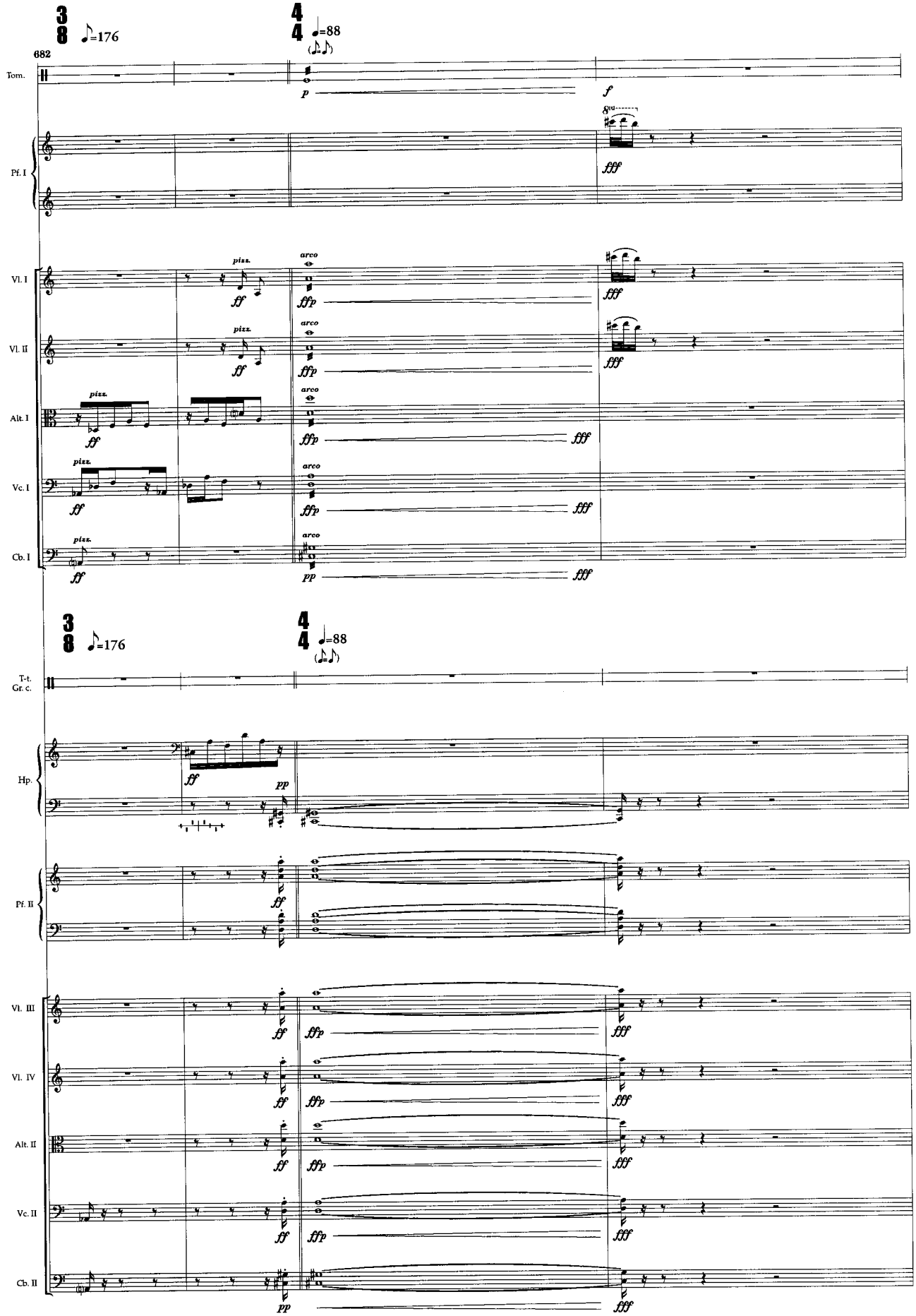

651
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Timb.
wood blocks
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.
pizz. (ord.)

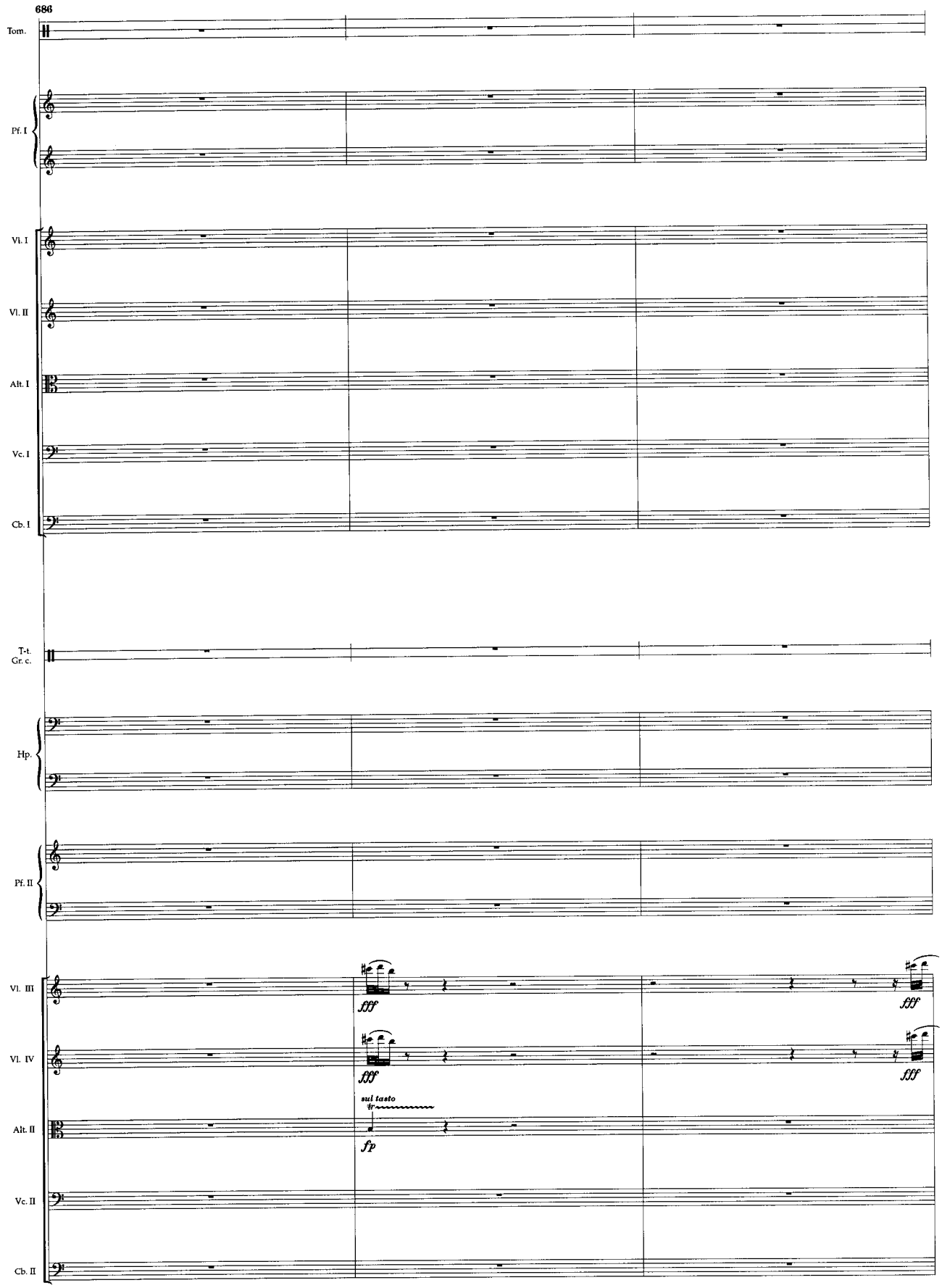

656
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
Wd. bl.
tam-tam
grosse caisse
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
arco

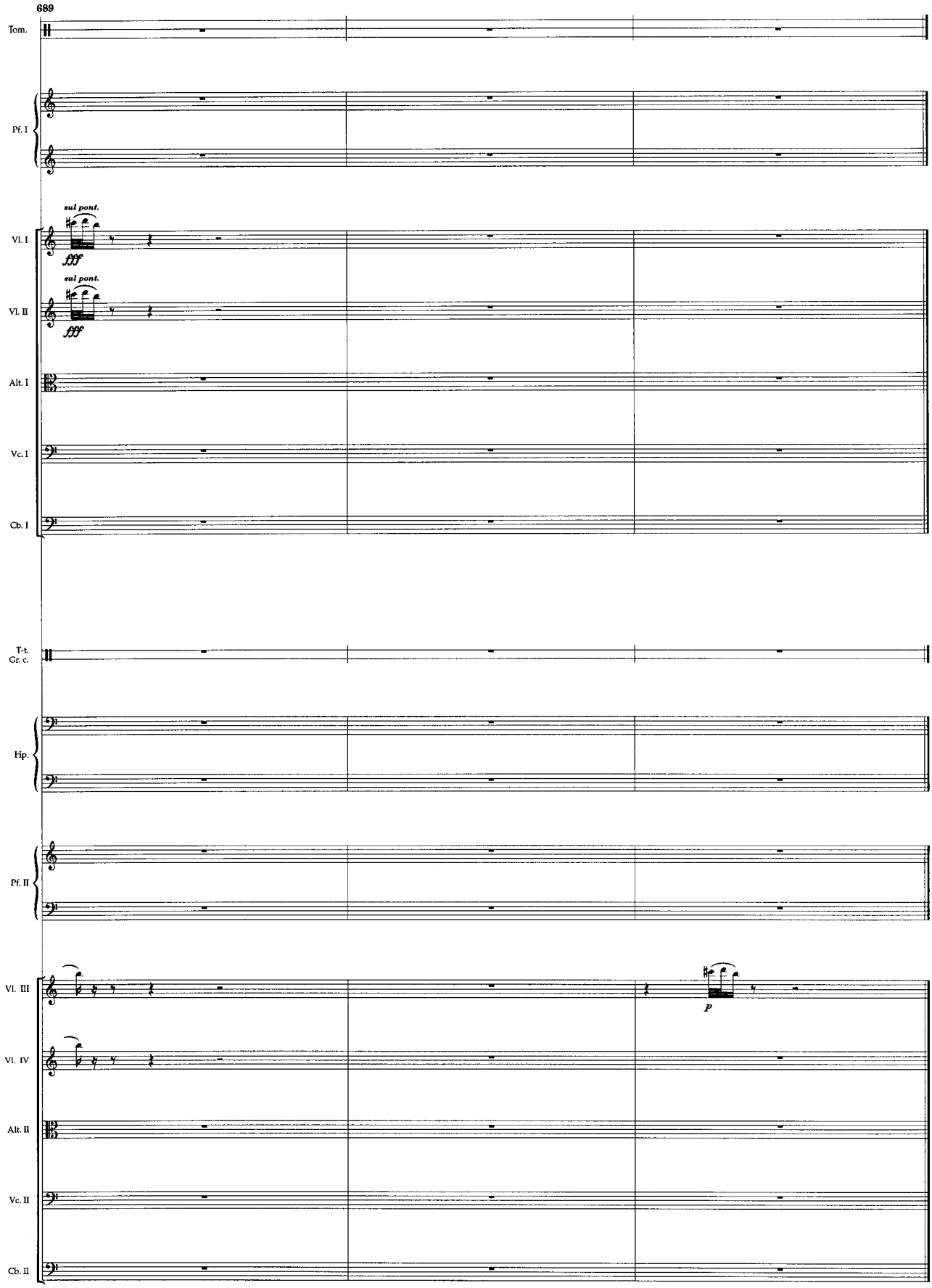

662
Tom.
Accel.
ff
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II


668
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
♩=144
♩=116
sempre ff
ff


3/8
2/4
♩=72
3/8
675
Tom.
8va
fff
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
3/8
2/4
♩=72
3/8
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
p
ppp


682
3/8 ♪=176
4/4 ♩=88
(♪♪♪)
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
pizz.
arco
p
f
ff
ffp
fff
pp


686
Tom.
Pf. I
Vl. I
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Gr. c.
Hp.
Pf. II
Vl. III
Vl. IV
Alt. II
Vc. II
Cb. II
fff
fff
fff
fff
sul tasto
fp


689
Tom.
Pf. I
sul pont.
fff
Vl. I
sul pont.
fff
Vl. II
Alt. I
Vc. I
Cb. I
T-t.
Cr. c.
Hp.
Pf. II
Vl. III
p
Vl. IV
Alt. II
Vc. II
Cb. II