Communication and Control

Issues and aesthetics associated with writing for graphic and traditional notation and the influences of both notational systems on the compositional process.

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Declaration

I hereby declare that this paper has not been submitted as an exercise for a degree at this or any other university and that it is entirely my own work. The candidate also agrees that the library may lend or copy this paper upon request.

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ABSTRACT

This dissertation investigates such processes along and addresses the separate methodologies involved in the composition of music using graphical or traditional notation. The impact of either notational system upon compositional and performance processes is analyzed and assessed. In so doing, pertinent issues, such as how the music is perceived (making use of stream segregation, Gestalt psychology and schematic processing) and interpreted, are addressed. This discussion appositely applies to the two strands of the compositional work submitted (using graphical and traditional notation respectively). A number of scores are presented: *Modular Motion, Approximate Motion* and *Framed Motion* employ graphic notation; and traditional notation is employed by *Passing / Parting / Release* and *Block / Static / Mass* for large ensemble and electronics. By looking at these areas I can uncover the compositional process and examine how I create, communicate and control musical experience.

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Introduction

1.1 Overview

> A piece of music resembles in some respects a photographic album, displaying under changing circumstances, the life of its basic idea – its basic motive. The circumstances, which produce these various aspects of the basic motive – its variations and developments, derive from considerations of variety, structure, and expressiveness.[1]

The parameters available to the composer to sculpt this 'photographic album' are at the same time separate identities and combinations of several musical elements. Pitch cannot exist without duration and timbre, and counterpoint will involve pitch, harmony, texture, and timbre. These parameters are sometimes explored through the structures established by notational systems. Traditional notation provides the composer and performer with somewhat controlled and fixed relationships. When these relationships become unfixed or abstract, not only are entirely new notation systems required, but also entirely new attitudes towards notation and music. This dissertation investigates such issues. It examines the separate methodologies involved in composing using graphic and traditional notation. This examination allows the assessment and analysis of the impact of either notational system upon compositional and performance processes.

[1] Arnold Schoenberg, *Fundamentals of Musical Composition* (London: Faber and Faber, 1967), 58.

1.2 Objectives

This report analyses the structural and aesthetic processes undertaken, and highlights the methodology and differences involved, in composing using both graphic and traditional notation. The pieces I developed from this research are detailed as follows:

Pieces for Graphic Notation

I. *Modular Motion* – for Viola, Cello, Vibraphone and Electronics.
II. *Approximate Motion* – for SATB and Electronics.
III. *Framed Motion* – for String Quartet and Electronics.

Pieces for Traditional Notation

I. *Passing / Parting / Release* – for Large Ensemble and Electronics.
II. *Block / Static / Mass* – for Large Ensemble and Electronics.

Other areas examined include issues concerning the performer and notation, interpretation and improvisation, the use of schemas in music, the processing of musical information, music cognition, my use of electronics and influences that shaped my approach to the compositions presented.

1.3 Structure

Chapter 1 consists of an overview of the topics and issues addressed in this report. It details the report's objectives, presents a brief description of the pieces presented and documents the content within each chapter.

Chapter 2 examines the graphical notation scores written by a group of American composers that became known as the New York School (NYS). Consisting of Morton Feldman (1926–1987), Earle Brown (1926–2002), John Cage (1912–1992) and Christian Wolff (1934–), its members challenged the role of the musical score. Their innovative ideas about music demanded new and challenging methods of notation. Chapter 2 also examines how we process musical information in graphical notation, looking at schemas in particular. Finally, it examines performance considerations associated with writing for and performing graphically notated scores.

Chapter 3 looks at the relationship between notation, interpretation, improvisation and the performer. This section highlights aspects that influence performer within these categories and factors associated with musical performance. These considerations are examined with comments from two performer-based perspectives: improvisers and non-improvisers.

Chapters 4, 5 and 6 outline the background for the use of graphic notation in my pieces *Modular Motion* (Chapter 4), *Approximate Motion* (Chapter 5) and *Framed Motion* (Chapter 6). It highlights the score's development while discussing the works of the NYS and other composers who utilized graphic notation.

Chapter 7 highlights compositional and performance issues associated with traditional and graphic notation. Furthermore, it examines present and future trends in graphic notation.

Chapter 8 examines areas concerned with music cognition. It looks at the processes of grouping musical information, Gestalt psychology and elements of *Auditory Scene Analysis*. This research acts as a background study to issues addressed later in the analysis of the pieces presented.

Chapters 9 and 10 outline the processes involved in composing the two pieces presented for traditional notation. While covering the musical aspects discussed above, these chapters focus on the use of electronics and composers' works consulted during the development of both *Passing / Parting / Release* and *Block / Static / Mass*.

Chapter 11 presents a critical appraisal of the compositions presented. It concludes that by experimenting and working through one's own musical material, through either graphic or traditional notation, one can develop a distinct musical language.

Chapter Two

Graphic Notation - The New York School

2.1 Background

> It is many years now since painting freed itself from the constraints of pure representation and description and from academic rules. Painters respond to the world – the completely different world – in which they found themselves, while music was still fitting itself into the arbitrary patterns, called forms, and following obsolete rules.[2]

The above quotation, from Edgard Varèse, documents a composer who embraced other arts. While in Paris, Varèse's friendship with important painters, sculptors and writers on art gave him a completely individualistic approach to musical composition. After immigrating to New York City in 1917, Varèse's works, thoughts and ideas on music provided an important point of departure for the members of the New York School of composers (NYS). The NYS consisted of the composers Morton Feldman (1926–1987) Earle Brown (1926–2002), John Cage (1912–1992) and Christian Wolff (1934–). Inspired by the processes used by Abstract Expressionist painters of the early 1950s such as Jackson Pollock, Willem de Kooning and Mark Rothko, and by working alongside Cage and Wolff, Feldman and Brown began to question basic assumptions relating to music – most notably form, content and time.

[2] Lewin Alcopley, 'Edgard Varèse on Music and Art – A conversation between Edgard Varèse and Lewin Alcopley', *Leonardo: International Journal of Contemporary Art, 1/2* (April, 1968), 187-195.

They challenged not only music, but also the constructs of the musical score during the early periods of their compositional careers. This exploration of musical representation led to the performer gaining more freedom to interactively interpret the scores for themselves. This in turn fundamentally challenged the notion of the score as being merely subservient to the 'music'.

Various events brought about this shift in thinking for the composers of the NYS. Firstly, percussion and piano pieces written by composers Henry Cowell, John Cage and Lou Harrison during the 1940s and throughout the 1950s anticipated the NYS fundamental questioning of the traditional relationships among notation, execution and perception.

Secondly, one figure stands out for his forward thinking, philosophy and direct influence on the school, the composer Edgard Varèse. John Cage argued that, even though Varèse was an artist of the past, he nevertheless "more clearly and actively than anyone else of his generation established the present nature of music".[3] Indeed, Cage's definition of 'Organized Sound' directly resembles Varèse's notion that he accepted "all audible phenomena as material proper to music".[4] Varèse believed that music was the most abstract of the arts and also the most physical. These two attributes, abstraction and physicality, became the goals which the NYS of painters and composers strove to achieve in their art. With the resonances of the Abstract Expressionists in mind, Morton Feldman and Earle Brown set out to explore new areas in music.

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[3] John Cage, *Silence: Lectures and Writings* (London: Marion Press, 1968), 83-84.
[4] *Ibid.* , 83.

The painters gave Feldman the ambition to create a sound world more immediate and more physical than anything that had existed up until then. At times he used to work by putting his manuscripts on the wall so that he could step back and look at them the way an artist looks at a picture. Feldman also began to view the score rather like a canvas, as opposed to a linear, narrative structure:

> I put sheets of graph paper on the wall; each sheet framed the same time dimension and was, in effect, a visual rhythmic structure.[5]

Feldman's first graphical piece, *Projection 1* (1950) (Fig.1), allowed only indeterminacies in pitch. For solo cello, the P and A refer to two kinds of timbral production: pizzicato and arco. Within each of these systems, the relative pitch (high, medium and low range) – but not specific pitch – is shown. The score indicates that any tone within the ranges indicated may be sounded. Although the score seems to have no temporal reference, each dotted box is described as being equivalent to four pulses at 72 BPM.

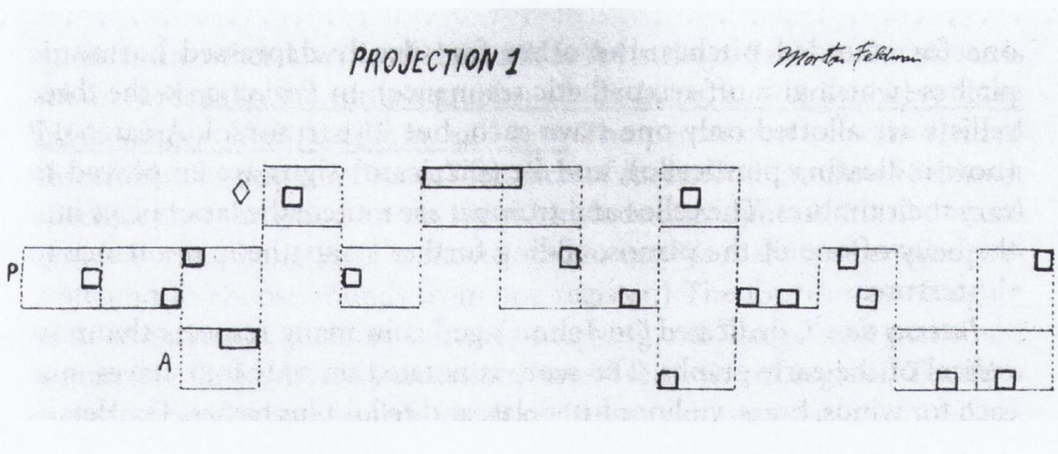

Fig. 1 Morton Feldman's *Projection 1.* [6]

[5] Steve Johnson, *The New York Schools of Music and Visual Arts* (New York: Routledge Press, 2002), 11.
[6] Morton Feldman, *Projection 1*, C.F Peters Corporation (New York: 1962).

What Feldman sought to do with *Projection 1* was to 'unfix' music's traditional parameters (rhythm, pitch and dynamics) in such a way that the sounds could exist as themselves. Feldman never thought of this piece as an exercise in improvisation, but rather "an exercise in abstract sonic adventure".[7] Visually this piece resembles the work of Franz Kline's *Painting Numbers* (1952) and Mark Rothko's *Ochre and Red on Red* (1954), (Fig 2).

Fig. 2 Mark Rothko's *Ochre or Red on Red.* [8]

[7] *Ibid.* , 121.

[8] Mark Rothko, *Orchre or Red on Red*, David Anfam (ed.), *Mark Rothko - The Works on Canvas,* (New Haven, CT: Yale University Press, 1998), 597.

A friend of Feldman was fellow composer Earle Brown. Influenced by Feldman's graphical scores, Brown set about creating a truly graphic score, in which nothing is specified. *December 1952* (Fig.3) from Brown's collection *Folio* (1952–1953) represents a clear example of Brown's openness with regard to directions for the performer. Hence it is widely open to differing interpretations.

Fig. 3 Earle Brown's *December 1952.*[9]

[9] Earle Brown, *December 1952,* Associated Music Publishers, (New York: 1961).

Brown's intention was:

> To have elements exist in space, space as an infinitude of directions from an infinitude of points in space. To work (compositionally and in performance) to right, left, back, forward, up, down and all points between. The score (being) a picture of this space at one instant, which must always be considered as unreal or transitory, a performer must set this all in motion (time), which is to say, realize that it is in motion and step into it... either sit and let it move or move through it at all speed.[10]

Thus, the score can be placed on any four sides and can be read in four basic ways. It can be played by one or more instruments, performed in any direction and from any point in the defined space for any length of time. Like Feldman's *Projection 1*, the performer has a wide spectrum in which to explore. This flexibility within the notation gives the performers a remarkable degree of freedom in the way they interpret the piece. Brown was hugely influenced by the visual arts. He greatly admired the work of Jackson Pollock: in a sense, Pollock's work *looked* like what Brown wanted to *hear*. The principal artist who had the greatest influence on Brown was the sculptor Alexander Calder, whose pieces included *Mobile (Arc of Petals)* (Fig. 4).

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[10] Earle Brown, *Folio* from the accompanying score notes (New York: Associated Music Publishers Inc, 1961).

Fig. 4 Alexander Calder's *Mobile (Arc of Petals).* [11]

[11] Alexander Calder, *Mobile (Arc of Petals)*, J. Lipman, *Calder's Universe*, exhibition. catalogue, (New York: Guggenheim Museum of Modern Art, 1976), 33.

Brown had focused on Calder's ideas of making two or more objects find actual relations in space. This was the primary feature of his approach: the organization of contrasting movements and changing relations of form in space. *December 1952* strongly resembles Calder's work in that Brown sought to have sounds relate, move and change through an infinitude of points in space. Brown observed that mobile form was subject to:

> The physical manipulation of its components, resulting in an unknown number of different, integral and "valid" realizations.[12]

The 1950s were times of rapid change in thinking. The NYS realized that traditional notation made assumptions, in its form and uses, about the very nature of music. These assumptions, in the end, became inappropriate to the new activities and horizons that the NYS sought to envisage. Ultimately, the development and use of graphic notation was the crucial factor that brought the NYS closer to this horizon. Along with Cage, Feldman and Brown were early influences in the careers of the Minimalist composers La Monte Young (1935–), Terry Riley (1935–) and Steve Reich (1936–), all of who, in the early periods of their careers questioned both music and compositional processes.

[12] Earle Brown, *Folio* from the accompanying score notes (New York: Associated Music Publishers Inc, 1961).

2.2 Graphic Notation – Processing Musical Information

Chapter 8 examines cognitive musical processing in terms of traditional notation through 'grouping processes' (part of Gestalt theory) and elements of Albert Bregman's publication *Auditory Scene Analysis*. In order for us to make sense of how we process graphic notation, we must first examine how we order musical events that may be new and foreign to the eye and to the mind.

Our environment is structured by our ability to establish cross connections between different modes of perception. These cross connections implement cognitive devices known as *schemas*. Schemas help us organize and simplify our knowledge of the world around us. We have schemas about ourselves, other people, mechanical devices, food, and in fact almost everything. Schemas effect what we notice, how we interpret things, how we make decisions and act. They act like filters, accentuating and downplaying various elements. They also help us forecast and predict a sequence of events. In everyday life, we remember and recall information with the help of schemas, using them to 'encode' memories and experience.

Sandra P. Marshall, in *Schemas in Problem Solving*, discusses a theory that has a certain consistency in defining aspects of both music and music cognition:

> Many different kinds of experience and knowledge are linked through the schema, including conceptual information, discriminating features, planning mechanisms, and procedural skills. A well-informed schema will have all of these.[13]

Marshall attempts to explain the role of the schema in the conceptual process. Conceptual processes, planning mechanisms and procedural skills are evident in music, in terms of its composition, performance and interpretation. Within this chapter, these and other cognitive elements will attempt to explain how we process musical information. Much like a graphical score, schemas can have both a fixed and variable content. Previous knowledge about graphic notation can influence schematic perception (in that schemas can change with situations). Essentially, schemas act as a storage strategy, a network of connectivity between past and new experiences. The factors discussed here are of great importance in terms of mental processing and representation of graphic notation, and indeed all music. Traditional notation triggers a complex of responses (in that some signs (musical notes) trigger actions that are learned).

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[13] Sandra P Marshall, *Schemas in Problem Solving* (Cambridge: Cambridge University Press, 1995), *vii.*

In graphic notation, these actions are different for every individual (due to subtlety of interpretation). Fig. 5 attempts to illustrate this process:

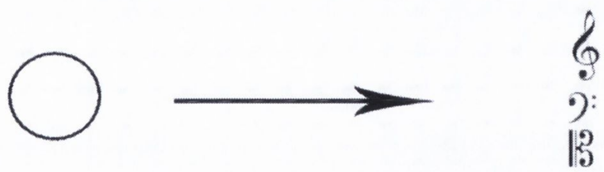

Fig. 5 Examples of pictorial symbolism and musical symbolism (chance in regard to graphic notation and exactitude and predictability in regard to traditional notation).

Much like a road sign that points us in the right direction, graphic symbols rely on habitual stimulus-response patterns (Fig. 6):

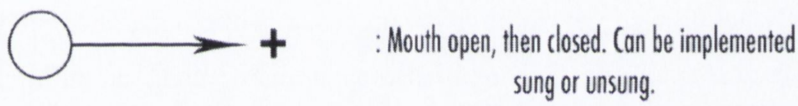

Fig. 6 Example of graphical symbols used in *Approximate Motion.*

All forms of notation contain the following to varying degrees:

I. Exactitude and predictability.

II. Chance.

The interaction between composer and performer alters through the use of graphic notation. All musical information is thus *processed* in a different manner. The two graphic scores presented here, by Mauricio Kagel and John Cage, illustrate, firstly, exactitude and predictability and, secondly, chance.

In *Sonant* (1960 – Fig. 7), three ranges (denoted by Roman numerals) are prescribed for the guitar, harp and double bass; each player of these instruments plays the percussion (skin instruments) notated under his/her part on three lines. In the space marked B.C. above each stave, actions "with closed mouths" are notated. This piece established the concept of 'instrumental theatre' central to many of Kagel's later works. Instrumental theatre explicitly acknowledges the physical presence of the performers and requires them to present dramatic meaning rather than 'absolute music' (music as an art form separated from formalism). Thus players make verbal comments and mime their own playing and that of others, or create sounds in dramatic contexts, highlighting various aspects of difficulty, mockery or confusion. Although it is possible to trace broad influences from European and American avant-garde ideas current in the 1950s, few of Kagel's works are developed from any clear source other than his own imagination.

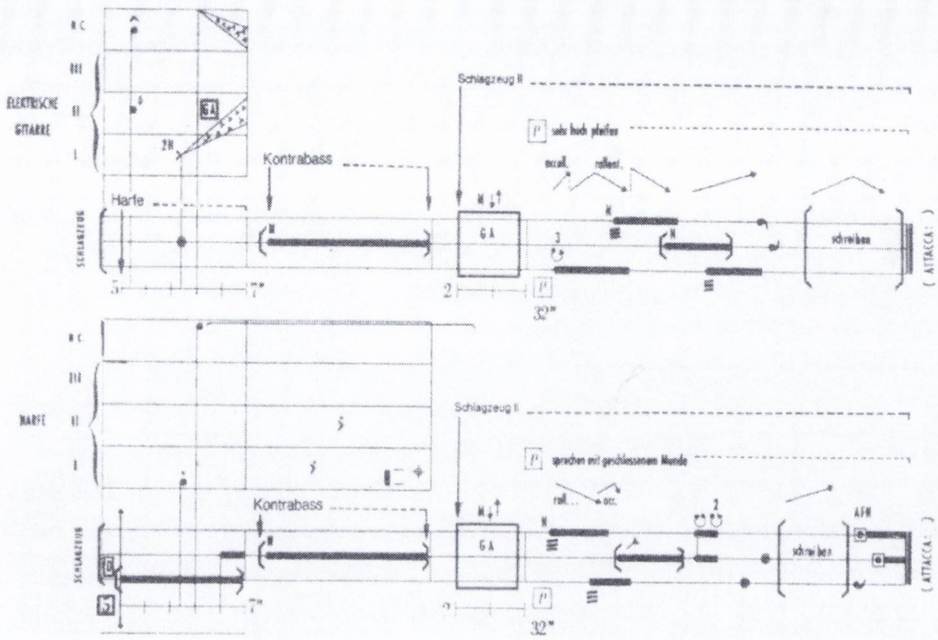

Fig. 7 Excerpt from Mauricio Kagel's *Sonant.* [14]

In John Cage's *Cartridge Music* (1960 – Fig. 8) all kinds of small objects are inserted into cartridges (of old phonographic pick-ups), such as pipe cleaners, matches, feathers and wires. All sounds are then amplified and controlled by the performer(s). The number of performers should be at least that of the cartridges and not greater than twice the number of cartridges.

[14] Mauricio Kagel, *Sonant,* Erhard Karkoschka (ed.) *Notation in New Music - A critical guide to interpretation and realization* (London: Universal Edition, 1972), 107.

Each performer makes his part from the materials provided: 20 numbered sheets with irregular shapes (the number of shapes corresponding to the number of the sheet) and 4 transparencies, one with points, one with circles, another with a circle marked like a stopwatch and the last with a dotted curving line, with a circle at one end. These transparencies are then superimposed on one of the 20 sheets, in order to create a constellation from where one can create one's part. In this piece, Cage attains indeterminacy, for both the order of the actions and the single actions are to a great extent left to chance, to spontaneous decision.

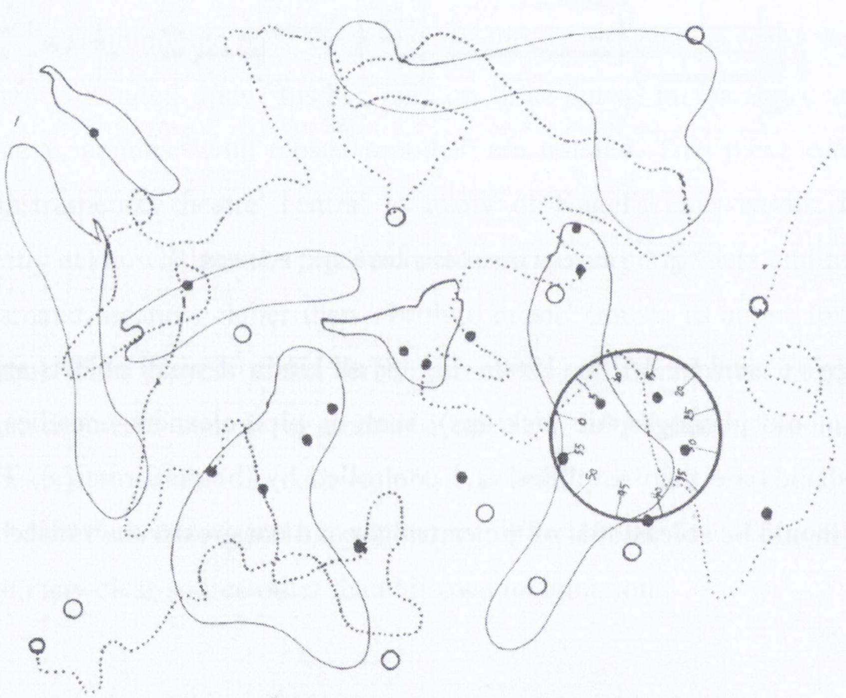

Fig. 8 Excerpt from John Cage's *Cartridge Music.* [15]

[15] John Cage, *Cartridge Music,* William Fetterman, *John Cage's Theatre Pieces* (London: Routledge, 1996), 62.

The goal, ultimately, of graphical notation is to coax the composer and performer alike into different ways of translating and processing musical information, to awaken the aesthetic imagination, and to develop new schematic processes. It seeks to free the interpreter from inhibitions, to lead the interpreter to discover occurrences in sound that would not have previously existed. The factors associated with these freedoms are examined in Chapter 7, which considers my transition from graphic to traditional notation.

2.3 Graphic Notation – Performance Considerations

In moments when the performer becomes composer, this, as composer Lukas Foss once recognized, is where progression takes place in music:

> The history of music is a series of violations, untenable positions, each opening doors. Progress in the arts: a series of gifted mistakes perhaps. We owe our greatest musical achievements to an unmusical idea: the division of what is an indivisible whole, "music", into two separate processes: composition (the making of music) and performance (the making of music).[16]

The interactivity between Feldman, Brown, Cage and Wolff and the Abstract painters in New York City during the late 1950s, acted as a springboard for development of their scores. The new ideas the NYS had developed in music required new systems of notation. Graphic notation helped Feldman and Brown to free themselves from the constraints of traditional notation. The score became the canvas upon which Feldman and Brown *projected* their ideas.

[16] Benjamin Bortez and Edward T.Cone (ed.) *Perspectives on Notation and Performance* (New York: W.W Norton and Company, 1976), 32.

Both composers sought to release music from intention, to allow it to be free, to become unfixed. On this idea, Feldman once noted that:

> Each of us in his own way contributed to a concept of music in which various elements (rhythm, pitch, dynamics) were de-controlled. Because this music was not 'fixed', it could not be notated in the old way. Each new thought, each new idea within this thought, suggested its own notation.[17]

Both Feldman and Brown attempted to 'unfix' music's traditional parameters. In Feldman's early music the performer's freedom and control operated together. Brown, on the other hand, saw the use of graphical notation as a device in which the performer is completely free. This is more than evident in his piece *December 1952*, in which improvisation plays a major role. In Brown's later works like *Music for Cello and Piano* (1961 – Fig. 9), natural deviations from precise indications became an integral part of the piece and essential to the nature of the work itself. For Brown, graphic notation was a chance to explore spatial relationships through improvisation. Brown, like Feldman, was striving to find ways in which his control over the material could be balanced against a new freedom through improvisation on the performer's part. For Brown, this relates somewhat to his background in jazz (where during World War II, Brown played) in military bands in Louisiana and Texas, playing alongside legendary jazz musicians including Zoot Sims.

[17] Steve Johnson, *The New York Schools of Music and Visual Arts* (New York: Routledge Press, 2002), 25.

Fig. 9 Earle Brown's *Music for Cello and Piano.* [18]

[18] Earle Brown, *Music for Cello and Piano*, Associated Music Publishers Inc. (New York: 1961).

One of the unique characteristics of improvisation in music is that it can transform a performance into something much different than expected. Whether through the performance of an individual or of a group, and regardless of the material, music can be elevated by an unexpected development produced through improvisation. Such issues concerning both improvisation and interpretation are examined in Chapter 3.

When notating using graphic notation, the representation of *time* is an important component in terms of the varying degrees of improvisation and interpretation. In Brown's 'time notation', pitch and dynamics are specified. For Feldman, pitch was mostly specified; rhythmic and durational elements were left to the performers. This results in a heightened spontaneity, which only performance, through improvisation and interpretation, can display. In performance, due to the fact that so much control and liberty is given to the performer, the performer controls the piece. In terms of the performer's execution and interpretation of a graphical notation score, a number of issues must be considered.

These issues include:

I. **Background of Performer:** This is dependent upon the performer's knowledge of the music being performed and to the musical range a performer can call upon.

II. **Communication**: The performer must be willing to adapt and study the score in order to realize its performance directions. The appropriateness of a notational system has nothing to do with the completeness, incompleteness, or amount of detail shown. Often, it can only be determined in terms of the performer's ability to *interpret* it.

III. **Preferred Style**: Traditional performance training is largely based upon the physical and hierarchical separation of playing and creating. The performance of graphically notated scores sees these two worlds collide. Performers who are involved in contemporary and improvised music are generally outstanding in the interpretation of graphic notation.

Graphic notation sought to extend the traditional vocabulary of music in terms of its presentation and performance, to allow music to explore beyond conventional time-pitch relationships. Throughout the 20th Century, the composer and performer alike have developed extended techniques to further expand these relationships.

In a way, the contemporary use of extended techniques is much like the *ghost* of the graphic score; in that these techniques allow the composer and performer to extend the use of timbre and rhythm.

Much of our comprehension of the music of the present depends on our knowledge of the past. Graphic notation attempted to distance itself from the musical past, expanding the role of both the composer and performer. Both composer and performer alike could now use their imagination to explore new and variable 'space-time relationships' in music. These new relationships were born out of a convergence of imagination and reality. Composer Roman Haubenstock-Ramati, an early proponent of graphic notation, wrote on this very notion:

> Each new composition brings, therefore, new notational problems from the material as well as from the form. Each new composition produces another new struggle between the idea born in the imagination and the material dependent upon the realities of the system and upon technique.[19]

[19] Benjamin Bortez and Edward T. Cone (ed.) *Perspectives on Notation and Performance* (New York: W.W Norton and Company, 1976), 101.

2.4 Conclusion

The notions of 'open' or 'interpretive' strategies in the arts are not unique to music. There have been parallel developments in literature, film, the fine arts and architecture. Philosophers Gilles Deleuze and Umberto Eco have suggested that open art forms express something "characteristic of contemporary popular culture in general".[20] Eco saw that these works open up a much vaster phase in culture:

> The poetics of the "work in movement" sets in motion a new cycle of relations between the artist and the audience, a new mechanics of aesthetic perception, a different status for the artistic product in contemporary society. It opens up a new page in sociology and in pedagogy, as well as a new chapter in the history of art. It poses new practical problems by organizing new communicative situations. In short, it installs a new relationship between the contemplation and the utilization of a work of art. [21]

Contemporary society consists of the cultural elements that prevail in any given society. These cultural facets result from the daily interactions, needs and desires and cultural 'moments' of the time. Graphic notation was born out of changing notions within contemporary society, within the arts, within music. This form of notation developed within a small group of people that had a strong interest in an area of which the mainstream popular culture had only partial awareness.

[20] Christopher Cox and Daniel Warner (ed.) *Audio Culture – Readings in Modern Music* (Continuum: New York, 2004), 174.
[21] *Ibid.* , 174.

Graphic notation embodied the quest for artistic freedom and expression in music. The graphical notation developed by the NYS, by Earle Brown and Morton Feldman, originated from their desire to liberate individual sounds from compositional rhetoric, from their experience with new American painters and from the transforming world that surrounded them. Soon these practices were shipped to Europe. On this aesthetic migration, Feldman wrote:

> I find Earle (Brown) was a kind of bridge between Europe and America. And I think that as a tangible influence, Brown, by his notation and by his plastic forms, has influenced Europe more that the rest of us. In an obvious way, I feel that (Luciano) Berio in the notation of, say, *Circles* (1960), comes out of Brown. The loops of (Witold) Lutosławski are out of Brown. I think he has been ripped off more than any of us, in an overt way.[22]

Karlheinz Stockhausen's *Momente* (1961 – Fig. 10) is somewhat related to Brown's piece *Available Forms,* also of the same year. In *Momente*, rhythm, pitch, and dynamics were being either decontrolled or highly regulated through notation experiments. *Momente* was composed in "moments" which are defined by:

I. K ("Klang" - timbre, verticality, regularity, homophony, Percussion, male voices, noises).
II. M ("Melody" - horizontality, monophony, heterophony, randomness, pitches and noises equally mixed, trumpets and trombones, soprano solo).
III. D ("Durations" - polyphony, pitches, electric organ, and female voices).

[22] Steve Johnson, *The New York Schools of Music and Visual Arts* (New York: Routledge Press, 2002), 49.

The conductor, rendering each performance of the piece unique but still highly structured, arranges these moments. In this piece, Stockhausen also employed statistical elements used for instrumental notes. This enabled the composer to achieve great rhythmic variety without the notation of beats, therefore making it impossible to reproduce the same performance every time.

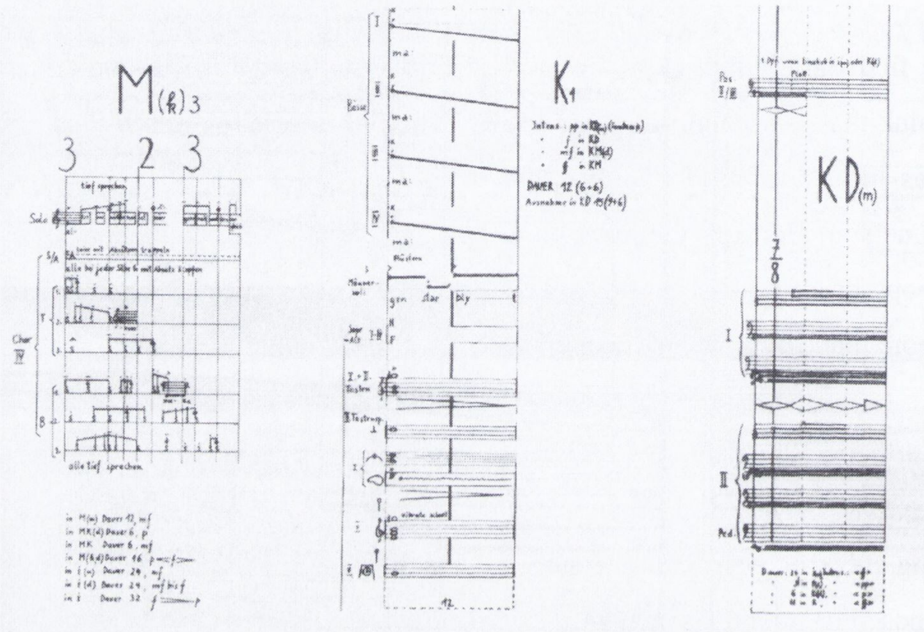

Fig. 10 Extract from Karlheinz Stockhausen's *Momente.* [23]

In *Available Forms 1* (1961 - Fig. 11) each of the score's six unbound pages specifies four or five events. The conductor, who has general control over dynamics and velocity, begins with any event on any page and creates from the available materials an individually shaped version of the work.

[23] Karlheinz Stockhausen, *Momente*, Erhard Karkoschka (ed.) *Notation in New Music - A critical guide to interpretation and realization* (London: Universal Edition, 1972), 175.

Fig. 11 Earle Brown's *Available Forms 1.* [24]

[24] Earle Brown, *Available Forms 1*, Associated Music Publishers Inc. / G.Schirmer (New York: 1961).

For a time, the graphical score wiped the slate clean; it declared independence from all other forms of musical composition. It highlighted and questioned the *process* of writing music. The graphical score's most important contribution to music is that it brought about new processes and attitudes towards the performance of music. Ultimately, this moved towards a reappraisal of music itself and its meaning to composer, performer and audience. These 'new attitudes' saw composers use the tools of their trade more freely and imaginatively, according to the needs of the moment. In *Sounds and Signs – Aspects of Musical Notation*, Hugo Cole discusses this notion further:

> We relate notations to the situations and circumstances in which they operate, they can be seen to act as barometers which register changes and fluctuations in the musical climate, reflecting on the divisions and uncertainties of an age, the preoccupations, prejudices, and inter-relationships of their users. Every age, you could say, gets the notation it deserves.[25]

The New York School and other composers and performers who developed and performed graphically notated scores, reconsidered and reconfigured the presentation of music. The graphical score documented, historically, such experiments, reforms and developments in musical thought.

[25] Hugo Cole, *Sights and Sounds – Aspects of Musical Notation* (London: Oxford University Press, 1974), 2.

Chapter 3

The Performer

3.1 Overview

Notation is just one of the vehicles that communicate musical thought. Notation can only approximate the composer's intentions as to how the musical meaning is to be interpreted. The performer is therefore another essential part of this process. Firstly, we must examine the function of notation. According to F. Joseph Smith in *Understanding the Musical Experience*, musical notation should not be interpreted as the language system of music:

> The function of musical notation is different. A written word refers to a certain spoken sound. Such referring may suggest an identification of the written word with musical notation, which is also a set of instructions for producing a certain sound. The written word in a language system refers primarily to the concept being conveyed by the spoken word. Musical notation has no such possibility since the meaning of a musical process cannot be related to a conceptual scheme.[26]

Smith highlights notation as a two-way system. It is up to the performer to interpret the score and decide upon both the most effective performance aesthetic and communicative process. Notation is a selective process, a *subjective* realization of sound. This chapter examines the relationship between notation, interpretation, improvisation and the performer. This section highlights aspects that influence performers within these categories and factors associated with musical performance. These considerations are examined with comments from two performer-based perspectives: improvisers and non-improvisers.

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[26] F. Joseph Smith, *Understanding the Musical Experience* (London: Routledge, 1989), 82.

By examining these areas we can further undercover the role of notation and the performer's role. The communication and control of a musical experience can depend on these very elements. Through this examination we shall discover that there are some dimensions of musical meaning that cannot be captured in a notational artifact.

3.2 The Performer and Notation

In *Musical Works and Performances*, Steven Davis specifies notation as "the instructions transmitted via a score that must be sufficient to characterize a work of the kind in question".[27] 'Transmission' and the meanings associated with this process are important considerations for both the performer and composer. Musical notation helps generate an instance of the piece it specifies. As such, no single form of representation (notation in our instance) can reveal all that can be experienced or be approached in the same way. Renowned guitarist and improviser Derek Bailey once commented that the performer could assume either position in relation to notation:

> a) The performer sees the advantages and validity in a collaboration between composer and performer, or
> b) The performer considers it disadvantageous and limiting for the improviser. [28]

Notation can present a communal sense of exploration, acting as a device in which both composer and performer can achieve personal and professional advancement. It can act as an extension of both compositional and performance approaches. Saxophonist and improviser Evan Parker saw the composer as a hierarchic and authoritative figure and saw that notation embodied much more than the 'composer's intentions':

> Leaving aside the score as the embodiment of an ideal performance, a score can also be considered a recipe for possible music making. That's an idea I can have much more sympathy with, taking into account as it does much more than the composer and his muse. [29]

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[27] Steven Davis, *Musical Works and Performances – A Philosophical Exploration,* (Oxford: Clarendon Press, 2001), 101.
[28] Derek Bailey, *Improvisation: Its Nature and Practice in Music* (British Library: London, 1992), 79.
[29] *Ibid.* , 81.

Throughout the history of music, as notation became more complex, so did the relationship between the performer and the composer. By increasing notational detail, the composer can become further distanced from the presentation of their works. Perhaps the presentation of music questions the 'authenticity' of the work itself. Considerations like these highlight how notation serves both compositional and performance processes. In *A Humanistic Philosophy of Music*, Edward A. Lippman observed that:

> Musical notation not only provide the permanence and textual authenticity that artistic composition deserves, but it changes the process of composition itself so as to foster the very properties of unified diversity and qualitative interest that it permits us to preserve.[30]

Steven Davis in *Musical Works and Performances* highlights one way in which the performer approaches notation, commenting, "the score is read in terms of the performance practices it assumes".[31] The conventions of traditional notation determine for the performer 'known' conditions. For this reason, the graphically notated scores (presented in this portfolio) have accompanying indices. Anything non-standard within these 'known' conditions must be indicated explicitly. These indices help clear up any ambiguities that the performer may have.

[30] Edward A. Lippman, *A Humanistic Philosophy of Music* (Hillsdale, NY: Pendragon Press, 2006), 178.

[31] Steven Davis, *Musical Works and Performances – A Philosophical Exploration,* (Oxford: Clarendon Press, 2001), 117.

In *Musical Communication*, a number of factors are considered in regard to the psychology of the performer in performance:

I. Individual Factors - Age, gender and personality.
II. Musical Factors - Levels of instrumental, interpretative and expressive skill.
III. Psychological Factors – Arousal and anxiety levels.[32]

Different musical genres and different societies can give rise to certain expectations, thus influencing the above factors. In *Improvisation: Its Nature and Practice*, Bailey comments on the performer's role in the performance of traditional notated music:

> In the straight world the performer approaches music on tiptoe. Music is precious and performance constitutes a threat to its existence. So, of course, he has to be careful. Also, the music doesn't belong to him. He's allowed to handle it but then only under the strictest supervision. Somebody, somewhere, has gone through a lot of trouble to create this thing, this composition, and the performers' primary responsibility is to preserve it from damage. At its highest, music is a divine ideal conceived by a super-mortal. In which case performance becomes a form of genuflection.[33]

For Bailey, traditional notation was a form of hierarchy. The composer and his script was god and the performer merely his servant. From this viewpoint, notation, for the performer, was essentially an extension of the composer's ego. Finally, for Bailey, traditional notation possessed a reverential attitude towards the creation of music, one that almost leaves the performer behind.

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[32] Dorothy Miell (ed.), Raymond MacDonald (ed.), David Hargreaves (ed.) *Musical Communication* (Oxford: Oxford University Press, 2005), 14.
[33] Bailey. , 67.

3.2.1 Interpretation

Generally, interpretation relates to concepts like 'meaning', 'intention', 'explanation', 'application', and 'truth'. In music, interpretation varies as much as it does in other process-based art forms (visual arts and literature). Philosopher Max Black commented on this activity, expressing that "interpretation suffers from process-result ambiguity"[34], according to which "interpretation in the process sense is not identical with interpretation in the result sense".[35] Hence musical interpretation questions not only musical license and the boundaries of a musical work but more specifically the areas relating to notation and the performer. Pierre Boulez, in *Music Today* discusses what he termed 'an active analytical method' with regard to interpretation in music:

> It must begin with the most minute and exact observation possible of the musical facts confronting us; it is then a question of finding a plan, a law of internal organization which takes account of these facts with the maximum coherence; finally comes the interpretation of the compositional laws deduced from this special application.[36]

This formula regarding interpretation and the composers' intention clearly places the performer in a subordinate and functionary role as far as the creative outcome of the music is concerned.

[34] Max Black quoted in *The Interpretation of Music: Philosophical Essays,* Michael Krausz (ed.), (Oxford: Oxford University Press, 1995), 10.
[35] *Ibid.* , 10.
[36] Pierre Boulez quoted in *Boulez On Music Today,* Susan Bradshaw and Richard Rodney (trans.), (Bennett Publishing: London, 1971), 18.

In *Musical Works and Performances – A Philosophical Exploration,* Stephen Davies highlights how interpretation goes beyond the piece itself:

> The score reveals what is instructed only when it is taken in conjunction with the social practices brought to its comprehension by musicians. [37]

Graphically notated music calls for extended interpretative freedom. In the same light, both graphically and traditionally notated music are dependent on performance practices. Davies, in *Musical Works and Performances,* expands further on this notion, clarifying the extent to which performance practices influence musical interpretation:

> The performer's choices do not affect the work's properties but do affect properties of the performance and, thereby, properties of the interpretation provided by that performance. In a sense, performance interpretation goes beyond the work. [38]

Drummer and percussionist improviser Edwin Prévost commented in an article entitled *Free Improvisation in Music and Capitalism: Resisting Authority and the Cults of Scientism and Celebrity,* that the musical experiments of the past still directly influence performers of today:

> I would contend that positions proposed by the serialists and the indeterminists (who emerged in a time where polemics were an anticipated part of any cultural proposal) regarding the relations of musicians to sound, musicians to fellow musicians and musicians to the wider cultural landscape remain essentially intact and in position.[39]

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[37] Stephen Davies, *Musical Works and Performances* (Clarendon Press: London, 2001), 112.

[38] *Ibid.* , 111.

[39] Edwin Prévost quoted in *Free Improvisation in Music and Capitalism: Resisting Authority and the Cults of Scientism and Celebrity,* James Saunders (ed.), *The Ashgate Research Companion to Experimental Music* (London: Ashgate Publishing, 2009), 138.

Prévost goes on to discuss on one hand the unlimited freedom in Cage's music and the 'scientific democracy' of serial music. He highlighted that for the performer, indeterministic techniques were something of a paradox with regard to questions of authority:

> Cage and company initially seemed to offer something of a liberating respite. However, the deception of randomization, the real message behind the new procedures of making music was not freedom but its opposite: authority. [40]

Many improvisers will be quite adamantly against the authority of the composer. Forms of authority exist in many types of music, including the traditionally notated pieces presented in this portfolio.

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[40] *Ibid.* , 139.

3.2.2 Improvisation

In *No Sound is Innocent*, Prévost distinguishes the differences between the preparation and performance of traditionally notated music against improvised music. He suggests:

a) That in a so-called normal piece of formal music, most of the technical problems of preparing for a performance are solved and refined before the presentation.
b) That the relationships between the musicians are mediated through the manuscript that normally represents the score. [41]

Prévost continues, discussing factors relating to improvised music and its relationship with musicians:

a) That improvising musicians are searching for sounds and their context within the moments of performance.
b) That the relationships between the musicians are directly dialogical: their music is not mediated through any external mechanism such as a score.[42]

Prévost highlights improvisation as a social engagement, a process of self-invention. He saw that it acted as an arena in which "enquiring musicians find and develop a unique voice to represent their individuality and their general aspirations".[43]

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[41] Edwin Prévost, *No Sound Is Innocent* (Essex: Matching Tye, 1995), 171 - 2.

[42] *Ibid.* , 171 - 2.

[43] Edwin Prévost quoted in *Free Improvisation in Music and Capitalism: Resisting Authority and the Cults of Scientism and Celebrity,* James Saunders (ed.), *The Ashgate Research Companion to Experimental Music* (London: Ashgate Publishing, 2009), 135.

Composer and improviser Cornelius Cardew, in *'Towards an Ethic of Improvisation'* from his *Treatise Handbook,* discusses such an idea. He discusses improvisation in terms of European philosophy and indeterminate notation. Cardew, who had been an assistant to Karlheinz Stockhausen in the early 1960s, had become increasingly uneasy with the rigidities of composing music. As both composer and improviser, Cardew's writings on the matter are full of insight and pertinence. Cardew was attracted to "people processes". [44] He wrote:

> We are searching for sounds and for the responses that attach to them, rather than thinking them up, preparing them and producing them. The search is conducted in the medium of sound and the musician himself is at the heart of the experiment.[45]

His own objections to the musical situations he encountered were later to take a purely political tone, issuing provocative assertions such as "Stockhausen serves imperialism".[46] Cardew attempted to magnify the performer's integrity and role in music and its performance. He wished for the performer's direct and immediate involvement, viewing it as an escape from the rigidity and formalism of musical background. The performer's musical background, or lack of it, is an important factor when discussing improvised music, and indeed when discussing elements associated with graphic notation.

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[44] Michael Nyman, *Experimental Music: Cage and Beyond*, 2nd edn. (London: Routledge, 1999), 6.

[45] Cornelius Cardew quoted in Derek Bailey, *Improvisation: Its Nature and Practice in Music* (British Library: London, 1992), 130.

[46] Cornelius Cardew, *Stockhausen Serves Imperialism, and other articles: with commentary and notes* (Berkeley CA: New Latimer Press, 1974), 54.

Improviser Derek Bailey in *Improvisation: Its Nature and Practice in Music,* discusses improvisation and the possibilities it offers to the performer:

> There are those for whom it is an activity requiring no instrumental skill, no musical ability and no musical knowledge or experience of any kind, and others who believe that it can only be reached by employing a highly sophisticated, personal technique of virtuosic dimensions. Some are attracted to it by its possibilities for musical togetherness, others by its possibilities for individual expression. [47]

Improvised music is determined primarily by the moment-to-moment decisions and interactions of the players. For some, like Cardew and Parker, environmental factors played a role in the performance of music. Identity, time, place and emotional factors are some of the conditions that improvised music can encompass.

We must now look at the issues confronting trained musicians and their experience with improvisation. In the same publication, Bailey interviews Anthony Pay, who was at the time a clarinetist with the London Sinfonietta. In their discussion, Pay comments on the idea of 'liberation' from traditional notation:

> Technically there are a tremendous number of things from which you are immediately liberated. The difference is, as far as I am concerned, that one (improvisation) is unknown poetry in which I can progress. In playing written, precisely notated music I'm not actually progressing. I'm just leaning to do better what I already do. [48]

[47] Derek Bailey, *Improvisation: its Nature and Practice in Music* (British Library: London, 1992), 85.
[48] *Ibid.* , 69.

Pay's comments highlight some interesting factors concerning the ways in which performers approach music. The explorations of new sounds and textures are some of the key elements in improvised music and indeed graphic notation. Essentially, interpretation is in the hand of the performer in the form of 'responses'. The graphically notated pieces presented in this portfolio examine such processes.

3.3 Conclusion

The issues discussed by Prévost, Cardew and Bailey highlight the performer's extended role in musical performance. In music that contains improvisational elements, the performer becomes the creator and can contribute a wide range of inputs. In traditional notation, the role of creator is more strongly identified with the composer. Within this portfolio, the creative role of the performer is evident in both forms of notation. Both forms of notation allow for direct and personal contributions on the performer's behalf. The degrees to which these elements can be extended are dependent upon not only the performer, but also the notation used. Musical notation is not universal in terms of its communication and transmission of musical meaning.

This chapter examined the performer’s role in notation, interpretation and improvisation. By removing some degree of control exercised by the composer, the performer can develop further interpretative and improvisational skills. By examining such areas, I attempt to highlight the performer's role in relation to the function of graphic notation and to the function I intended it to serve in my own music.

Chapter Four

Commentary on *Modular Motion* – for Viola, Cello, Vibraphone and Electronics.

(Score – Appendix I / Realization - Appendix CD 1).

4.1 Background

> What interests me is to find the degree of conditioning (of conception, of notation, of realization) which will balance the work between the points of control and non-control. There is no final solution to this paradox, which is why art is.[49]

The above quotation comes from the composer Earle Brown. Brown's works contained two defining characteristics: spontaneity and open-form mobility. Brown often used the word 'projection' when referring to the presence of sound in time and space. The word 'projection' also referred to the performer constructing their immediate and physical interpretation of his scores. The immediate desire to deal with what sound *is*, rather than what the composer may *think* it is or decides he *wants* it to be, was one ideal held by Brown during the 1950s. The philosophical and aesthetic motivations were as personal and characteristic of each composer as their music was. Morton Feldman wrote: "It was only by unfixing the elements traditionally used to construct a piece of music that sounds could exist as unique entities - not as symbols, or memories of other music to begin with".[50]

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[49] Interview with Earle Brown, Michael Nyman, *Experimental Music - Cage and Beyond* (Cambridge: Cambridge University Press, 1999), 56.
[50] B.H Friedman (ed.) *Give My Regards to Eight Street - Collected Writings of Morton Feldman* (Cambridge: Exact Change, 2000), 10.

Modular Motion (MM) integrates and displays the notions discussed by both Feldman and Brown. In this piece, I aimed to find a way to constitute geometric rather than symbolic representations of pitch, rhythm and timbre. The changing relations of form in space were of major importance in MM's score structure.

In *The Interpretation of Music*, British musicologist and conductor Thurston Dart discusses the rules of any well-devised set of symbols in that "each symbol should have only one meaning".[51] Both forms of notation use symbols that serve as a trigger for musical action. The difference between what Dart discusses as a 'well-devised set of symbols' and the symbols I developed for MM is that a whole new set of symbols were developed specifically for MM.

[51] Thurston Dart, *The Interpretation of Music* (London: Harper Collins, 1954), 14.

4.2 Score Development

In MM, each 'Module' is a self-contained unit, section, or component with a specific function. These units represent abstract forms and constitute geometric rather than symbolic representations of duration and pitch. The frequency range in the piece is relative to that of each instrument performing. The piece is scored as 'open-form'– in that graphical symbols act as a catalyst for the performers to freely interpret the piece. I believe that the benefit of using such a system is that the performer may expand, contract, or remain on a section until a cue is heard (within the electronics section), or move through the piece at a constant rate relative to the tape section. In the event that a performer has not yet moved on to another module or is in the middle of a module when the aural cue is heard, the module may be continued into the next section and then terminated. The development and construction of the modules and their contents are documented in Fig. 12-17.

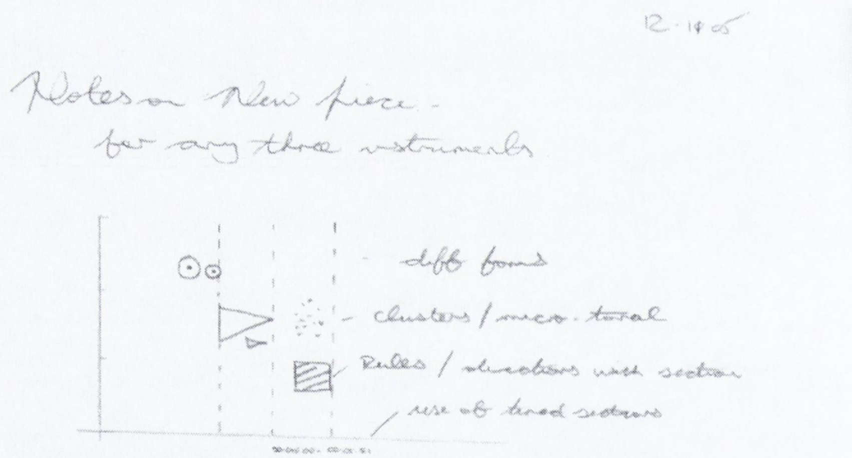

Fig. 12 Early sketches on the development of *Modular Motion* (I).

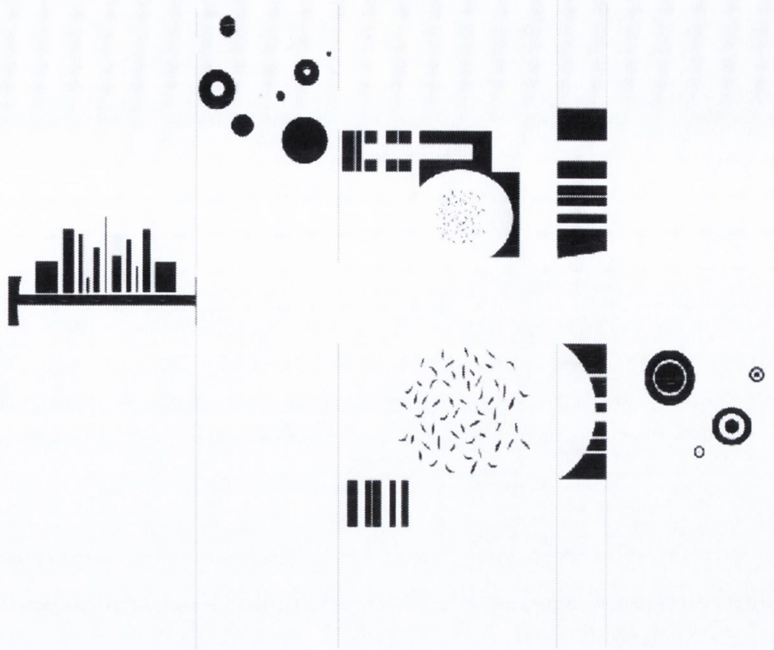

Fig. 13 Early sketches on the development of *Modular Motion* (II).

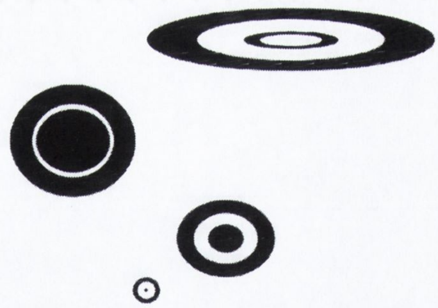

Fig. 14 *Loops:* The broadness of the circles determines duration. The dots in the center indicate dynamic level.

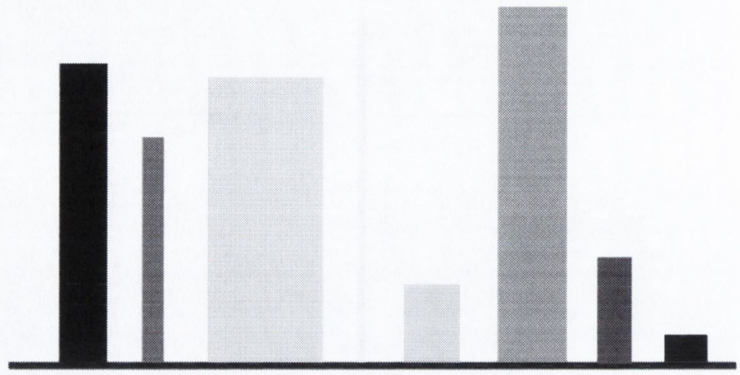

Fig. 15 These solids represent sustained tones. The relative level of shading represents the dynamic range within the module - dark is loudest - while the thickness embodies timbre and length signifies duration.

Fig. 16 A random collection of notes, dictated by the performer. The performer can also use the curve and thickness as dynamic indications.

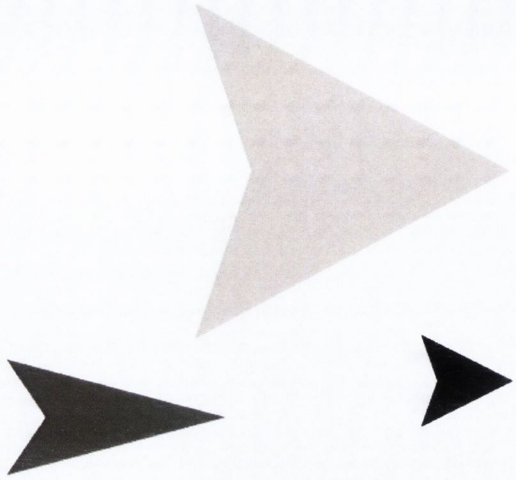

Fig. 17 Attacks may be interpreted as different spaces or relative to the module in question. Again the shading represents dynamic range while length indicates duration.

A number of questions arose while I was constructing the score. They address issues that may arise for performers, and I will answer them as part of the analysis of the piece.

1. What do the modules represent?

In MM, a 'Module' is a self-contained unit. They represent sections within the score where geometric shapes constitute musical occurrences. There are four modules in all, each with a time-span of two minutes. Fig. 18 shows the first module of the score:

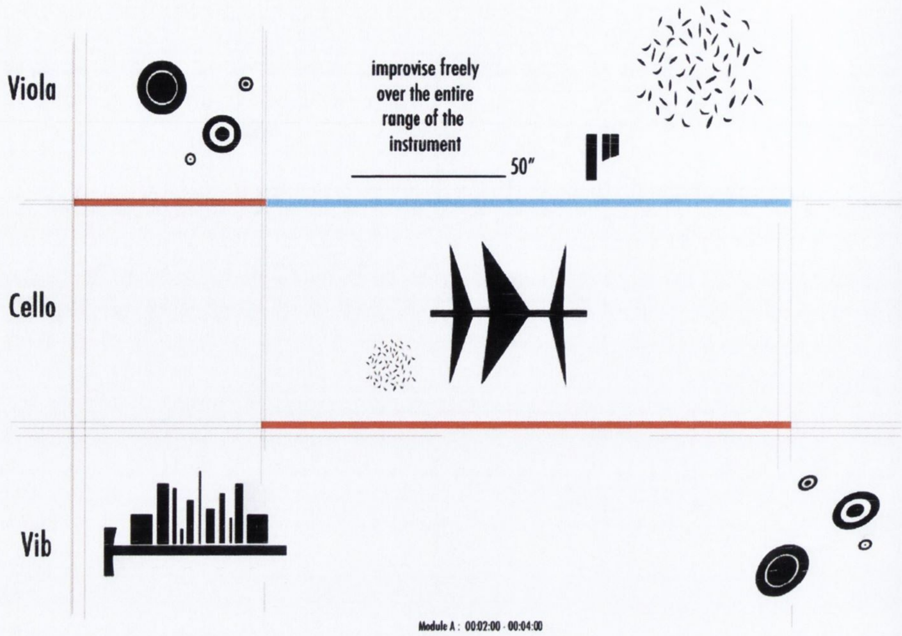

Fig. 18 First module of *Modular Motion*.

2. *How do the shapes relate to the time given in each module?*

The duration of each shape is unregulated but must be executed within the module duration of two minutes. In the prefatory note within his *Folio* collection of 1952, Earle Brown wrote: "Time is the actual dimension in which music exists when performed and is by nature an infinitely divisible continuum".[52] Sound may begin or end anywhere along this dimension – as in Brown's *25 Pages* (Fig. 19). MM implements a form of '*time-space notation'*. These relationships are illustrated in Fig. 20.

[52] Earle Brown, *Folio* from the accompanying score notes (New York: Associated Music Publishers Inc, 1961).

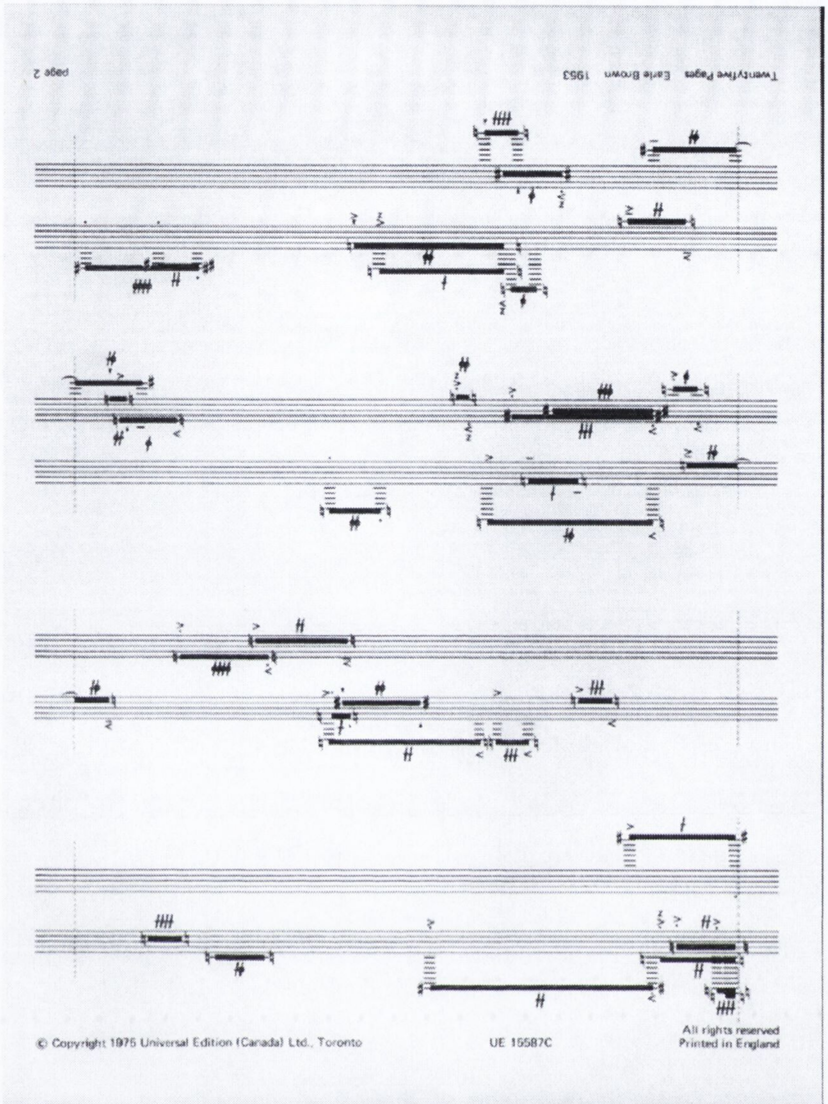

Fig. 19 Earle Brown's *25 Pages.* [53]

53 Earle Brown, *25 Pages*, Universal Edition (Toronto: Universal Edition, 1975).

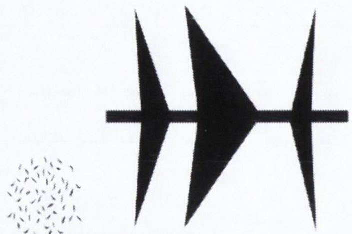

Fig. 20 Illustrating visual-temporal relationships in MM. This form of 'time-space notation' used has greater freedom than that of Brown's version (in that the duration is decided by the performer).

3. What are the relationships between pitches?

In MM, each note is heard as a separate, isolated pitch whose intensity is completely governed by the performer – as in Feldman's *Projection 1*. Pitch has now become a secondary characteristic to that of instrumental timbre, reversing the traditional relationships between the two. By giving the performer free range in pitch relationships, the melodic continuity of MM becomes unfixed. (Fig. 21).

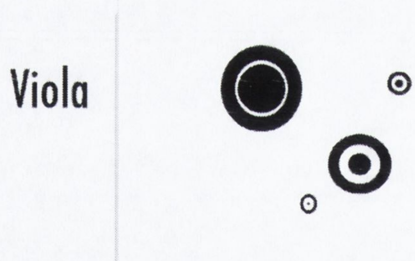

Fig. 21 Free range pitch relationships in MM.

4. *Should the relating musical elements be logical or arbitrary, consistent or inconsistent?*

Brown saw "form as a function of people acting directly in response to a described environment. It seems reasonable to consider the potential of the human mind as a collaborative creative parameter".[54] I designed MM with similar objectives in mind, to encourage the performers to engage in real-time conceptual realization. All of the above depends on the level of the performer's interpretation and participation within the piece.

In Robert Moran's 1963 score for flute, harp and string quartet, *Four Visions* (Fig. 22), duration of the 'visions' is fixed: No. 2 lasts between 1' 15" and 1'35" and No. 3 lasts 1'. Each can be read from left to right. Moran realized that the different ways in which the symbols could be executed and the various coincidences of individual actions resulted in a more direct and spontaneous response to the piece.

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[54] *Ibid.* , *Folio.*

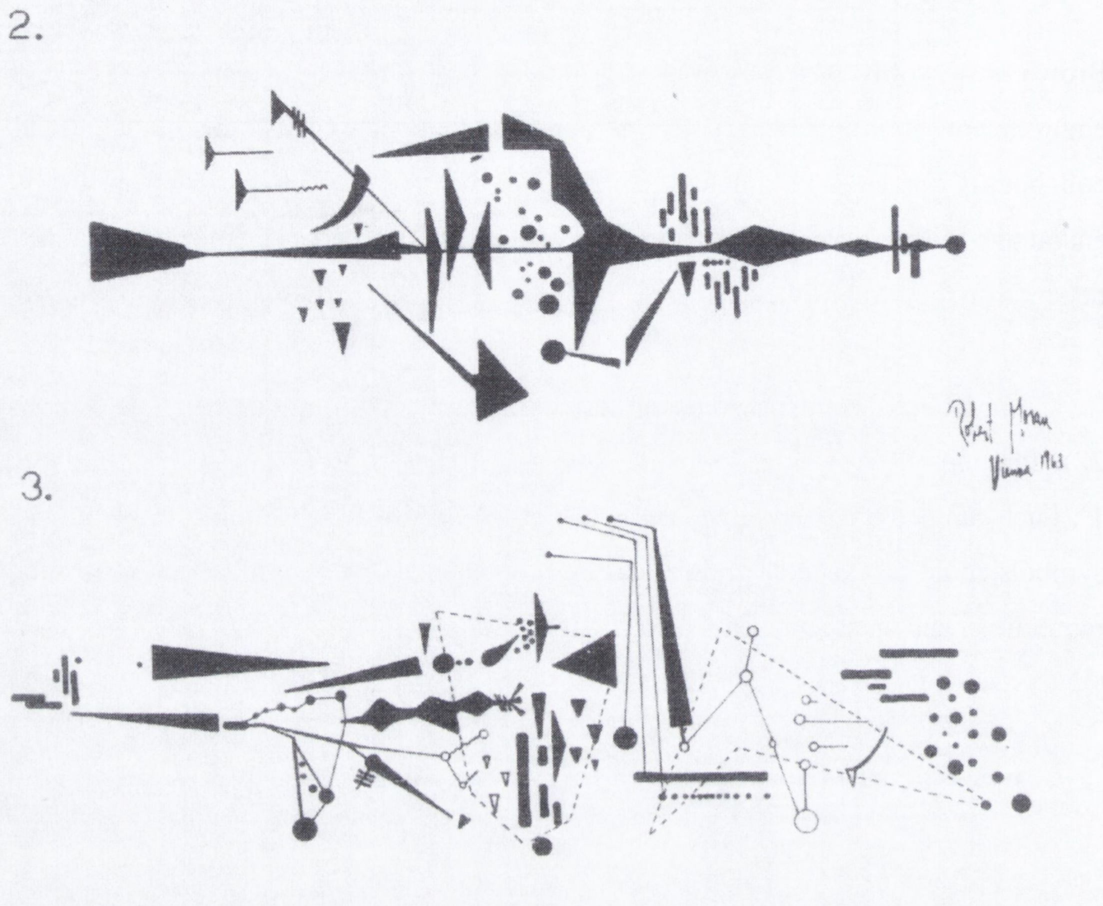

Fig. 22 Robert Moran's *Four Visions.* [55]

[55] Robert Moran, *Four Visions*, Erhard Karkoschka (ed.) *Notation in New Music - A Critical Guide to Interpretation and Realization* (London: Universal Edition, 1972), 68.

4.3 Conclusion

A number of aims were achieved in the development and construction of MM. Firstly, I made an attempt to condition the performer's sensibility and involvement when approaching and performing pieces of new music that involve the use of graphical scores. Secondly, MM allows the performer to contribute more directly to the completion of the piece. When implementing graphic notation, composers often find themselves developing new symbols, individualistic notation, which lead to the distribution of control between composer and performer.

Finally, this creative process has illustrated the processes involved in generating new systems of notation, ones in which the performer has a greater platform for musical expression.

Chapter 5

Commentary on *Approximate Motion* – For SATB and Electronics.

(Score - Appendix II)

5.1 Background

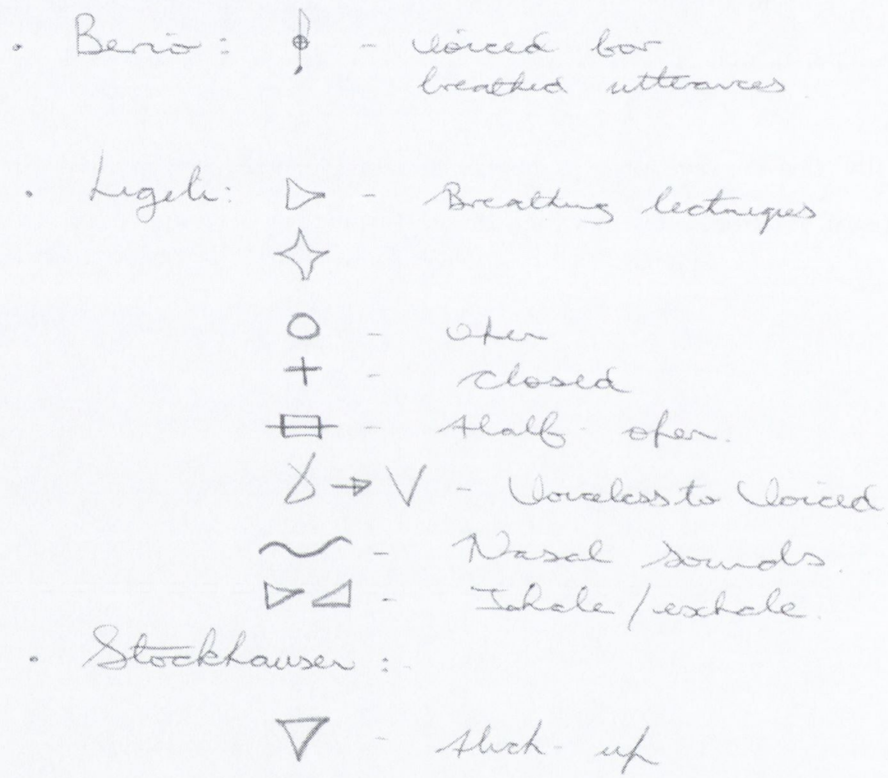

Fig. 23 Table of symbols from graphical pieces for voice.

Fig. 23 documents some of the ways in which some composer's developed alternative score directions during the 1960s. In Erhard Karkoschka's 1966 publication *Notation in New Music,* he states:

> The notation of New Music was to make possible the construction, preservation and communication of more complex kinds of music. The technical possibilities of a notation system also influence the act of composing – the entire musical way of thinking of all musicians – so that the aural image of a musical work in every epoch is characteristically related to its visual configuration.[56]

This new form of notation encompassed developments in all areas of music: pitch, tempo, meter, duration, intensity, articulation and, most importantly, organization. The *organization* of sounds within the score became of utmost importance to composers working with unconventional notation.

I composed AM as a work that gives the performer total control in the determination of tone color, vocal utterances and dramatics within the piece. An important factor to consider is that often the performer has no uniformity or consensus to rely on, no standardization to act as a basis.

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[56] Erhard Karkoschka, *Notation in New Music* (London: Universal Edition, 1966), 5.

5.2 Score Development

The following are some early sketches detailing the development of AM.

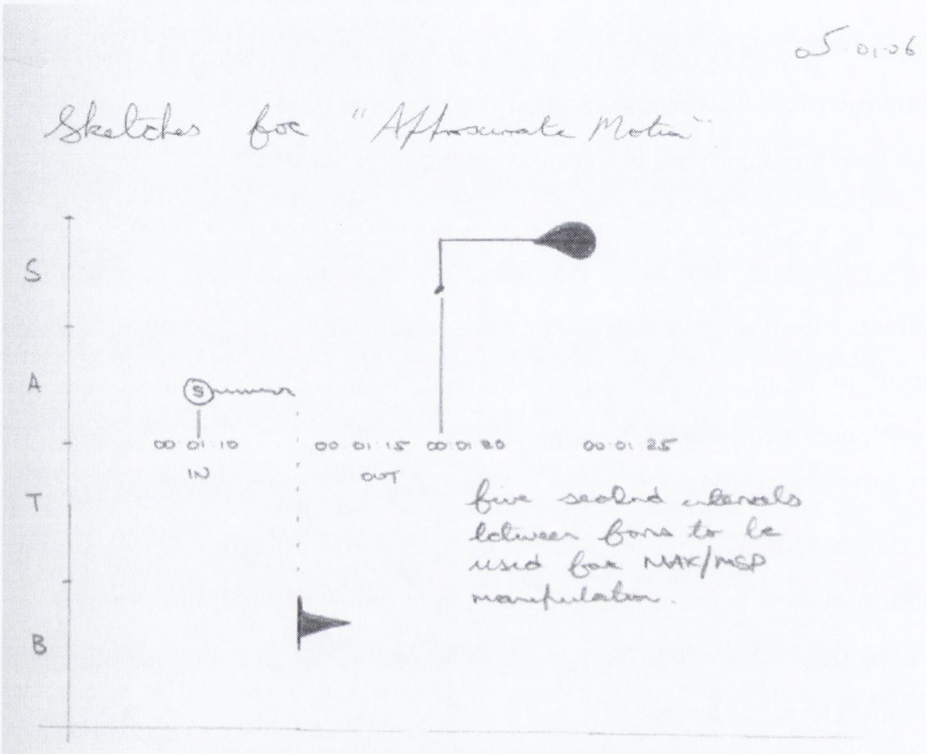

Fig. 24 Early sketches for *Approximate Motion (I)*.

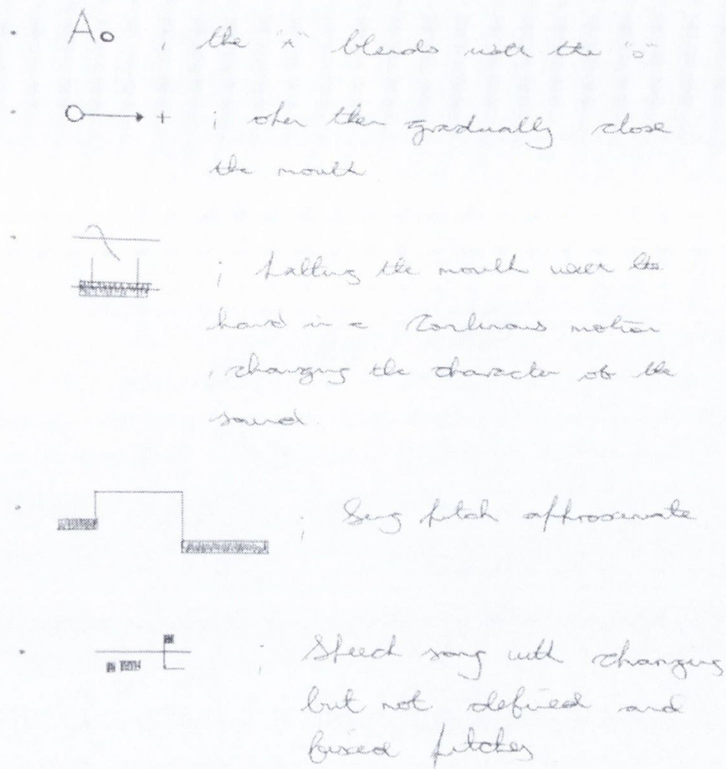

Fig. 25 Early sketches for *Approximate Motion* (II).

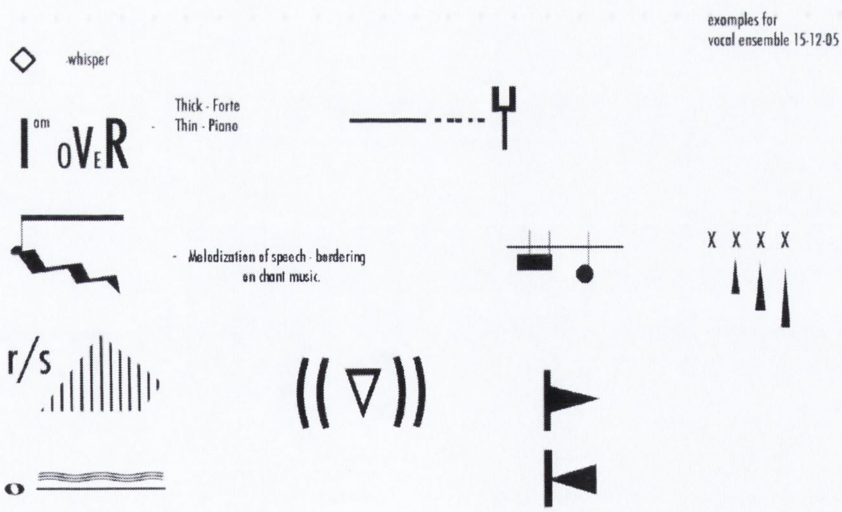

Fig. 26 Early sketches for *Approximate Motion* (III).

The notation used in AM combines some elements of traditional notation, such as the use of traditional note head values (Fig. 27), with elements of individuality.

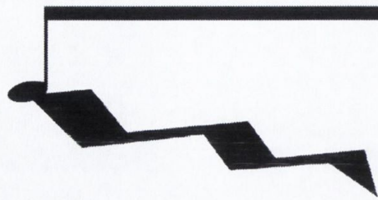

Fig. 27 Extract from AM (I) - Melodization of speech, bordering on chanting - voice wavering.

AM presents directions for the performer with the aid of two indices. The title of this piece indicates approximate values in relation to pitch (Fig. 28). The pitch registers are divided into high, middle and low registers. It is up to the performer to judge the 'approximate' placement of pitch.

Fig. 28 Extract from *AM* (II) – slow, wide vibrato.

In AM, letters are used in this score as elements of musical sound (Fig. 29).

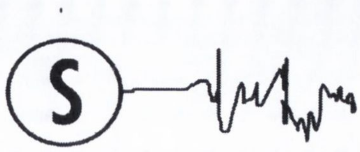

Fig. 29 Extract from *AM* (III) - A hissing sound with fluttering on the indicated letter.

Dynamics are unspecified, leaving the performer to decide them. A clock dictates rhythm and meter. Most figures are five seconds in duration, with gaps of silence from two to five seconds. The intention of this is to have the live electronics 'echo' the performers' realization. This manipulation should be subtle and reflect almost human vocal traits. Electronic manipulation processes vocal noise only (Fig. 30).

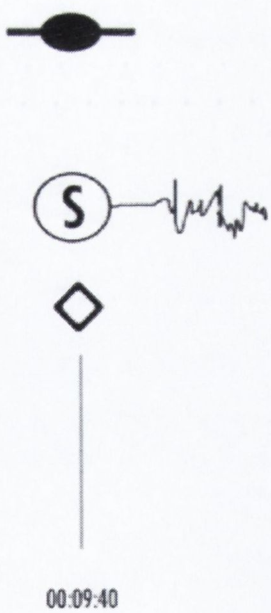

Fig. 30 Extract from AM (IV) - A hissing sound with fluttering on the indicated letter, that is whispered (symbol below). The markings above indicate directions for electronic manipulation.

5.3 Conclusion

No two singers produce the same interpretation, even from an exacting score. Each has unique qualities of timbre, resonance, placement, and strength within its vocal registers. Each is housed in a body and coordinated by an intellect and a range of emotional experience unique to that individual.

The title of the piece *Approximate Motion* emphasizes the approximate or inexact nature of the way in which the events are placed within the score. Each execution of AM will contain subtle performance variations and inaccuracies. In composing this piece I aimed to find a balance between the composer's notational liberation and the performer's extension of the human voice as a sound-producing instrument. It represents another step in the search for a more efficient notation and seeks to further extend the performer's role in the control and execution of the pieces presented for this portfolio.

Chapter Six

Commentary on *Framed Motion* – For String Quartet and Electronics.

(Score - Appendix III / Realization – Appendix CD 1).

6.1 Background

The concept 'Mobile' notation implies possibilities for chance, or regulated, selection of components of musical forms. Isolated fragments, which can be written either in traditional or in non-traditional notation, are selected and combined by the performer or conductor during the course of performance. Sometimes in mobile (or open) form notation some special conditions are stated, which direct the performers from one fragment to another. The benefit of mobile notation is that it produces a wealth of different interpretations. The poetics of the mobile score are that it sets into motion a cycle of relationships between the composer and performer. During the development of *Framed Motion* (FM), I studied a number of mobile scores and scores using sequences or patterns. I examined Feldman's *Marginal Intersection* (1962 – Fig. 31) for its use of grids, which contained directions for the performer, concerning pitches in this case. As Feldman's music grew more complex, so did his notation. One thing that he was highly interested in was the organization of duration, much like the physical dimensions of the painter's canvas.

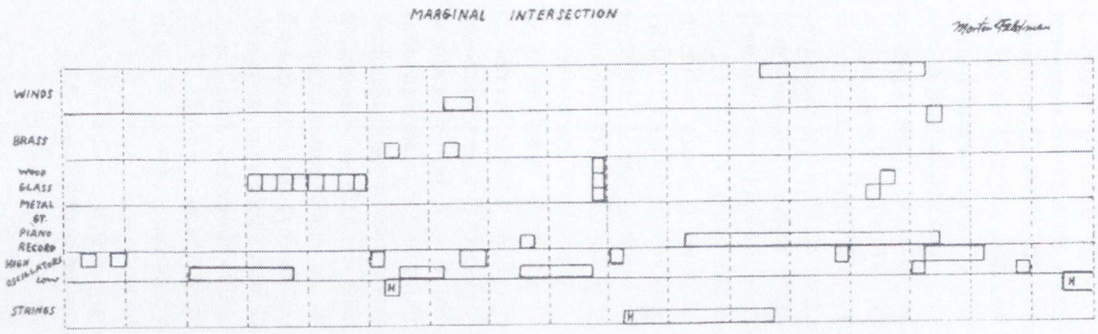

Fig. 31 Extract from Feldman's piece *Marginal Intersection.* [57]

Feldman argued strongly for the score's 'look' as an aspect of role-playing and as a voice during composition stages, if not on stage then off, attributing the development of his notational style to:

> The almost hierarchical prominence I attribute to the notation's effect on composition.[58]

Projection 1, written in 1962, has similar traits to *Marginal Intersection* in that it only allows for indeterminacies of pitch. Within the grids, the performers are requested to play any tone within the ranges indicated: high, middle and low. Although the score appears to suggest space-time notation, a process whereby relative durations are suggested by the physical lengths of the pitches on the page, relative duration is in fact given: each dotted box is described as being equivalent to four pulses at a tempo of 72 beats per minute.

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[57] Steve Johnson, *The New York Schools of Music and Visual Arts* (New York: Routledge Press, 2002), 28.
[58] *Ibid.* , 192.

Another trademark of Feldman's work is his use of silence. In MM and AM, I used silence as an important structural and gestural device. Feldman often referred to the fact that this new music he and others were creating in the late 1950s was not 'fixed' and therefore could not be notated in the traditional sense. Brown's piece *Module 1* (1966 - Fig. 32) sees the composer placing more restrictions on the performer and of the execution of the piece. In this piece, the performer plays the material, within each module, in any order and at will. Brown's background and training as a jazz musician brings an improvisatory quality to his scores and, in turn, to his music.

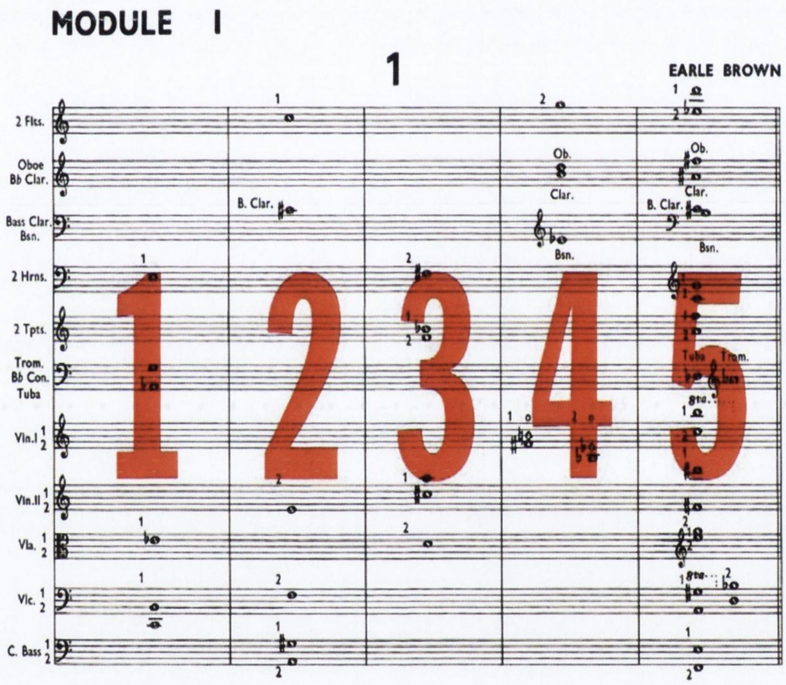
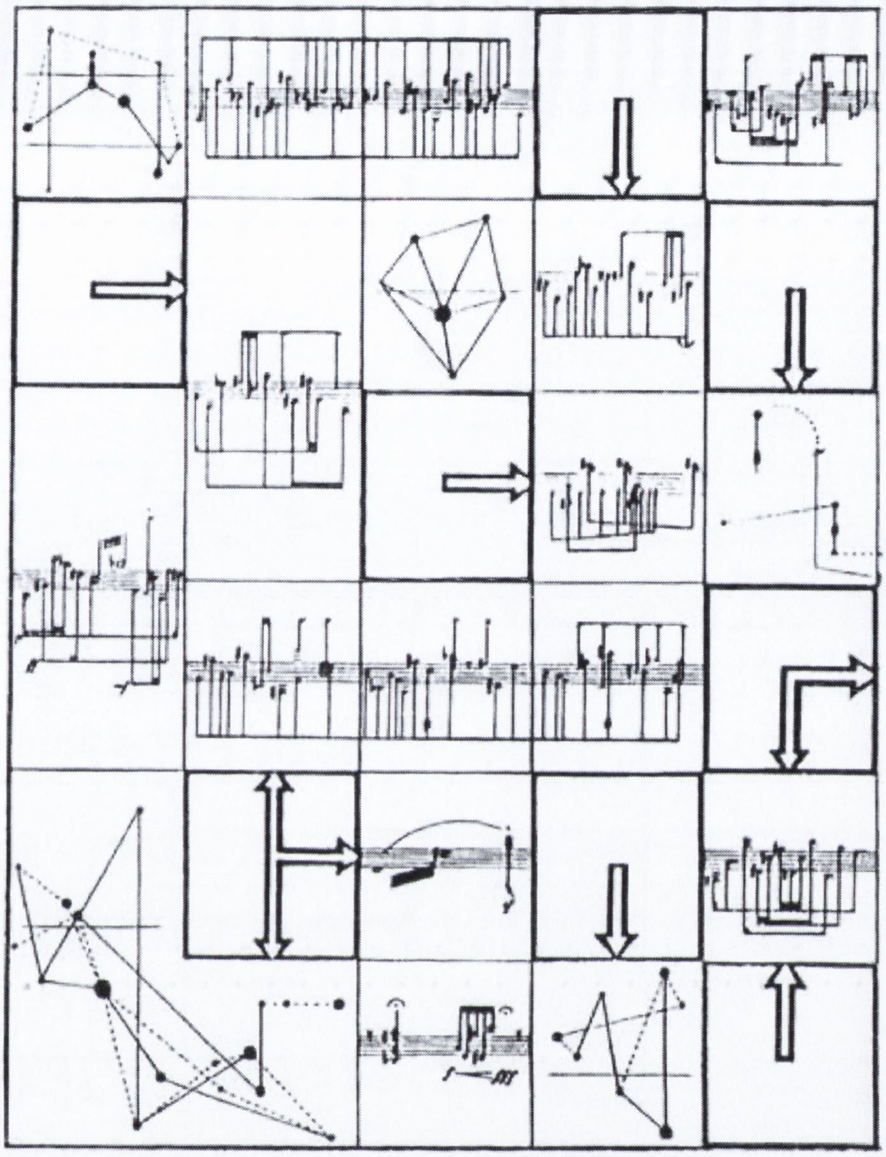


Fig. 32 Extract from *Module 1.* [59]

[59] Earle Brown, *Module 1,* Edition Peters (New York: Peters Music Publishers), 1966.

Module 1 directly contrasts with his pieces from the previous decade, most notably *December 1952*. Indeed, Brown was highly influenced by Alexander Calder, whose mobile sculpture pieces examined the organization of contrasting movements of forms and their changing relations in space. Brown and Feldman were essentially concerned with how sounds are 'projected' in time and the mobility that is brought about by this process. They both had the idea of bringing about a similar 'mobility' of sound-objects in time and were striving to find ways in which control over the material could be balanced against a new freedom on the performer's part. These considerations directly influenced the notation I employed during the development of FM.

Roman Haubenstock-Ramati's piece *Mobile for Shakespeare* (1958 - Fig. 33) was also studied during the development of FM. Haubenstock-Ramati's work resembles that of Earle Brown. Many of his pieces were composed in the form of a mobile, which indicates a free and often cyclical path to be followed throughout. This 'cyclical path' process was a technique I utilized when composing FM. In addition to being a creative innovator of graphic notation, he was also an avid supporter of the art form, organizing in Donaueschingen in 1959, the very first exhibition of graphic notation.



Roman Haubenstock-Ramati: Ausschnitt aus dem Mobile „Liaisons".

Fig. 33 Extract from Roman Haubenstock - Ramati's piece *Mobile for Shakespeare.* [60]

[60] Roman Haubenstock – Ramati, *Mobile for Shakespeare*, Erhard Karkoschka, *Notation in New Music* (London: Universal Edition, 1966), 5.

6.2 Score Development

Framed Motion (FM) is structured in the following way: each instrument has a 'frame' (ABCD). Within each frame, there are seven sequences containing themes and directions for the performer (Fig. 34).

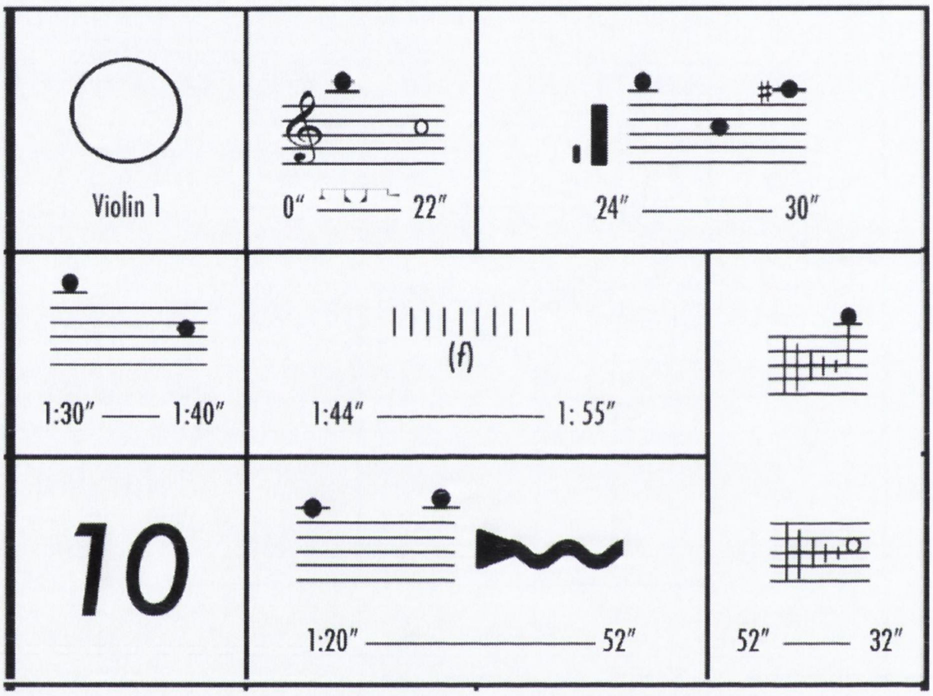


Fig. 34 Excerpt from *FM* (I).

The performers act as conductors to each other, commencing and completing frames together as required. Directions for reading frames are given in Index (III) of the score. Throughout the piece, the frames can be varied and manipulated, bringing about disjointed timbres and structures.

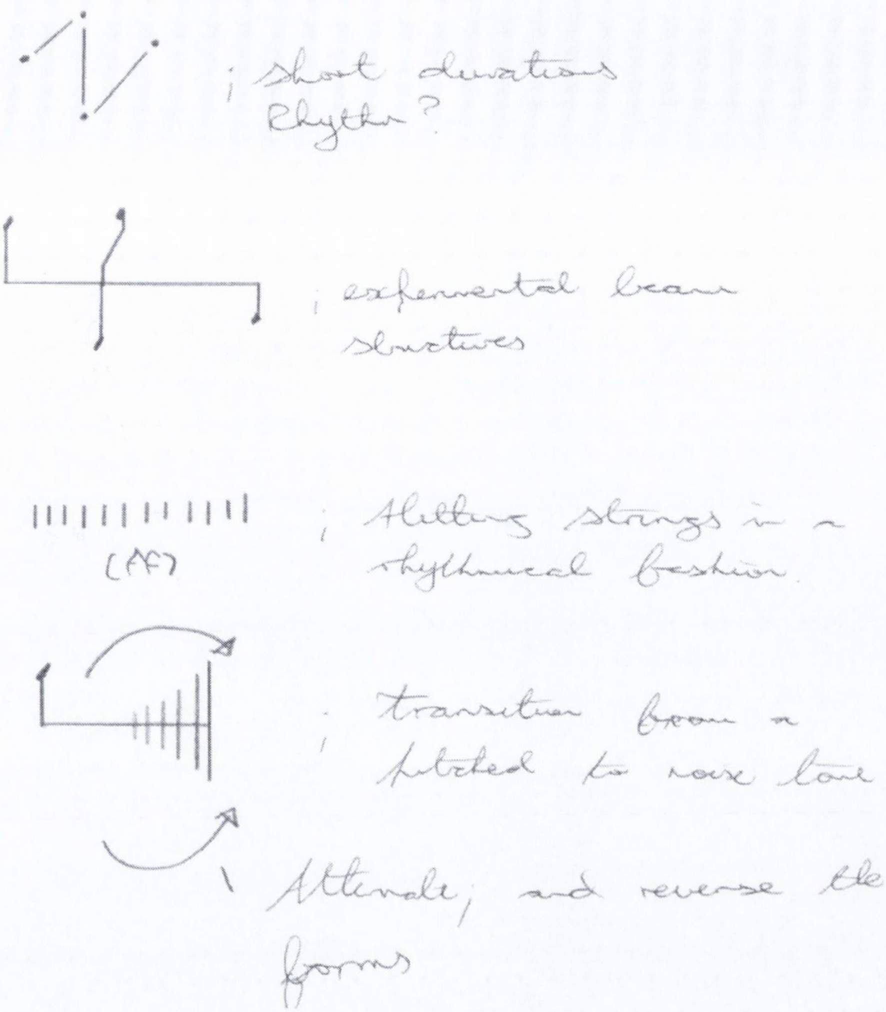


Fig. 35 Early sketches for *FM* (I).

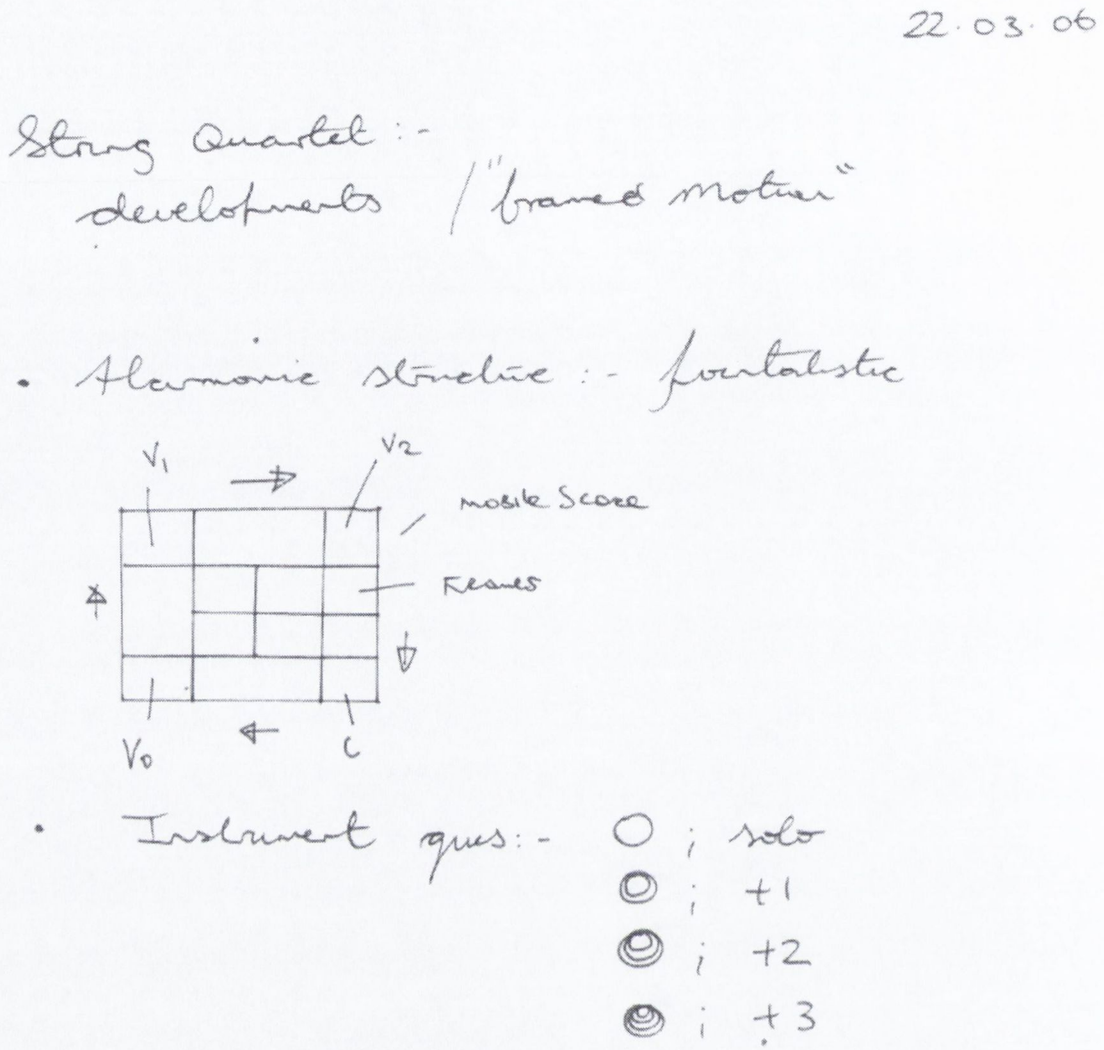


Fig. 36 Early sketches for *FM* (II).

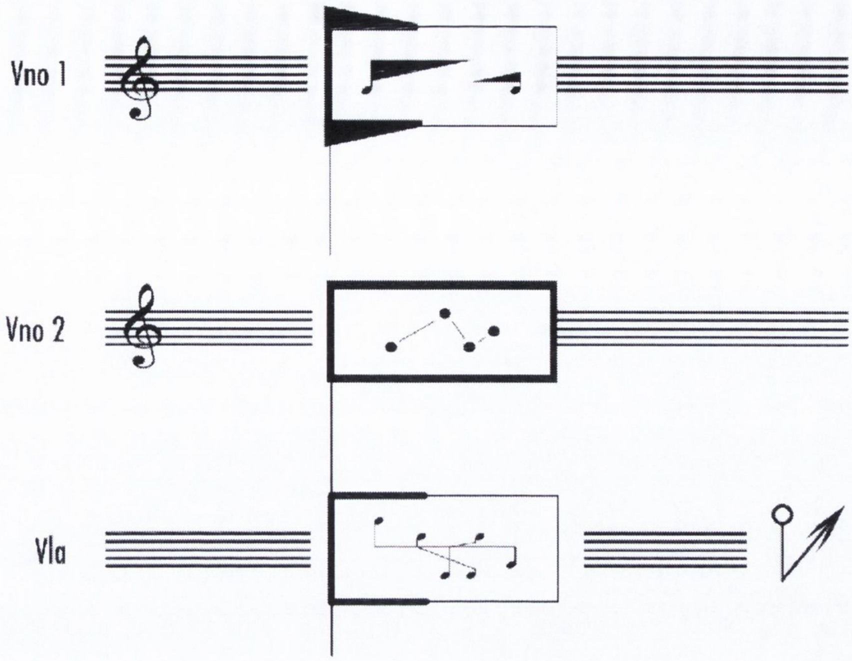


Fig. 37 Experimenting with alternative score structures (I).

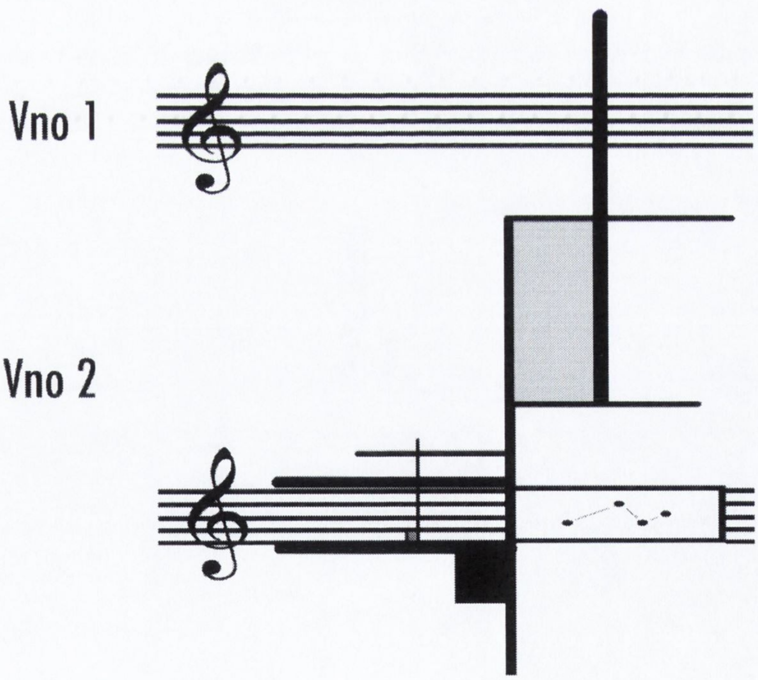


Fig. 38 Experimenting with alternative score structures (II).

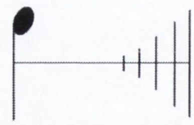


Fig. 39 Excerpt from *FM* (II) - transition from a pitched tone to a noise tone

Fig. 39 presents the transition from a pitched tone to a noise tone – the performers were required to react to the aural environment of the tape track. What the audience hears should be adapted by the performers, and then re-presented for the audience. In Fig. 40, one direction to bow at the tailpiece and the other to bow between the bridge and the tailpiece was implemented to produce hollow and dry timbres, which have an interesting aural presence when heard alone.

Fig. 40 Excerpt from *FM* (III).

Fig. 41 Excerpt from *FM* (IV) – tap on the body of the instrument.

Fig. 41 directs the performer to tap his/her knuckles on the body of the instrument. What these symbols sought to achieve was the discovery and exploitation of the timbre-contrasts of each instrumental group and thus inevitably of each single instrument. In FM, performers are required to produce harmonics with different timbres (Fig. 42). By implementing such directions I wanted the performer to make the instrument sound unlike it does when used 'traditionally'.

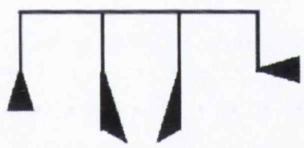


Fig. 42 Excerpt from *FM* (V) – production of harmonics.

Finally, each frame can in turn be played by a single instrument, or by all at once. Fig. 43 illustrates the way in which additional circles represent the number of instruments required to perform the frame. Indeed, the performers can reconfigure this as they wish.

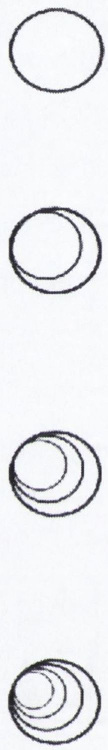


Fig. 43 Excerpt from *FM* (VI) – indicating how many instruments play the module in question.

6.3 Conclusion

Umberto Eco, in *The Poetics of the Open Work,* discusses the importance of the performer's freedom in 'open-works':

> From Mallarme's Livre to the musical compositions of Berio and Boulez, there is a tendency to see every execution of a work as divorced from its ultimate definition. Every performance *explains* the composition, but it does not *exhaust* it. Every performance makes the work an actuality, but is itself only complementary to all possible other performances of the work. In short, we can say that every performance offers us a complete and satisfying version of the work, but at the same time makes it incomplete for us, because it cannot simultaneously give all the other artistic solutions, which the work may admit.[61]

Eco's essay is highly informative and gives a clear and vivid sense of theory behind FM. Written in 1959, Eco fully understood the practical problems within communicative situations and interpretation. *The Poetics of the Open Work* is characterized by an invitation for the observer, or in our case, the performer, to make the work in conjunction with the author. He continues:

> Every reception of a work of art is both an interpretation and a performance of it, because in every reception the work takes on a fresh perspective for itself. [62]

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[61]Anna Cancogni (trans.) Umberto Eco, *The Poetics of the Open Work,* 2nd edn. (Cambridge: Harvard University Press, 1989), 15.
[62] *Ibid.* , 4.

Eco concluded that all interpretable works of art are essentially 'works in progress', adding that these works are "brought to their conclusion by the performer at the same time he experiences them on an aesthetical plane".[63] In FM, I attempted to address and employ these methodological considerations in its construction. Earle Brown referred to a number of 'conditionings' when referring to notational ambiguities, mobile scores and spontaneity in compositional and performance processes. He was concerned with the performer's *impulses*, in how actions can inhibit or release the work as an entity. Brown summed up the ethos of mobile form composition in the following statement, a statement that has great relevance to the development and performance of *Framed Motion*:

> What interests me is to find the degree of conditioning (of conception, of notation and of realization) that will balance the work between the points of control and non-control. At that point, the work, the performer, and I will most clearly exist – both as entities and identities.[64]

The graphically notated pieces presented in the portfolio examine the control and communication of musical ideas. All three pieces highlight the balance between 'control and non-control' to varying degrees.

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[63] *Ibid.* , 8.

[64] Earle Brown quoted in Christopher Cox, (ed.) *Audio Culture: Readings in Modern Music,* (New York: Continuum, 2004), *171.*

Chapter 7

From Graphic to Traditional Notation

7.1 Background

Throughout this research, three pieces for graphic notation were developed:

I. *Approximate Motion* – For Vibraphone, Viola, Cello and Electronics.
II. *Ornament Motion* – For SATB and Electronics.
III. *Framed Motion* – For String Quartet and Electronics.

By using graphic notation, an attempt was made to dissolve the hierarchical division of labor between the composer and performer. As such, I used graphic notation as a platform for active collaboration between both the composer and performer. During the compositional process a number of factors became evident:

I. Graphic Notation enables the composer and performer to engage in new and challenging methods of notation.
II. It expands the composers' and performers' tools.
III. It allows for a greater sense of collaboration between the composer and performer.

Along with this a number of composer-based considerations were taken into account. They included:

I. *Limits of the Human Performer* – some performers are unable and possibly unwilling to extend their musical backgrounds as far as the composer or score is asking them to.

II. *Lack of Control* – due to the fact that the composer hands over some, if not all control of musical material to the performer, the role and function of the composer changes.

For the purpose of this analysis we must examine issues relating to different types of graphical notation. In Chapter 2, indeterminate notation (as used by John Cage) and ultra determinate notation (as used by Karlheinz Stockhausen) was also examined. Indeterminate notation relies on the composer allowing the performer to complete the work. Ultra determinate music demands an equally detailed notation. In ultra determinate notation a human relationship is involved, so a mechanistic and precise response is impossible to achieve. This is essentially why some composers who used determinate notation gradually moved towards electronic music during the 1950s. Composer Milton Babbitt's interest in 'total control' over musical elements eventually led him to the medium of electronic music. He recognized that electronic music presented profound opportunities for the composer:

> In an electronic piece, anything that can be perceived can be differentiated (and) can be structured.[65]

[65] Judith Tick (ed.), *Music in the USA – A Documentary Companion, Interview with Milton Babbit* (Oxford: Oxford University Press, 2008), 668.

In traditional notation, the compositional process can be followed, decomposed and analyzed. We can appreciate a score's structure without hearing its end result. In graphic notation, this process has *abstract* results due to differing psycho-visual relationships; it is *unfixed*. Ultimately, these relationships change with the needs of the music, the composers, performers and listeners, as well with the changing relationships between them.

Systems of notation have been invented as they were found necessary, as in the experiments and developments pursued by the New York School of composers. The history of graphical notation in music is one of innovation, change and modification. This chapter examines the factors associated with the use of indeterminate notation (implemented by Cage), ultra determinate graphic notation (implemented by Stockhausen), and the graphic notations developed by the New York School (Morton Feldman and Earle Brown in particular) are also examined. My decision to compose the remaining pieces within this portfolio using traditional notation is based on the examination that follows in this chapter.

7.2 Observations

As discussed previously, the development of each new notational approach, each new sign and procedure, is valid under certain circumstances. Within the New York School of composers, it was the circumstances of changing times, new attitudes and exposure to the ideals of the Abstract Expressionist painters they associated with. Kurt Stone, in *Music Notation in the Twentieth Century,* noted that during the 1950-60s, traditional notation was now dealing with:

I. Music involving aperiodic, constantly changing durations of sounds and silences, all governed by non-metric means.

II. Music in which different meters and speed, as well as non-metric successions of durations, are combined without any fixed or rigid coordination, but rather, with deliberately flexible organizational instructions which usually invite the performer(s) to exercise varying degrees of interpretive freedom.[66]

To accommodate this, new forms of (graphic) notation were developed in order to accommodate new areas of exploration in music during the 1950s:

I. **Indeterminate Notation** – (used by John Cage).
II. **Ultra Determinate Notation** – (used by Karlheinz Stockhausen**).**
III. **NYS – Methods of Notation** – (used by Morton Feldman).

[66] Kurt Stone, *Music Notation in the Twentieth Century* (New York: W.W Norton & Company, 1980), 108.

Firstly, the scores developed by NYS document a specific musical environment, that of New York City in the 1950s. Secondly, and in general, notation allows the composer to invent new music, and thirdly, to co-ordinate independent parts. For the performer, it provides an external memory. Traditional notation imposes a time limit for the performer in that markings have specified directions (*adagio, presto*). Finally, it acts as a study tool for the purposes of analysis. In order for it to function, it must be clear and precise for the performer to interpret.

7.2.1 Indeterminate Notation

In the 1950s, John Cage introduced the term "indeterminacy". This was directly related to his growing interest in Zen Buddhism, which profoundly influenced his aesthetic viewpoint. His Zen practices sparked his commitment to non-intention: "the affirmation of life as it is rather than the desire to improve upon it".[67] In his book *Silence*, Cage discussed what indeterminacy brought about through performance:

> An experimental action is one the outcome of which is not foreseen. Being unforeseen, this action is not concerned with its excuse. Like the land, like the air, it needs none. A performance of a composition that is indeterminate of its performance is necessarily unique. It cannot be repeated. A recording of such a work has no more value than a postcard; it provides a knowledge of something that happened, whereas the action was a non-knowledge of something that had not yet happened. [68]

Through this, Cage brings up an important point. For Cage it was impossible to control 'the action of non-knowledge'. This was one of the first factors that lead me to reconsider the use of graphic notation. All notations are indeterminate in so far as they fail to give a complete specification. In traditional notation, some parameters (timbre and methods of attack) are judged as much as they are specified.

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[67] Christopher Cox and Daniel Warner (ed.) *Audio Culture – Readings in Modern Music* (New York: Continuum, 2004), 176.

[68] John Cage, *Silence* (London: Marion Boyars, 1968), 37.

In Earle Brown's *December 1952*, not a single musical parameter is specified. In indeterminate notation, the player must often ask themselves what sort of pitch or dynamic is appropriate to the piece. In this light, notation ceases to have any resemblance to a system in the common sense of the word, in that no coherent standards or benchmarks are available. I believe that indeterminate notation exists as both music and art. Feldman did refer to his earlier works as "a totally sonic abstract adventure".[69] "Ambiguity is where art, ideas and influence begin".[70] Roberto Gerhard discusses this point further in *Notations*:

> Notation's ambiguities are its saving grace. Fundamentally, notation is a serviceable device for coping with imponderables. Precision is never of the essence in creative work. Subliminal man (the real creative boss) gets along famously with material of such low definition that any self-respecting computer would have to reject it as un-programmable.[71]

[69] Morton Feldman quoted in Michael Nyman, *Experimental Music: Cage and Beyond* (Cambridge: Cambridge University Press, 1999), 70.

[70] Robert Gehard, *Notations* (New York: Something Else Press, 1969), 297.

[71] *Ibid.* , 297.

7.2.2 Determinate Notation

Absolute control, a mechanical response, can never be attained while a human relationship is involved. In *Sound and Signs – Aspects of Musical Notation*, Hugo Cole discusses what determinate notation fails to take into account. The main factors included:

I. The limits of the human performer.
II. The incompleteness of the notational specification.
III. The extent to which unconscious deviation from the directive contributes to satisfactory realization.
IV. The inappropriateness of an authoritarian directive in contexts where creative collaboration is called for. [72]

During the 1950s determinate graphic notation came along with the spirit of the age; it represented a time caught up between the technological age and the scientific revolution. Music was being taken to a different plateau of synchronism and accuracy. As discussed previously, the advent of electronic music was an additional governing force for a notation that was determinate to finite degrees.

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[72] Hugo Cole, *Sights and Sounds – Aspects of Musical Notation* (London: Oxford University Press, 1974), 128.

In Stockhausen's *Elektronische Studie II* (1954) an absolutely precise method of notation was generated. The reason for this was the fact that it was was executed through the use of tone generators, filters and oscillators. Thus the notation is not intended for live performance or any degree of interpretation on the performer's behalf. In the score, two parallel graphs are used: the first, above the horizontal time-scale, plots intensity against time. In each case the shapes delineated refer to particular types of sound, each type being a sound-mixture of five frequencies. Frequency (pitch), intensity (dynamics) and time are all plotted very precisely in appropriate units – hertz, decibels and centimeters of magnetic tape. The values are given at the beginning of the score, as shown in Fig. 44.

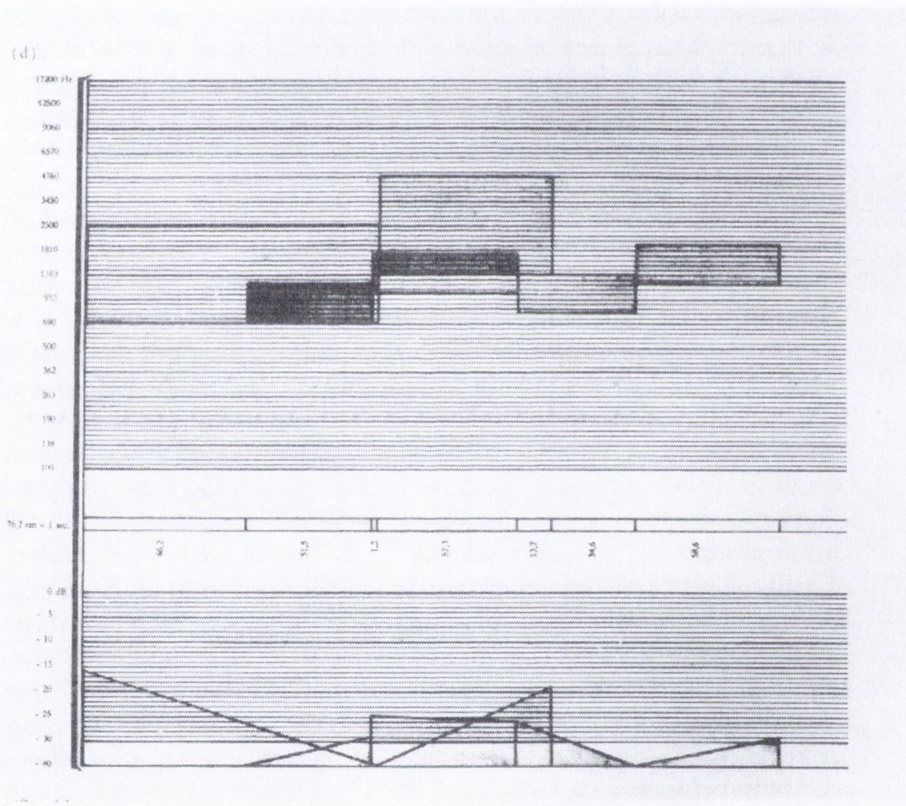

Fig. 44 Excerpt from *Stockhausen's Elektronische Studie II.* [73]

[73] Karlheinz Stockhausen, *Elektronische Studie II* (Vienna: Universal Editions), 1954.

Determinate notation, especially for electronic music, was extremely complex. One of the main limitations of *Elektronische Studie II* is that only three parameters can be notated conveniently on a two dimensional graph. What's evident is that this piece would be more difficult to notate if the types of sounds were to change during their presentation. Another factor is that once a piece of this nature is committed to tape, it needs never to be reconstructed again, in that it could be easily duplicated by tape playback, thus rendering its notation defunct.

In *Elektronische Studie II* Stockhausen defines all aspects of the sounds. This total mechanical environment leaves this style of music and its notation limited in terms of its emotional impact. The fact that the performer has no way to collaborate and interact with the score leaves the piece void of an essential and fundamental musical trait; the performer's interpretation. Composer Lukas Foss commented on this very nature of the determinate score: "the precise notation which results in imprecise performances".[74] The type of determinate notation Stockhausen employed for this piece eliminates the interaction and any relationship between the performer and score. The relationship and level of communication between the composer and performer is I believe one of the most important relationships in music and it was a major consideration in this report.

[74] Lukas Foss, *'The Changing Composer – Performer Relationship: A Monologue and Dialogue'*, *Perspectives of New Music* (Spring, 1963): 45-53.

7.2.3 (NYS) - Methods of Notation

In *Music and Modern Art*, James Leggio comments on Morton Feldman's compositional evolution and how it shared similarities with the Abstract Expressionist movement in painting:

> Feldman's work evoked the elimination of symbolism, the simplification of gesture, the avoidance of marked contrast or exaggerated differentiation, and, in his later works, the dramatic expansion of scale.[75]

From the beginning of his career, Morton Feldman constantly described sound in visual terms: light, perspective, surface and space. Feldman sought to incorporate the painter's canvas into music; he saw an opportunity to compose beyond the staves, beyond what conventional notation would allow. Despite the inventive techniques employed by Feldman in such scores as *Intersections* (1951-53) and *Intermissions* (1953), he was satisfied with neither the results of the notation he developed nor their indeterminate performances. From 1953 to 1958, he returned to traditional notation. This too had its faults. Feldman found that traditional notation was "too one-dimensional. It was like painting a picture where at some place there is always a horizon".[76]

Throughout the 1960s and 1970s Feldman left this form of notation behind, and began to compose pieces that allowed temporal freedom for performers. This, over time, became the step between the indeterminacy of his early works and his determinate late works.

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[75] James Leggio (ed.) *Music and Modern Art* (New York: Routledge, 2002), 230.
[76] *Ibid.* , 236.

In *Christian Wolff in Cambridge* (1963), durations are indeterminate, to be decided during performance by a conductor (Fig. 45).

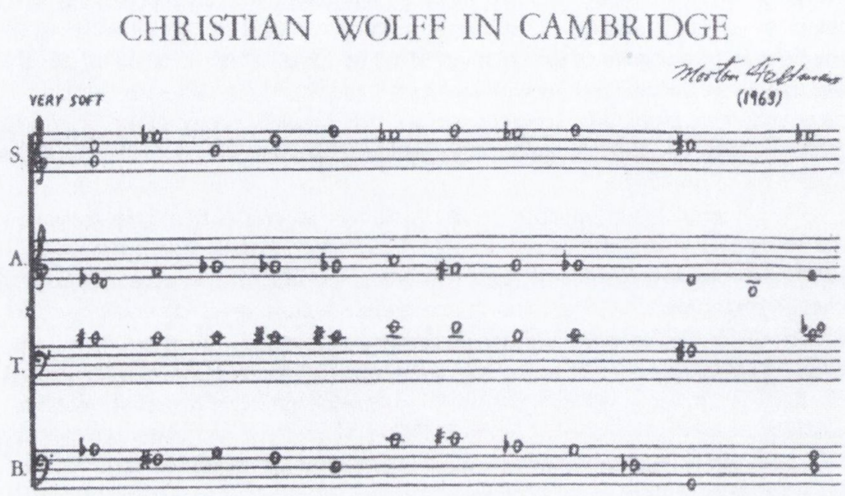

Fig. 45 Excerpt from Morton Feldman's *Christian Wolff in Cambridge.*[77]

In terms of performance directions, Feldman provides no meter or tempo, allowing the conductor and singers to determine both the overall tempo and the duration of each note or chord. Each singer works from the full score, which presents a sequence of nineteen "sound events"—sixteen chords with three solitary pitches mixed in (allotted to the bass, alto and tenor parts respectively)—is stated twice. The second statement is the same as the first except for a couple of added crescendos. Some thirty years later, Feldman commented that the graphic notation he employed was stylistically correct for the time it was written. Feldman saw that "clearly it would have been a mistake to persist in this style once its time had passed and its problems had begun to appear".[78] Precise notation was too 'one dimensional' for Feldman. What became evident was that he realized that he was more interested in "freeing the sound and not the performer".[79]

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[77] *Ibid.* , 237.

[78] Cole Ganges, Morton Feldman in *Soundpieces: Interviews with American Composers* (Metuchen, N.J: Scarecrow Press, 1982), 169.

[79] *Ibid.* , 195.

In regard to the 'grids' employed in *Marginal Intersection* (1962 – Fig. 46), Feldman later realized that "you have a sense of the propriety of it, like the way Jackson Pollock would have a sense of his eye and the scale of things".[80]

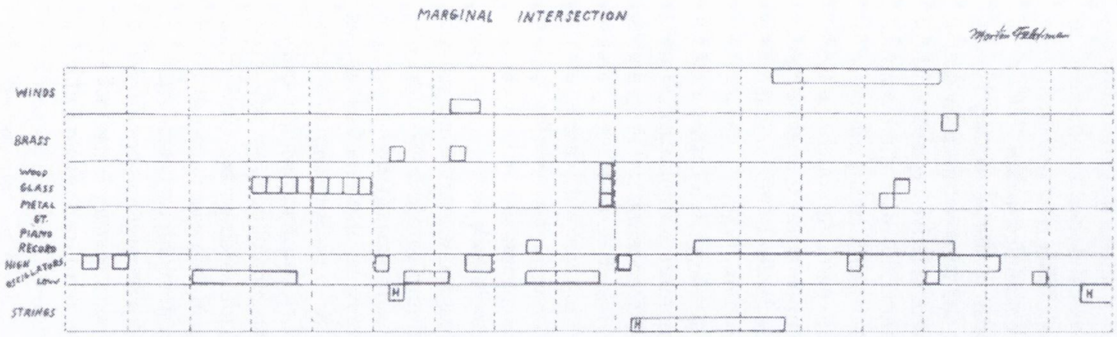

Fig. 46 Excerpt from Morton Feldman's *Marginal Intersection.* [81]

Feldman's solution to this was to reverse the freedoms and constraints of the earlier graphical pieces; to take back partial control, and have the performer decide on a number of musical parameters. In *De Kooning* (1963), pitches are specified while durations are only approximate. The dotted lines represent a definite sequence of entrances, proceeding according to the trajectory of the dotted lines, and intended simultaneities are indicated with solid vertical lines ending in arrowheads (Fig. 47). The lines are an extension of the bar line, in that they distinguish the events. The piece represents a homage to drawing rather than painting. Feldman was now composing through *gestures*, like the strokes of a De Kooning painting, with ideas starting and stopping within the staves.

[80] *Ibid.* , 195.
[81] *Ibid.* , 194.

Fig. 47 Excerpt from Morton Feldman's *De Kooning.* [82]

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[82] Steve Johnson, *The New York Schools of Music and Visual Arts* (New York: Routledge Press, 2002), 198.

Feldman had now adopted a controlling exactitude in traditional notation. "Precise notation is my handwriting", he commented in 1980, adding that "notation, at least for me, determines the style of the piece".[83] The works that followed saw individual parts come under tighter control. Feldman spent his career trying to break free from the constraints within the staves. Yet, ultimately, he was in control of the musical material.

Throughout his career, his changing interest in spatial graphical notation, indeterminate events and the placements of sonic events accounted for much of his continuing search for new notational solutions. As an artist in a musical medium, Feldman "challenged the relationship between sight and sound by subtly manipulating space and time".[84]

[83] *Ibid.* , 205.
[84] James Leggio (ed.), *Music and Modern Art* (New York: Routledge, 2002), 238.

7.3 Conclusion

In *Musical Composition*, Reginald Smith Brindle, when discussing the teaching of composition, says that "in the music profession (including students) there are two strongly held opinions: one is that composition cannot be taught; the other that composition should not be taught".[85] He follows the statement with this:

> In ways of art and music, we advance by stepping in each other's footsteps, following a path and then branching off on our own. With a wise guide we can reach our ultimate goal more quickly. [86]

The history of the arts and music is one of constant reference and homage. In music, the field of composition is an environment in which subliminal influences seep in at all times. From something very basic and physical to elements more elusive and abstract, there can be no denying that, however well musical notation may be adapted for conveying abstract ideas, "it is also manifestly a code, and inherently a rationale, of instructions as to actions, emphasis and timing". [87]

In presenting the graphic scores, *Approximate Motion*, *Ornament Motion* and *Framed Motion,* I have highlighted the processes involved in the composition of my graphically notated music. The development of the graphical scores allowed for the extension and development of a unique system of notation, one that has served great intent in my own music.

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[85] Reginald Smith, Brindle *Musical Composition* (Oxford: Oxford University Press, 1986), 1.
[86] *Ibid.* , 1.
[87] Robin Maconie, *The Concept of Music* (Oxford: Clarendon Press, 1990), 3.

The process of expanding one's compositional pallet, I believe, is essential in the development of the composer's journey to finding his/her sound. In any creative process, chaos is structured into something communicative. Both types of notation present structures, shapes and help to build patterns. For compositional means, it is traditional notation that presents a clearer sense of coordination and synchronicity. This, ultimately, is why traditional notation possesses the clearest and most coherent notational system for the communication and control of musical ideas:

> Language acquires depth, as users acquire the background knowledge of possible connotations that gives to every combination of symbols, in every context, its own subtly shaded inflection of meaning. It is this depth of meaning that the codes, the artificial languages of the avant-garde notations, inevitably lack.[88]

At this stage I felt, like Feldman, that graphic notation was no longer precise enough for me at this particular developmental stage of my compositional output. I reached this conclusion after comparing aspects of indeterminate and determinate graphic notation against each other. In particular, my decision was informed by a desire on my part to have a degree of control over the audible result that was not possible using graphic notation. Furthermore, I considered it most appropriate to this thesis to compare exclusively graphic notation against music conceived and executed using exclusively traditional notation. This meant that a clear comparison could be made of the two approaches to notation, and the consequences that they may have for the music produced could be assessed. Ultimately, this made it possible to see which notation is more suited to my current compositional needs.

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[88] Hugo Cole, *Sounds and Signs – Aspects of Musical Notation* (Oxford: Oxford University Press, 1974), 150.

Chapter Eight

Composing for Traditional Notation

8.1 Introduction

Out of the issues raised and highlighted in Chapter 7, I decided that the remainder of this composition portfolio would comprise two pieces for large ensemble, notated traditionally.

Firstly, this chapter looks at the areas associated with cognitive science, in particular music cognition. It examines Gestalt psychology and how the musical experience is structured in traditional notation for both *Passing / Parting / Release* and *Block / Static / Mass.* Secondly it looks at the work of Albert Bregman and his publication *Auditory Scene Analysis (ASA).*[89] In this, Bregman developed theories about how we process music by looking firstly at the *parts* (timbre, pitch) and then the *whole* (the fusion of these). His work with timbral fusion influenced considerations about orchestration, tonal blending and ensemble development when writing for traditional notation. These factors are elemental in how we process scores written in traditional notation, much as schemas are part of the cognitive process associated with graphic notation (Chapter 2).

[89] Albert Bregman, *Auditory Scene Analysis* (Cambridge, Mass: MIT Press, 1990).

8.2 Background - Music Cognition

Music cognition is regarded as a sub-section of a more general research area known as 'Cognitive Science'. It examines the mental processes that support musical behaviors including perception, comprehension, memory, attention and performance. In terms of perception, grouping processes are fundamental, both visually and aurally. They can be understood using principles from Gestalt psychology, which developed from a school of psychology developed in Germany in the early 1900s. Gestalt theory was an approach to the whole field of psychology, but its greater impact was on the field of visual perception.

The German word Gestalt, meaning 'form' or 'shape', can also be translated as 'configuration'. It proposes an organization based on grouping or configuration, elements being perceptually grouped if they were similar, proximate, formed a closed contour, or moved in the same direction.

This chapter examines areas concerned with the cognition of scores notated traditionally. It looks at ways in which we perceive, distribute and control auditory information. These considerations act as a platform when defining how the musical experience is structured in both *Passing / Parting / Release* and *Block / Static / Mass.*

8.3 Traditional Notation – Processing Musical Information

Humans have an innate ability to perceive the distance, direction, loudness, pitch and tone of many individual sounds simultaneously. We use the ear, body and brain simultaneously to decode auditory environments. In his publication *Auditory Scene Analysis* (ASA), Bregman developed 'laws of grouping' of auditory information, as discovered by Gestalt psychologists in relation to visual information. The laws help us identify and group auditory events. In our case, some of its principles can be applied to traditionally notated music. He developed his principles as follows:

I. **Proximity**: Elements that are neighboring are viewed as belonging together (the spatial adjacency of notes).

II. **Similarity**: Elements that appear to have the same structure or colour are also seen as belonging together (timbre/harmony).

III. **Closure**: Based on how we deal with missing information (rests and use of silence).

IV. **Good Continuation**: Elements of a pattern can establish an implied direction (smooth and continuous change of melodic/rhythmic patterns).

V. **Common Fate**: Aspects of coordinated motion (melodic and rhythmic).

VI. **Set and past experiences**: The listener's past experience and expectation will influence what is heard.

VII. **Law of Best Figure**: We tend to prefer the simplest and most stable of possible organizations.

VIII. **Law of Belongingness**: We tend to associate a sensory element exclusively with a perceived object.[90]

[90] Albert Bregman, *Auditory Scene Analysis* (Cambridge, Mass: MIT Press, 1990), 196-203.

Bregman proposed that through these 'laws of grouping' we stream simultaneously occurring musical elements into organized wholes. He saw that "the stream plays the same role in auditory mental experience as the object does in the visual". [91] 'Stream segregation' contains two grouping processes:

I. **Sequential Integration**: how sounds that are presented as a temporal sequence are grouped – Horizontal integration or *streaming*. Segregation into separate streams becomes stronger when a sequence of music has variation of rhythm and melody.

II. **Simultaneous Integration**: how sounds that are presented at the same time are grouped – Vertical integration or *fusion*. Fusion depends on the presence of correlations between the properties of different components in simultaneous auditory stimuli, including harmony, consonance, dissonance and timbre.[92]

The perceptual segregation of sound components into sequential streams depends on differences in pitch, amplitude, rhythm and location and on any sudden changes in any of these. Sounds tend to group sequentially with others that are close to them in frequency. This effect lends itself to the *proximity principle*: tones that are close in pitch will be more likely to be grouped together. This segregation of musical information into separate streams becomes stronger when a sequence of music accelerates. This highlights the importance of stream integration in processing musical information; how various sound components (pitch, rhythm and timbre) are grouped together to form different voices of a musical piece.

[91] *Ibid.* , 11.
[92] *Ibid.* , 642.

Abrupt changes, through the alteration of timbral, rhythmic and harmonic values can also increase stream segregation. Other factors that influence this increase in stream segregations and the processing of musical information include 'Simultaneous Presentation' and 'Schema Based Organizations' (Gestalt).

A number of factors influence the simultaneous presentation of sounds. The intensity of a timbre or rhythm and its attack value make musical voices easier to distinguish. Schema-based organizations utilize Gestalt psychology. Organizational processes involved with this are referred to as 'primitive grouping' - the ways in which our auditory systems have evolved to sort out incoming sounds and attribute these sounds to the correct sources. As documented in Chapter 2, Schema-based organization occurs due to our knowledge of sound from experience, or because our attention has been drawn to some particular aspect. In ASA, Bregman illustrates how Gestalt processes of organization are the basis for the recognition of sounds, in that they appear as Schemas:

We can have a stored representation of a sequence of sounds that encodes the temporal pattern of its elements and their relative pitches; otherwise we would not be able to remember music. Our memory complex for changes in timbre over time is what enables us to distinguish one instrument from another. [93] When we experience music, we are organizing the segregation of streams of musical information at different levels through conscious and subconscious memory processes. These streams make the *part* of a piece of music that eventually fuses into the *whole*. The reasons for looking at aspects of ASA are that they relate to my own theoretical framework when using traditional notation.

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[93] *Ibid.* , 406.

The following details the major aesthetical and methodological subjects covered when analyzing the two pieces for traditional notation presented. Throughout, the correlations between Bregman's theories and the topics below are illustrated. Topics discussed include:

I. **Schematic Processes**: The composer engages in schematic relationships by composing.

II. **Retention and Reproduction**: These are ideas associated with factors of human memory (in that we retain and mentally reproduce musical information while listening to music).

III. **Hierarchical Structures and Frameworks**: Hierarchical structures explore the relationships between musical elements: articulation, orchestration, texture and tonality.

IV. **The Musical Experience**: The dictation of inner monologue, sensory reaction to external occurrences and emotional interactions, all become processes involved in writing music.[94]

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[94] *Ibid.* , 136.

8.4 Conclusion

The principles of ASA and laws of grouping give us an understanding of how we create, communicate and control auditory and musical experience from acoustical stimulation. Albert Bregman developed his theories by looking firstly at the *parts* (timbre, pitch and rhythm) and then the *whole* (the fusion of these). His work with timbral fusion influenced my considerations about orchestration, tonal blending and ensemble development (all of which are considered in relation to the pieces presented at a later stage). Bregman pointed out that both melodic presentation and timbral definition have 'emergent properties' that are influenced by both ASA and grouping principles:

> The identity of the component sounds is known as the result of the partitioning that is done by scene analysis and the partitioning allows us to hear different timbres at the same time. This means that the use of timbre in music depends on a practical understanding of the principles of auditory fusion and segregation. When composers understand these principles, they can use instruments as generators of auditory features and use the rules of spectral grouping to form new "orchestral timbres" as clusters of these properties.[95]

[95] *Ibid.*, 697.

Chapter Nine

Commentary on *Passing / Parting / Release* - For Large Ensemble and Electronics.

(Score Appendix IV / Realization - Appendix CD I)

9.1 Structure

Passing / Parting / Release (PPR) contains three sections; *Passing* (Bars 1 – 135), *Parting* (Bars 135 – 180) and *Release* (Bars 180 – 225), the first section being the largest while the second and third section are one third the size. Structural devices, such as melodic progression being halted mid-syllable by tone clusters from the piano and harp (Fig. 48), are employed in *Passing*. Not only does the result achieve maximum dislocation from melodic progression, but also refocuses the listener's attention. I used devices such as these throughout the piece, acting as 'signposts' that help each section develop structural continuity.[96]

Fig. 48 The use of tone clusters employed in *Passing* (bars 8 to 10).

[96] Albert Bregman discussed similar ideas in *Auditory Scene Analysis*, 'Set and Past Experiences' - the listeners past experience and expectation will determine what is heard. In PPR, the 'signposts' as described above, illustrates how Gestalt processes of organization are help listeners recognizing sounds and patterns in a piece of music.

Setting motives with similar rhythmic and melodic construction against one another and the use of subtle variation became key structural devices used in PPR.[97] Igor Stravinsky noted: "Musical form is the result of the 'logical discussion' of musical materials".[98] This *'logical discussion'* includes the substitution and swapping of rhythmic and harmonic 'units', again highlighting another important structural device in writing for this section and for the piece as a whole. In *Passing*, the use of thirds, dotted quavers and semi-quaver notes sets up an ostinato of sorts (in that rhythmic and melodic materials establish repetitive rhythmic-harmonic schemes).

These cross-rhythmic patterns alter throughout *Passing*. Eventually the flute and oboe enter this scheme and, with the addition of a counterpoint melody, the section becomes harmonically dense and rhythmically complex. Another structural device I employed in *Passing* involved offsetting staccato phrases that begin with dotted minims and end with dotted demisemiquavers. This created interesting cross rhythms and harmonic textures (Fig. 49), by using simple harmonic and rhythmic variations.

Fig. 49 Creating cross rhythms in *Passing* (bars 102 to 103).

[97] This technique encompasses one of the ASA laws of 'Similarity' – elements that appear to have the same structure or colour are seen as belonging together (timbre or harmony).

[98] Igor Stravinsky and Robert Craft, *Conversations with Igor Stravinsky* (London: Faber and Faber, 1967), 27.

In the second section, *Parting,* the melodic material stays near constant, almost mirroring that of the string section drones in *Passing*. The rhythmic structure now accelerates as different instrumental 'units' lock into one another. The harp and piano play near-constant demisemiquavers that almost blend the two instruments into one whole unit while the woodwind and string sections employ rhythmic variations that swarm above and below (Fig. 50).

Fig. 50 Creating rhythmic variations in *Parting* (bars 148 to 149).

As rhythmical values alter for piano and harp (Fig. 51), a tug of war begins against temporal variations in the string section.

Fig. 51 Varying rhythmic values in *Parting* (bars 164 to 165).

The listener now becomes engaged in a game of "retention and reproduction".[99] This game involves the retention and reproduction of musical material from memory. Retention and reproduction are two outstanding traits of human memory, and are equally important for the communication of music. This is especially true in traditional notation, where thematic, or very specific motives or musical objects can be employed. The final section, *Release,* represents the climactic interconnection between both *Passing* and *Parting*. A barrage of piano notes (played approximately – see score for directions – Appendix IV) are set against the strings (Fig. 52), mirroring structural devices utilized in the first section, *Passing*.

[99] Through memory, we have the ability to retain and reproduce musical material. This resembles the ASA law of organization of 'Set and past experiences' - the listener's past experience and expectation will colour what is heard.

Fig. 52 Using dissonance as a rhythmic device in *Release* (bars 180 to 183).

This harmonic interplay extends further by the addition of contrapuntal melodies from the woodwind and brass sections. The dissonance of the piano set against the interplay of different harmonic units carries this 'musical discussion' toward its end.

We shall now examine how these 'discussions' and 'interplay' occur in PPR. A pattern of subtle variations in note values and articulation resembles a conversation of sorts. In music, these structures can at times be referred to as *hierarchical*. Hierarchical structures explore the relationships between lower levels (articulation and orchestration) and higher levels of musical material (texture and tonality). This process involves the organization of rhythmic passages and melodic contours.

Daniel Levitin, in *This is Your Brain On Music*, describes the role of hierarchic structures (temporal grouping) in regards to the production of music as follows:

> Our memory for music involves hierarchical encoding - not all words are equally salient, and not all parts of a musical piece hold equal status. We have certain entry points and exit points that correspond to specific phrases in the music. Experiments with musicians have confirmed this notion of hierarchical encoding in other ways. Most musicians cannot start playing a piece of music they know at any arbitrary location; musicians learn music according to a hierarchical phrase structure. Groups of notes form units of practice, these smaller units are combined into larger units, and ultimately into phrases; phrases are combined into structures such as verses and choruses or movements, and ultimately everything is strung together as a musical piece.[100]

[100] Daniel Levitin, *This Is Your Brain On Music* (London: Dutton Press, 2006), 154.

Although Levitin reefers primarily to 'temporal' grouping processes, in PPR, similar structures exist. In *Passing,* the string drones establish tonal relationships in that they construct the tonality of the section itself. This combination presents us with a hierarchical structure, one that aids instrumentation separation. In a sense, I believe that hierarchic structures and grouping processes exist as the unconscious interplay in music.

When conductor/author Robert Craft proposed the question "What is good instrumentation?" to Igor Stravinsky in *Conversations with Igor Stravinsky*, he simply replied: "When you are unaware that it *is* instrumentation".[101] Hierarchical levels operate within each section of PPR (harmonically, melodically and rhythmically). It is possible to observe these structures in traditional notation due to the fact that it implements standardized musical elements, as opposed to the use of un-standardized musical elements that can exist in graphic notation.

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[101] Igor Stravinsky and Robert Craft, *Conversations with Igor Stravinsky* (London: Faber and Faber, 1967), 29.

9.2 Use of Electronics

One important feature of using a computer to manipulate sound is that it makes use of sound's ability to be *neutral*, in that a sound structure can be manipulated beyond recognition, freeing it of association. In PPR, phrases and melodies were extracted from the piece and processed electronically, thus modifying the behavior of existing sounds. Manipulating existing sounds in this fashion allows for the exploration of 'alternative parameters' in terms of pitch, melody, rhythm and timbre.

The use of electronics allows for the extension of timbre within the piece. It is possible to configure, mutate and transpose sounds to any degree imaginable. The result is the creation of an additional 'sub structure' of sound spectra, one that is unique to the piece itself. The implementation of electronics in PPR created the facility to produce combinations of, and transformations between, arbitrarily different sounds, the juxtaposition between familiar and unfamiliar, the expected and unexpected. Certain sounds retain their intrinsic timbral quality under the most extreme forms of distortion. Take the human voice, for example: utterances and the complexity of articulation make it easily recognizable, even when processed. The tools used to process sounds in PPR were kept to a handful. I made this decision in order to achieve a sense of continuity between the sections. The electronic components were considered to be much like an additional instrumentation section.

In *Passing,* I used 'GRM tools' plug-ins, developed by *Groupe de Recherches Musicales.* The 'GRM delay' plug-in (Fig. 53) used in *Passing* uses up to 128 delays that affect amplitude and timing. In this stereo version of this plug-in, the delays are assigned alternatively to the left and right channels. The plug-in was used also to adjust the timing of the delay to commence at a fast rate and then become slower, vice versa or to remain equal. For implementation in *Passing*, the number of delays used (in this case 24) produced a metallic and dry sound.

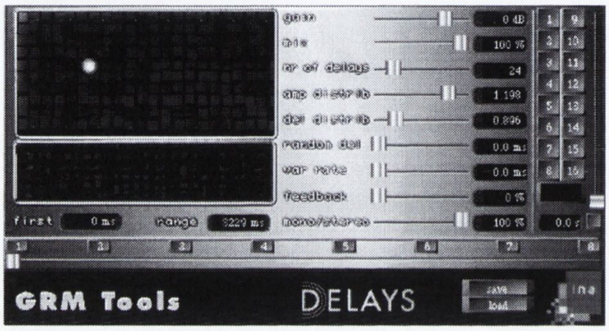

Fig. 53 *Groupe de Recherches Musicales* GRM tools 'Delay'

Secondly, a 'Native Instruments Quadra-Fuzz' plug-in was utilized in *Passing* (Fig. 54). This distorted the delays created by the 'GRM Delay' plug-in.

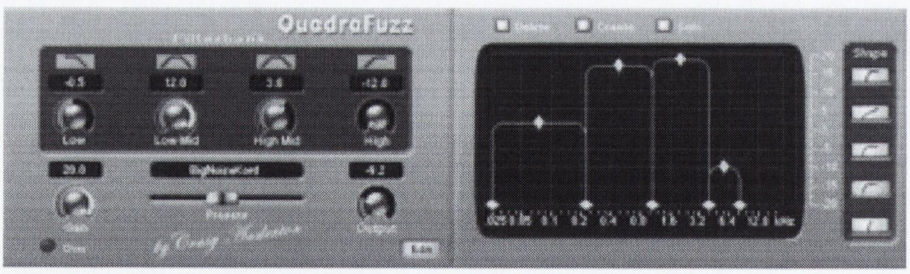

Fig. 54 Native Instruments QuadraFuzz plug- in.

Further plug-ins used in *Passing* includes two more 'GRM' tools: the 'Stereo Shuffler' and 'Pitch Accumulation'. Sounds are fragmented and these fragments are shuffled in time. The 'Pitch Accumulation' filter, on the other hand, uses two independent and simultaneous transposers that can be used with delays and modulations to transpose the pitch of an input sound. In *Parting*, Cycling 74 'Pluggo' filters were utilized. 'Pluggo' filters used include a 'fragulator' and 'degrader'. The 'fragulator' (Fig. 55) works on the principle of segmenting the input signal into pieces (fragments) specified by a buffer size that then loops each fragment either forwards or backwards at varying speeds. The result is a pitch-shifting sampler that introduces digital distortion effects.

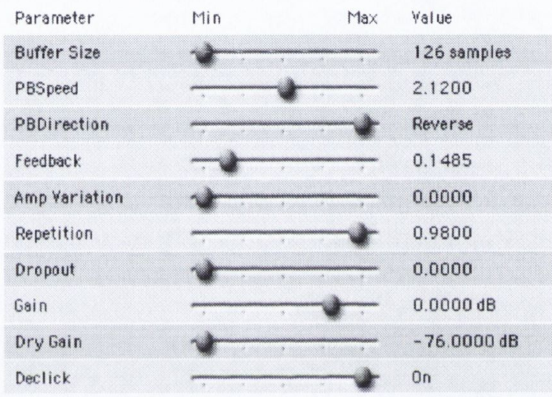

Fig. 55 Cycling 74 Pluggo 'Fragulator' plug-in.

Secondly, in *Parting*, the 'degrader' unit (Fig. 56) simply reduces the effective sampling rate of a sound source and the bit depth of its input. In PPR, the plug-ins allowed for the extension of musical expression, extensions that evoke more abstract aspects of musical composition.

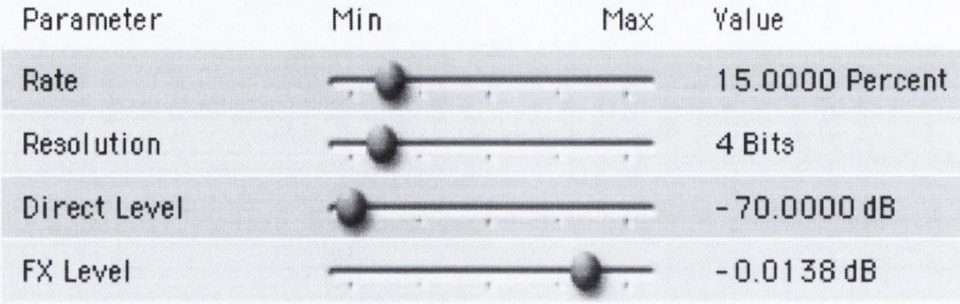

Fig. 56 Cycling 74's Pluggo 'Degrader' plug-in.

Release employs another collection of effects and plug-ins. The 'DFX transverb' plug-in (Fig. 57) resembles a delay plugin. The difference is that it can play back the delay buffer at different speeds. It's almost like a tape loop with two independently moving read heads. This plug-in was applied to the string section in *Release* and it resulted in a spectral mass, one with a distinct timbre. It simply layered delay lines at different velocities, giving the impression of different planes of sound pushing and pulling at one another.

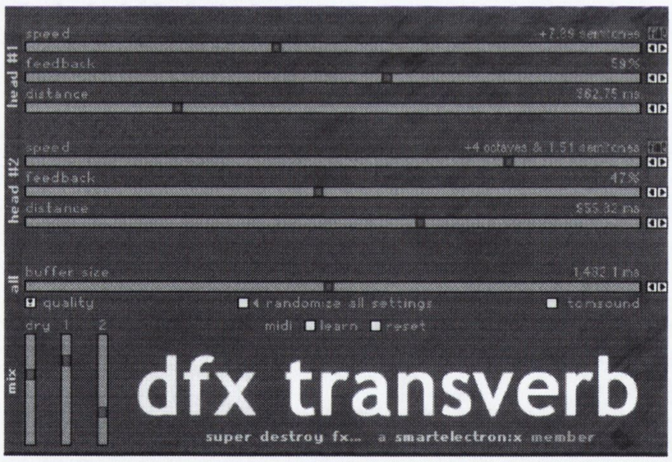

Fig. 57 DFX transverb plug-in.

An additional DFX plug-in, the 'Geometer', was implemented in *Release* (Fig. 58). The 'Geometer' works by generating 'points' or 'landmarks' on the waveform.

Each of these 'stages' can be manipulated in a variety of ways, combining to make millions of different effects.

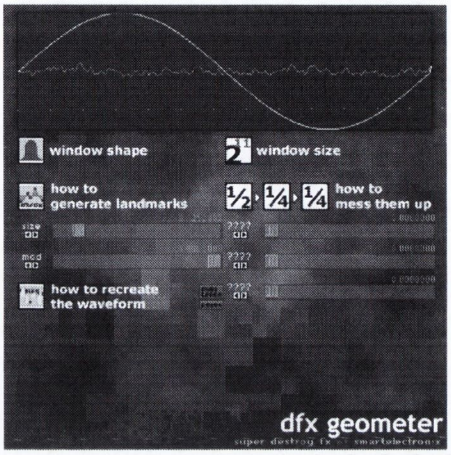

Fig. 58 DFX Geometer plug-in.

One of the key differences between electronic music and music composed for traditional instruments is that the composer not only creates the sounds themselves, but also then composes with them. The ability to get inside the physics of sound and directly manipulate its characteristics provided additional 'worlds' of artistic scope when composing electronics for PPR.

9.3 Pieces and Composers consulted during the development of *Passing / Parting / Release.*

Pieces consulted during the completion of PPR were musically both traditional and contemporary. From La Monte Young's 1960s piece *Composition 1960 #7* which consists of a B, an F sharp (a perfect fifth) and the instruction: 'To be held for a long time', to Peter Adriaansz's *Structure X111* (2005), the immersion in drone music certainly acted as a starting point for the piece. Other pieces consulted in terms of their use of dense harmonic planes were Phil Niblock's *The Movement of People Working* (2003) and David Lang's *The Passing Measures* (2001). Lang's *The Passing Measures,* written for bass clarinet, amplified orchestra and women's voices, consists of a single consonant chord that falls slowly over the course of forty minutes. Four percussionists scrape pieces of metal from start to finish, as if to accompany the consonance of the chords with the sounds of dirt and decay. In *The Passing Measures,* Lang uses sustained string and brass tones to achieve this dense tonal plane. In *Passing*, I take this technique and apply it to the string section to achieve similar results.

Composers who challenged the very notion of sound provided a great source of inspiration throughout the composition of both pieces presented. The first composer looked at was Edgard Varése. Varése embraced the other arts most enthusiastically throughout his career. In *Silence*, John Cage argued that in 1958, even though Varése was an artist of the past, he nevertheless "more clearly and actively than anyone else of his generation established the present nature of music".[102]

[102] John Cage, *Silence - Lectures and Writings* (London: Marion Boyars, 1968), 83.

Indeed, Cage's definition of 'Organized Sound' directly resembles Varése's notion that he accepted "all audible phenomena as material proper to music".[103] Varése's pieces *Ionisation* and *Deserts* greatly influenced the development of PPR. Varése uses this idea of 'Organized Sound' to achieve rhythmic and timbral grouping. In PPR, I use similar grouping in the form of 'units' in both the woodwind and percussion section. These ideas, along with harmonic, rhythmic and melodic decisions, helped structure aesthetical and methodological decisions taken when composing for traditional notation.

Stravinsky's *The Rite of Spring* (1913) and *Symphonies of Wind Instruments* (1930) also served as points of reference in constructing PPR. *The Rite of Spring*'s harmonically adventurous texture places emphasis on dissonance for the purposes of colour and musical energy. Rhythmically, it is similarly as harsh, with a number of sections having constantly changing time signatures and unpredictable offbeat accents. Stravinsky helped revitalize rhythm by using asymmetrical rhythm, the percussive use of dissonance, polyrhythm, polytonality, layering of ostinati and melodic fragments to create complex webs of interactive lines. Fig. 59 displays these varying time signatures (from the opening of the final section, *Sacrificial Dance*).

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[103] *Ibid.*, 83.

Fig. 59 Stravinsky's *The Rite of Spring – Sacrificial Dance* (1913).[104]

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[104] Igor Stravinsky, *Rite of Spring* (Mineola, NY: Dover Publications, 1989), 130.

In *The Rite of Spring,* Stravinsky uses asymmetrical rhythm and dissonance as a percussive element. In *Release,* an attempt is made to use similar techniques. A group of piano notes help to produce, in effect, a percussive element (Fig. 60).

Fig. 60 *Release* (bars 180 to 183).

In *Passing*, textures and rhythms experience sudden breaks, affecting almost every musical dimension: instrumental and registral, dynamic and rhythmic, harmonic and modal. These points of 'interruption' highlight issues in regard to musical information, and the distribution of musical information within the piece. As discussed previously, the alteration to the simultaneous presentation of rhythms, melodic patterns, loudness and spatial location results in changes in perceptual grouping.[105] In *Perspectives on Schoenberg and Stravinsky,* Benjamin Bortez and E.T Cone saw that these 'dimensions' could be defined as the following:

> This point of interruption proves to be the most immediately obvious characteristic of a basic Stravinskyan technique comprising three phases: stratification, interlock and synthesis.[106]

All these considerations, combined with the sheer aural elixir of Stravinsky's music, I believe, proved to be a further aesthetic influence in the development and execution of PPR. Traditional notation presents us with a coherent and fixed musical system, one that can be studied at length. The benefits of this include being able to directly 'see' the composer's intentions on the score and clearer directives for the performer(s).

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[105] Abrupt changes in rhythm and harmony increases stream segregation and enhances how we process simultaneous musical information.

[106] E.T Cone and Benjamin Bortez, *Perspectives on Schoenberg and Stravinsky* (New York: W.W Norton & Company, 1972), 156.

9.4 Conclusion

By researching into composer's worlds, both sonically and aesthetically, a heightened awareness of sound sculpting possibilities becomes evident. It is possible to study scores of the composers discussed above and admire the inner architecture of their compositional technique.

This is difficult to achieve in graphic notation, as only the composers *guidelines* are evident. As such, the composer is at a loss in terms of control of musical material. Part of the composer's journey through his/her career is to then find the balance between too much and too little musical information. Throughout composing PPR, innate and instinctive judgment, in terms of compositional and performance issues, often played a role in sculpting the aesthetic and methodological decisions I took during the inception and development of the piece.

Chapter Ten

Commentary on *Block / Static / Mass* - For Large Ensemble and Electronics.

(Score - Appendix V – Realization - Appendix CD 1).

10.1 Structure

Block / Static / Mass (BSM) contains three sections: *Block* (bars 1 to 110), *Static* (bars 110 to 165) and *Mass* (bars 165 to 440). *Block* presents melodic and harmonic materials that build gradually toward a forward-moving musical narrative. This presents a structure that assembles similar 'blocks' of harmonic and melodic rhythm.[107] These patterns of harmonic and melodic rhythm become interrupted by full measure rests, helping reinforce the idea that the 'blocks' are individual units of sound (Fig. 61). Harmonic rhythm builds relatively slowly, often with a single sonority lasting for one complete measure.

[107] This method highlights two 'laws of grouping' within ASA. Firstly, *Good Continuation* - elements of a pattern can establish an implied direction (smooth and continuous change of melodic/rhythmic patterns) and secondly *Common Fate* - aspects of coordinated motion (melodic and rhythmic).

Fig. 61 Using whole measure rests to separate musical material in *Block* (bars 8 to 10).

Through this process the piece's anatomy forms an incremental symmetry, in that each section increases in harmonic and rhythmic complexity. Alternatively, *Static* introduces melodic materials that are rhythmically erratic, resulting in short and sudden bursts of harmonic interruptions (Fig. 62).

Fig. 62 Varying articulation and use of rests in *Static* (bars 120 to 122).

The final section, *Mass,* implements the accumulation of musical elements from both *Block* and *Static*. This full tutti section relies on the variation of articulation and dynamics to aid instrumental separation.[108] While the percussion unit employs interlocking cross-rhythms, the woodwinds and brass use counterpoints, creating cross-rhythms that work in conjunction with the percussion section (Fig. 63). This varying alteration of harmonic rhythm defines the style and mood of the section.

[108] ASA highlighted that the perceptual segregation of sound components into a "separate streams" depends on differences in pitch, amplitude, rhythm and location and on any sudden changes in any of these.

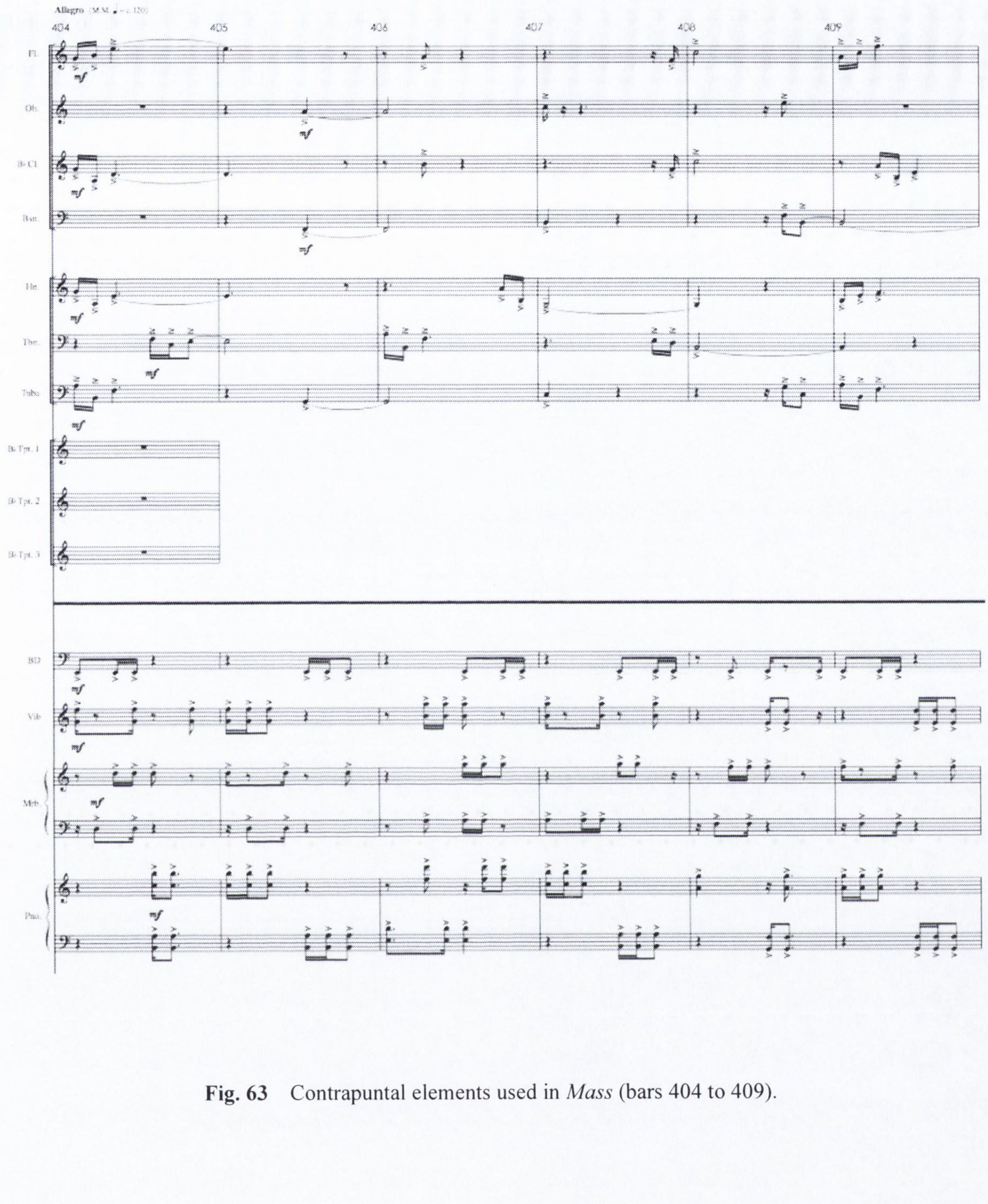

Fig. 63 Contrapuntal elements used in *Mass* (bars 404 to 409).

In the first section, *Block,* sustained notes from the double bass provide a solid low-end accompaniment that remains throughout the section (Fig. 64). These sustained tones are then utilized by both the woodwind and brass sections (Fig.65).

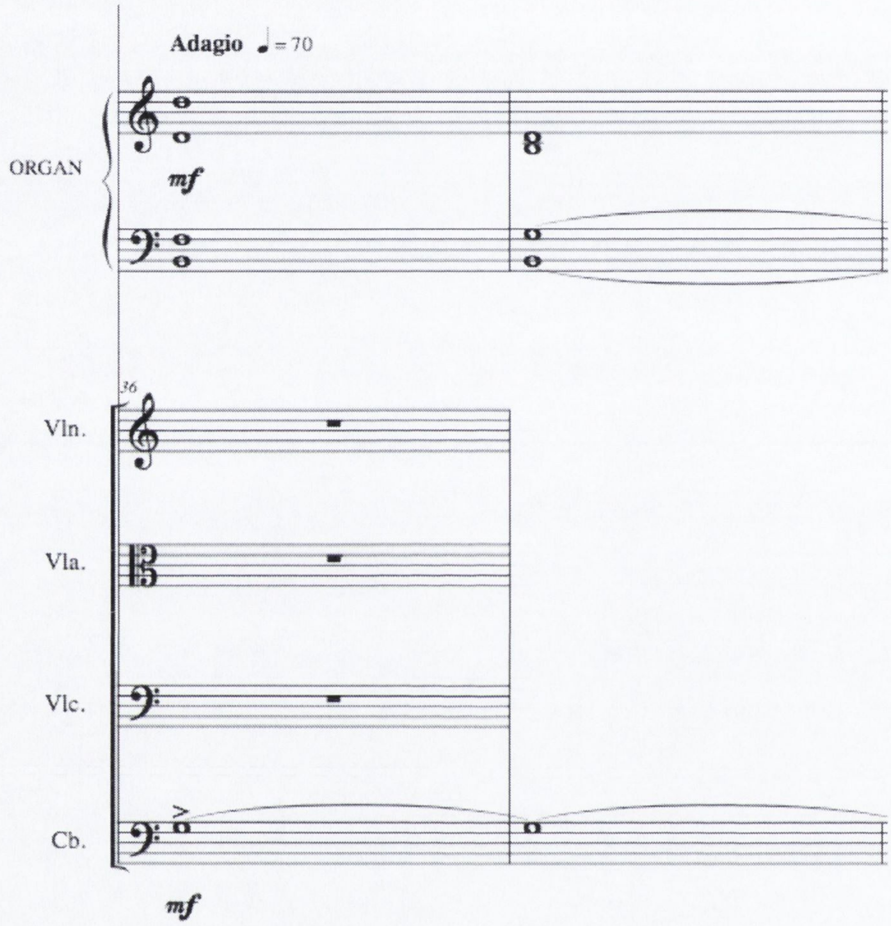

Fig. 64 Establishing bass accompaniment in *Block* (bars 36 to 37).

Fig. 65 Use of sustained tones in *Block* (Bars 36-42).

One important structural element contained within these phrases was making full use of rests. The length of silence, the distance between periods of silence, and the magnitude of silence gives the melodic material time to exist and decay naturally. The section's principle melodic motive (Fig. 66) involves the woodwind and brass sections playing parallel harmonies. This material becomes thinned out and subtracted until minimum content is left resonating.

Subtle variations in harmony and rhythm distinguish *Block* from the rest of the piece. These relationships, along with the affective qualities (psychological effects) of musical elements, define the shape and form of this section.[109]

Fig. 66 Establishment of key melodic elements in *Block* (bars 43 to 44).

Contrapuntal themes now emerge as textures begin to weave patterns. As the piano and marimba begin unison phrasing with the woodwinds and brass sections, the organ and double bass continue to act as the tonal base upon which all other harmonic progression unfolds. I found that the distribution of material, as in all orchestration, became important at this stage in developing BSM.

[109] Grouping processes shape the overall *part-whole* structure of a piece of music. Gestalt psychology proposes an organization based on grouping or configuration, elements being perceptually grouped if they were similar, proximate, formed a closed contour, or moved in the same direction.

Defining this distribution enabled me to form a template in which to group melodic information.[110] This distribution contains:

I. *Foreground*: principal voice, what the composer has chosen to stand in the limelight.

II. *Middle ground*: countermelodies and contrapuntal devices.

III. *Background*: accompaniment, chords or melodic figures.

What began as 'blocks' of sound now take the shape of ever-increasing density of melodic and harmonic motion. A melodic tension now begins, as the piano and marimba begin independent harmonies, while the vibraphone interjects themes employed previously in the woodwind section, establishing countermelodies (Fig. 67).

Fig. 67 Marimba and piano playing counter melodies in *Block* (bars 78 to 80).

[110] Stream segregation highly influences the distribution of musical material. It contains two grouping processes: *Sequential Integration* – Horizontal integration or streaming and *Simultaneous Integration* - Vertical integration or *fusion*.

Removing instruments helps introduce the preceding content through the use of a single instrument, the flute, which leads us into the finale of *Block*. Brass and woodwinds implement dense harmonic textures as the piano again leads as the foreground instrument. Finally, the use of single measure rests utilizes the power of silence, leaving wider scope for the sound masses to exist and decay.[111] The gradual decreasing of dynamical value helped move the musical material towards one last desolate piano chord, carrying *Block* to its completion (Fig. 68).

Fig. 68 The final chord of *Block* (bars 106-108).

Musicians and composers alike have always been aware of the intrinsic peculiarity of silence: "The notes I handle no better than many pianists. But the pauses between the notes—ah, that is where the art resides".[112]

[111] The 'laws of grouping' in ASA include 'Closure' – this process is based on how we deal with missing information (including the use of rests and use of silence).

[112] Arthur Schnabel, Quoted in the *Chicago Daily News* (1958).

Composer John Cage, on the other hand, once proposed that achieving silence was an impossible dream:

> There is no such thing as an empty space or an empty time. There is always something to see, something to hear. In fact, try as we may to make a silence, we cannot.[113]

John Cage approached silence with this aesthetic in mind. His landmark piece *4'33"* (1952) was an exercise in this notion. Silences used in *Block* are comparable and analogous with that of a dissolve in film editing - a gradual transition from one image to another, a change in perspective - suddenly moving the listener to another place. In the second section, *Static*, the relationships between musical elements alter, in that duration is manipulated.

Whereas *Block* deals with slowly building harmonic 'blocks' of sound, *Static* represents the opposite; *Static*, its meaning loosely defined as showing little or no change, sees the woodwind and brass instruments playing erratic short tones, again with minimal pitch deviation (Fig. 69).

[113] John Cage, *Silence – Lectures and Writings* (London: Marion Boyars, 1968), 8.

Fig. 69 Erratic tones used to achieve the sense of 'static' (bars 120 to 121).

The material in *Static* pulls apart from itself, rather than building gradually. Bringing with it more energy and a heightened dynamism in relation to the first section, *Static* presents a vastly different sound world, one with an increased tempo marking (crochet = c.120). In *Block*, the piano and string sections bring extra timbral and harmonic variation over dense and slow-moving wind and brass sections. *Static* presents an inversion of sorts in that the trumpet section now executes the string patterns from *Block*, signaling colourful bursts of sound. The string section accompanies this, beginning short glissandi (Fig. 70).

Fig. 70 Glisandi in *Block* (bars 126 to 128).

This 'static' presentation of material becomes interrupted at times when all the instruments play *tutti.* Altering the meter halfway through this section to 5/4 sees the instruments lock into synchronization. Variation of articulation and dynamics contribute greatly to this change.[114]

Themes from *Block* now enter this section in that similar dense 'blocks' of tone appear. As discussed previously, these themes serve as a signpost of musical continuity, a connection between the parts and the whole. Each section's central thematic device can be detailed as follows: *Block's* slow and dense moving tones (Fig. 71); *Static's* short and erratic motifs (Fig. 72); and *Mass's* use of cross-rhythms (Fig. 73). Elements of these thematic devices are used throughout the piece. This technique helped create a sense of continuity between the sections.

[114] ASA suggests that changes, through the alteration of timbral, rhythmic and harmonic values increases stream segregation.

Fig. 71 Slow and dense moving tones in *Block* (bars 99 to 101).

Fig. 72 Short and erratic tones used in *Static* (bars 120 to 121).

Fig. 73 Cross rhythms used in *Mass* (bars 332 to 333).

Mass refers to the piece's climactic tone and to the definition of the word itself: bulk, dimension, extent, magnitude, size, span, and volume - all encompassing the instrumentation's role within this section. The section relies heavily on the use of cross-rhythms, counterpoint and thematic elements from both *Block* and *Static.*

Mass commences with repetitive woodwind and marimba themes that flutter between trumpet lines as the bass drum and marimba push this evolution forward. Structural elements from *Block* soon appear; the use of the organ, double bass and cello help keep the bulk of the low-end sonorities present. This schema continues until the piano and organ take foreground roles. An elaborate counterpoint now dictates the woodwind and brass sections. Rhythmic development heightens as the bass drum begins cross rhythms. A harmonic return to layering of tones, similar to that used in *Block*, commences in the final stretches of this section.

Contrapuntal melodies employed in *Mass* (Fig. 74) help break up rhythmic unity, adding an array of cross rhythms and accompaniment. The brass section soon follows as counter melodies play catch-up with the percussion sections. This format continues as every unit, excluding the trumpet and string section, play interlocking and fixed pitch material.

Fig. 74 Contrapuntal themes used in *Mass* (bars 253 to 257).

Mass relies heavily on rhythmic variations. Hierarchic structures are evident in many musical relationships. In BSM, hierarchic structures are evident in each section. These structures can be divided into lower level relationships (dynamics and orchestration) and higher-level relationships (texture and tonality). Hierarchic structures help to:

I. Define individual parameters.
II. Define the form of patterns (melodic and timbral).
III. Structure harmonic relationships.

In music, these structures move from one level to another, continually altering in functional significance.[115]

[115] Perceptual grouping processes and schema-based relationships alter with variations of rhythm, pitch and timbre.

In *Block*, higher-level events (blocks of sound) continually shift while the piano and organ use lower-level events to aid instrumental separation. What acts as essentially process-based on one level (note-to-note relationships) becomes *formal* (the development of a motive, melody or theme) on the next. These relationships continue and develop throughout the section, and indeed throughout the entire piece. In *Mass*, these relationships can be broken down as follows - variation of dynamics and articulation act as lower-level processes, while higher-level interactions (tonality) help sculpt pattern-forming relationships. Hierarchic relationships help make sense of the structures and organization within a piece of music. In *Explaining Music,* Leonard B. Meyer illustrates this process of combining elements to achieve more complex structures:

> Just as the ways in which chemicals unite to form molecules are different from those involved in the organization of molecules into cells, so the ways in which tones are combined to form motives are different from the ways in which motives cohere to create larger, more complex musical events.[116]

[116] Leonard Meyer, *Explaining Music: Essays and Explorations* (Chicago and London: University of Chicago Press, 1973), 90.

10.2 Use of Electronics.

In PPR, the sound sources used in composing electronics for BSM were processed samples of prepared piano and vibraphone.

Granular synthesis was a major manipulation tool used in writing electronics for BSM. Granular synthesis uses micro-sound time scales (small units of sound, called 'grains', pieces of sound varying from approximately 1 to 50ms in length). These small pieces can then be layered on top of each other, all playing at varying speed, pitch, rhythm or volume. The result of this process became known as a granular 'cloud', a defining textural element of granular synthesis. Greek composer Iannis Xenakis (1960) was the first to explicate a compositional theory for grains of sound.[117] On commenting on what the 'grain' represented sonically, Xenakis believed that: "All sound is an integration of grains, of elementary sonic particles, of sonic quanta".[118]

Curtis Roads developed computer-based-implementation of granular synthesis in 1974 at the University of California, San Diego and in 1981 at the Massachusetts Institute of Technology. This technique appeared in several of his compositions, including: *NSCOR* (1980), *Field* (1981) and *Clang-tint* (1993).[119] The introduction of electronics in *Block* uses prepared piano samples that were processed using 'Max/MSP'.

[117] Curtis Roads, *The Computer Music Tutorial* (Cambridge, Mass: MIT Press, 1996), 169.
[118] Iannis Xenakis, *Formalized Music* (Indiana: University of Indiana Press, 1971), 54.
[119] *Ibid.* , 196.

The patch used was an 'ARGO Play Grain' patch (Fig. 75). This simple granular synthesis patch allowed for the configuration of grain intervals and duration. When these parameters are stretched out to long millisecond durations, it results in a sound that is raw and texturally sparse.

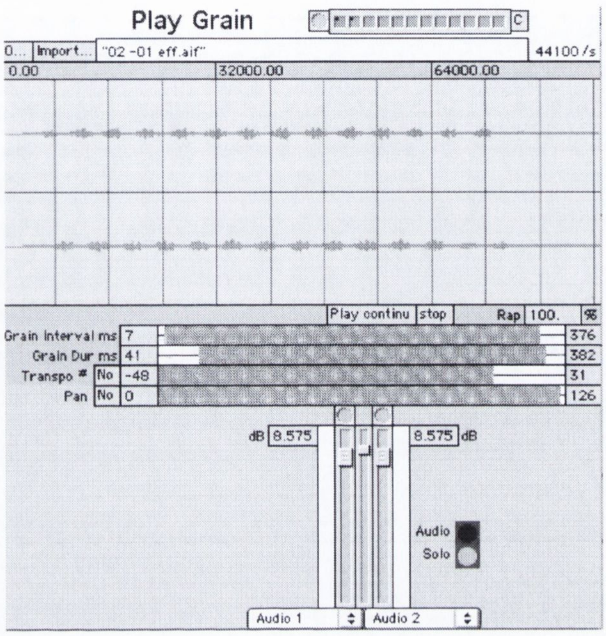

Fig. 75 ARGO's 'Play Grain' granular synthesis patch.

In *Block,* additional granular synthesis tools were utilized. The VST 'KT Granulator' (Fig. 76), developed by Smart Electronics, works in the following way - incoming (mono) sound is fed into a delay line from which small pieces of various durations and time intervals from the past are selected. Each of these pieces are then amplified, transposed and enveloped to form a 'grain'. Each grain is then randomly panned and the whole mix is sent out to a stereo output stream. Feedback of the grain output back into the delay line is also provided. The delay line can also be frozen so that the grains are only taken from what is currently stored in the delay line.

Prepared piano samples were manipulated with this plug-in and then sequenced with the piano of the MIDI realization of BSM. This resulted in a layering of tone, adding formants to the existing piano timbre. It also greatly added to the harmonic spectra of *Block*, as the samples shimmer and glisten around the piano's natural timbral presence.

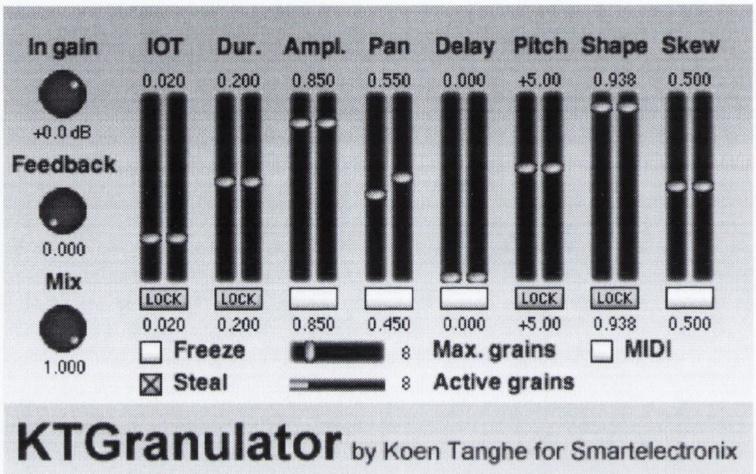

Fig. 76 Smart Electronix's KT Granulator.

In *Static,* electronics are introduced at a much later stage. During the development of the accompanying electronic parts, it became important not to overuse and overproduce the piece with unnecessary electronic accompaniments. Composing in this way allowed for the reintroduction of electronics to gain more presence within the piece. The harmonic and rhythmic content is at times strong enough and does not need additional 'virtual' textural elements. *Static* incorporates the use of 'Cycling 74 Pluggo' audio units, as previously documented in the analysis of electronics in PPR. The 'Pendulum' unit (Fig. 77) is a four-tap delay (two per channel) where a ramp wave oscillator controls the positions of each of the delays.

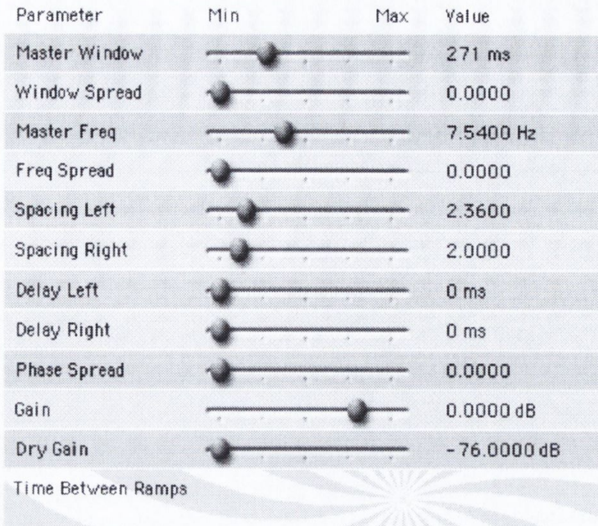

Fig. 77 Cycling 74 Pluggo audio units 'Pendulum'.

Other processing units used in *Static* include 'GRM Tools Delay', 'Pitch Accumulation filters' and 'DFX Transverb', all of which were discussed in the analysis of electronics in PPR. *Mass* concludes with an array of audio units and effects. It incorporates both instrument samples and audio files extracted from the piece itself.

The final one hundred bars of *Mass* use these filters to accentuate the chaotic and final climatic passages. *Mass* implements additional 'Pluggo' filters, a '16 band vocoder'. This vocoder consists of two banks of band pass filters, connected in parallel. One signal, the carrier, is sent to one bank; another signal, the modulator, is sent to the second bank. The filter banks divide each signal into a number of frequency bands, one band per filter. By extracting the percussion section from *Mass* and applying this vocoder filter, it allowed for the additional reinforcement of rhythmic elements and created varying harmonic shifts. Finally, both the 'KT Granulator' and 'Pluggo's Pendulum' are re-incorporated in the finale of *Mass* on a gradual linear fade, helping to enhance the sense of continuity in the electronic accompaniment throughout the piece.

Composers' have always possessed the desire to explore new ways of extending the way we hear music. Preceding the advent of electronic music, some choose to extend musical vocabulary by imitating nature (Vivaldi's *Four Seasons*, Beethoven's *Pastorale Symphony*) or by adding sound effects (funeral gongs in Berlioz's *Symphonie Fantastique*, anvils in Wagner's *Das Rheingold*). The next step was to incorporate non-natural sounds into traditional music (a wind machine in Ravel's *Daphnis et Chloe*, airplane propellers and sirens in Antheil's *Ballet Mechanique*).

In PPR and BSM the incorporation of electronics, I believe, performed a similar role to the use of graphic notation - it allowed for the expansion of both timbre and harmony, transforming how the composer and performer *thinks* about sound.

10.3 Pieces and Composers consulted during the composition of *Block / Static / Mass.*

A number of pieces influenced the aesthetic and methodological development of BSM, one being *Livre pour Orchestra* (1968) by Witold Lutosławski. Lutosławski's technique of using the orchestra in separate blocks - strings, wind, brass, keyboards (Piano, Celeste, Harp) and percussion became an ideal incorporated into the development of BSM. The work contains separate pieces rather than a unified cycle. The work is divided into four 'chapters', separated by three 'interludes', without any break in performance. Lutosławski refers to Couperin's *Livre de clavecin* and Bach's *Orgelbüchlein* as points of reference in that they were both collections of various lengths and forms.

His intent in providing these interludes was to give the listener an opportunity to relax the level of concentration from the more concentrated attention demanded by the main movements.[120] The structure of each 'chapter' utilizes the concept of foreshortening in which the lengths of the phrases in each of the individual solo lines shortens as the approach towards the climax progresses, and the entrances of subsequent instruments or groups of instruments occur sooner, creating a denser texture. These techniques are evident through his work and also appear in *Concerto for Orchestra* (1950-54).

[120] Tadeusz Kaczynski, *Conversations with Witold Lutosławski* (London: Chester Music, 1972), 166.

In the first movement of *Livre pour Orchestre*, the overall texture is given to the strings; only at the very end is it transferred to the brasses, which are then interrupted by the percussion, piano, contrabassoon, tuba and basses. In *Static*, an attempt is made to take this technique and apply it to the woodwind and brass sections, while the piano, organ, trumpet and string units interrupt the harmonic plane only temporarily before the woodwinds resume (Fig. 78).

Fig. 78 Transferring texture to the piano, organ and strings in *Static* (bars 120 – 122).

The thematic material that Lutosławski utilizes is *texture* itself - a texture that is deep and shallow, agitated and tranquil. Steven Stucky, assistant professor of music at Cornell University commented on this very idea in *Lutosławski and His Music*:

> It is difficult to imagine more persuasive evidence for the thesis that, in the hands of a composer of subtle and sophisticated skills, the qualities of texture can take on thematic substance no less compelling than the more traditional thematic materials of melody, rhythm and harmony.[121]

BSM pays homage to Lutosławski's texture-based sound world, one that synthesizes the conceptual with the compositional, one built out of contrasts; of intervallic character and interval combinations.

Igor Stravinsky's *Interlude,* part of his *Requiem Canticles* (1965-66), also played a role in influencing my approach to BSM. This work calls for four-part mixed chorus, three flutes, alto flute, two bassoons, four horns, two trumpets, three trombones, timpani, xylophone, vibraphone, harp, piano, celeste, and strings. The work is twelve-tone and uses two closely related rows. The rows are manipulated extremely intricately. Rotation of hexachords and vertical sonorities are used in addition to standard canonic manipulation. Certain aspects of the work pay homage to Verdi's *Requiem,* a piece Stravinsky was studying at the time of composition. Some commentators see the progression of the styles in the movements of the *Requiem Canticles* as an overview of the styles employed throughout Stravinsky's career as a composer. *Interlude* recalls stylistically similar passages throughout Stravinsky's neo-classical period. *Requiem Canticles* was written when he was eighty-five years old and in failing health, fully conscious of the imminence of his own death. *Requiem Canticles* makes a moving and satisfying conclusion to Stravinsky's long creative life.

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[121] *Ibid.*, 167.

10.4 Conclusion

As documented in the analysis of PPR, Stravinsky's primary influence was both musical and philosophical. His use of rhythm, metric alteration and the use of the orchestra in pools of small groupings influenced ideas I implemented in BSM ranging from instrumentation to harmonic considerations. Secondly, his attitudes toward musical form and sound influenced an array of Twentieth Century composers.

When discussing ideas of form and meaning in music with Robert Craft in *Expositions and Developments*, Stravinsky said the following about the composer:

> The composer works through a perceptual, not a conceptual process. He perceives, he selects, he combines, and he is not in the least aware at what point meanings of a different sort and significances grow into his work. All he knows or cares about is his appreciation of the contour of the form, for the form is everything. [122]

Finally, philosophically, Stravinsky was just as potent, in that he saw that music was mostly concerned with:

> an expression of communal, collective experiences; it is symbolic and stylized rather than representational; it taps into ancient, timeless ceremonies and acts of worship.[123]

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[122] Igor Stravinsky and Robert Craft, *Expositions and Developments* (London: Faber and Faber, 1962), 102.
[123] Jonathan Cross (ed.), *The Cambridge Companion to Stravinsky* (Cambridge: Cambridge University Press, 2003), 251.

Chapter Eleven

Conclusion

11.1 Overview

This paper documents the structural, aesthetic and methodological steps carried out in composing for both graphic and traditional notation. I developed three pieces for graphic notation: *Ornament Motion, Approximate Motion and Framed Motion.* Along with these I composed two pieces notated traditionally for large ensemble and electronics: *Passing / Parting / Release* and *Block / Static / Mass.*

Throughout Chapters 1-5, the field of writing for graphic notation was examined in three parts. Firstly, the experiments within a specific group (The New York School of Composers) were studied. The work of Morton Feldman and Earle Brown in particular were examined, and methodological similarities were drawn between their work and the graphic scores presented. Further variations of graphical notation, determinate and indeterminate, were also examined. Secondly, the cognitive methods by which we process graphic notation were analyzed, in particular, schemas. These functions are summarized as follows:

I. Schemas are storage devices.
II. Schemas are mental structures that help us organize information.
III. Schemas effect how we interpret information.
IV. Schemas help us forecast and predict a sequence of events.
V. Schemas can have both a fixed and variable content.
VI. Schemas change with situations.

What is most important about a schema is this: in traditional notation, pictorial signs trigger actions that are pre-conditioned. In the graphical score, because the signs do not trigger an a priori response (as it were, there are no underlying universally understood schemas for graphical notation) the manner in which the signs are interpreted is much less prescribed. Fig. 79 illustrates this process:

Fig. 79 Illustrating the process by which schemas aid in the translation of images in both traditional notation and graphic notation. The first image is easily recognizable as the bass clef. Our memory has previously built a schema for this image; it has a fixed content. The image below is unique and new, thus requiring different schematic processing, translation and storage processes.

From this we can see that we perceive and remember experiences, musical or otherwise, in terms of preconditioned or learned schematic processes. The issues addressed by Albert Bregman in *Auditory Scene Analysis,* as discussed in Chapter 8.2, further document this process.[124] In *Music, The Arts and Ideas*, Leonard Meyer states the importance not only of this symbolic familiarity, but also the role tonal familiarity plays in schematic perception within music:

> The more patent and better known a particular schema is, the more the other parameters of sound can be varied without obscuring the tonality of pattern relationships. The almost complete absence of such archetypal patterns in much experimental music immeasurably increases the tasks of perception, comprehension and memory. [125]

Performance considerations were also examined. From this a number of issues were highlighted. They included:

I. **The Background of Performer:** This is dependent upon the performer's knowledge of contemporary music, and its performance trends.

II. **Communication**: The relationship between composer and performer must be strong. The composer must set directives that are appropriate for the performer to execute.

III. **Preferred Style**: Traditional performance training is largely based upon the physical and hierarchical separation of playing and creating. The performance of graphical scores sees these two worlds collide. Performers who are involved in contemporary and improvised music are generally outstanding in the interpretation of graphical scores.

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[124] In ASA, Bregman developed schematic theories about how we process music by looking firstly at the *parts* (timbre, pitch) and then the *whole* (the fusion of these).

[125] Leonard B. Meyer, *Music, The Arts and Idea – Patterns and Predictions in Twentieth Century Culture* (Chicago: University of Chicago Press, 1967), 287-8.

After considering these issues, Chapter 7 examined my transition between writing for graphic and traditional notation. It examined the characteristics of both forms of notation and the reasons why it was no longer valuable to use graphic notation in my compositional output.

From Chapter 8 onwards, similar areas as documented above were analyzed, this time in terms of traditional notation. These included music cognition and the processing of musical information, performance considerations, the development of electronics in both pieces presented, and the influences on the compositional process, including seminal pieces and composers. Firstly, structural analysis detailed the implementation and variation of key musical concepts (the use of pitch, rhythm and timbre). Secondly, aesthetic and methodological steps addressed included the incorporation of concepts from music cognition and *Auditory Scene Analysis*. These included:

I. **Schematic Processes** - In both PPR and BSM this 'discussion' between musical materials is organized through schema-based organizations and stream segregation. The composer then structures these into pattern-forming relationships.

II. **Retention and Reproduction** - Through the 'laws of grouping' the listener retains and reproduces musical information in PPR and BSM through the perceptual segregation of sound into sequential streams.

III. **Hierarchical Structures and Frameworks** - These relationships exist in PPR and BSM as two grouping processes: *Sequential Integration* and *Simultaneous Integration.* They explore the relationships between lower levels (articulation and orchestration) and higher levels of musical material (texture and tonality).

IV. **The Musical Experience** - In PPR and BSM the listener organizes the segregation of streams of musical information at different levels through conscious and subconscious memory processes. This experience takes place in the present, which, by means of recollection and reproduction, includes elements of the past and future.

From this, what I found was that writing for both graphic and traditional notation altered the way we communicate through music. At cognitive and aesthetic levels, I found that both forms of notation engage within us conscious and subconscious responses. These processes operate at different levels and are affected by the notation employed.

I believe that music cannot communicate, let alone survive, unless it contains a high degree of unconscious content. The level to which this unconscious content operates depends on the notation implemented. In traditional notation, this unconscious is evident in the composers' initial creation, the development of a theme or idea. In graphical notation, this operates on two levels, as above but also in relation to the performers' interpretation of the score. Music written in traditional notation has been able to be read and exchanged by musicians across language and cultural boundaries for hundreds of years. Over this period, I feel that traditional notation developed not so much in the interests of artistic expression, but as recognition of the importance of adherence to certain musical parameters (pitch, rhythm, timbre).

In *The Concept of Music,* Robin Maconie discusses a similar notion:

> Music has been frequently described as a language. Like any other written language, notation is the servant of expression, but equally a medium of independent thought. The art of making notation work is the art of knowing what notation can do best.[126]

'What notation can do best' (for traditional notation) include immediacy, its documentary precision and the fact that it is universally understood. For graphic notation, I discovered that none of these strengths were evident. It may exist as a *servant of expression* (but ultimately its commonalities with a coherent system of notation, in contrast to traditional notation, were limited).

[126] Robin Maconie, *The Concept of Music* (Oxford: Clarendon Press, 1990), 113.

Presented within this report are three pieces written for graphic notation and two pieces for traditional notation. By isolating these two forms of notation it was possible to compare and contrast the varying levels of utilization between them. Notation itself sets up much of what happens within music. Traditional notation presents to us a fixed and coherent musical impression because "it is also manifestly a code, and inherently a rationale, of instructions as to actions, emphasis and timing".[127]

[127] *Ibid.*, 3.

11.2 Current / Future Research

Our perception of the arts is constantly being reconfigured thanks to technological advances - we can communicate and interact in a whole new way. Planned attempts to extend the research presented in this document include the incorporation of technological platforms. Multimedia composer Hans-Christoph Steiner implemented the use of *Pd* (Pure Data), a graphical data-flow programming platform, for the generation for the score to *Solitude* (2007). The score was created using Pd's graphical data structures. Each colour within the score represents a sample. The graphical forms generated in Pd trigger samples that generate the music. (Fig.80). On commenting on his ambitions within the piece, Steiner said the following:

> I pursue the intersection between timbral and tonal expression. Tonal expression is deeply embedded while timbral expression brings new opportunities for exploration. Timbral music requires new methods of composition to break free of the dictates of Western music notation. Sampling provides an avenue for using tonal music within other frameworks. I use my own graphic notation system, the scores are then played programmatically using samples as the source. This provides for seamless intermixing of melody and timbre and the interplay between the two. [128]

[128] *Solitude* (http://at.or.at/hans/solitude/, 15 August 2008).

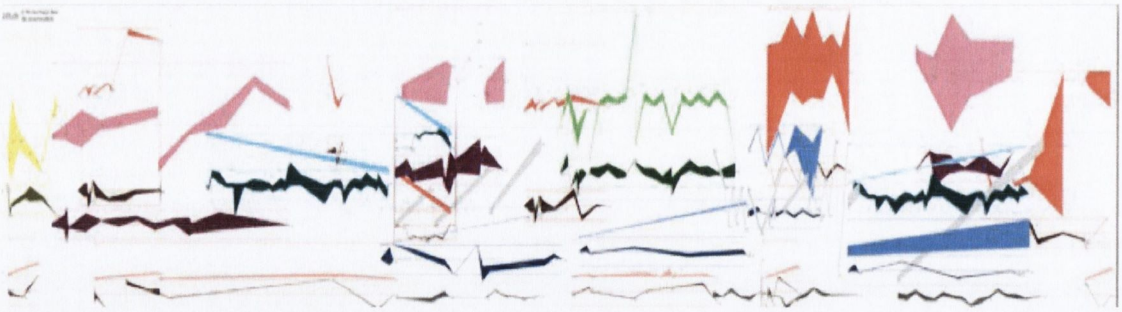

Fig. 80 Excerpt from Hans-Christoph Steiner's *Solitude* (2007).

Steiner's score is interesting in terms of its presentation. There are no performers in this piece; it is purely electronic. The result of this is that the piece is left somewhat lacking in emotional content. I also attempted to create a newer, more current, type of graphic score making use of recent technological advances. The test score for *Radio Aurora* (2008) for string quartet and electronics was generated using the video editing software 'Adobe Aftereffects'. An early draft, presented in **Appendix DVD I**, represents a test demonstration of what the score may resemble on completion.

The core idea behind this piece was that both the performer and composer not only create the score, but also execute it. During rehearsals, incoming audio information is fed into Max/MSP's 'Jitter' video programme. Improvisations from the players are stored and digital graphical imagery is then generated from this. This material then acts as a basis for live performances. In a live environment, the composer manipulates the video material to generate 'live virtual scores' while the performers select pitches of their choice and then try to recreate sonically the fluctuations of the graphic material as they see fit.

Furthermore, the composer has the ability to manipulate the incoming audio through Max/MSP. Thus, both the performer and composer can execute the piece in a live environment. Fig. 81 is an extract from the score.

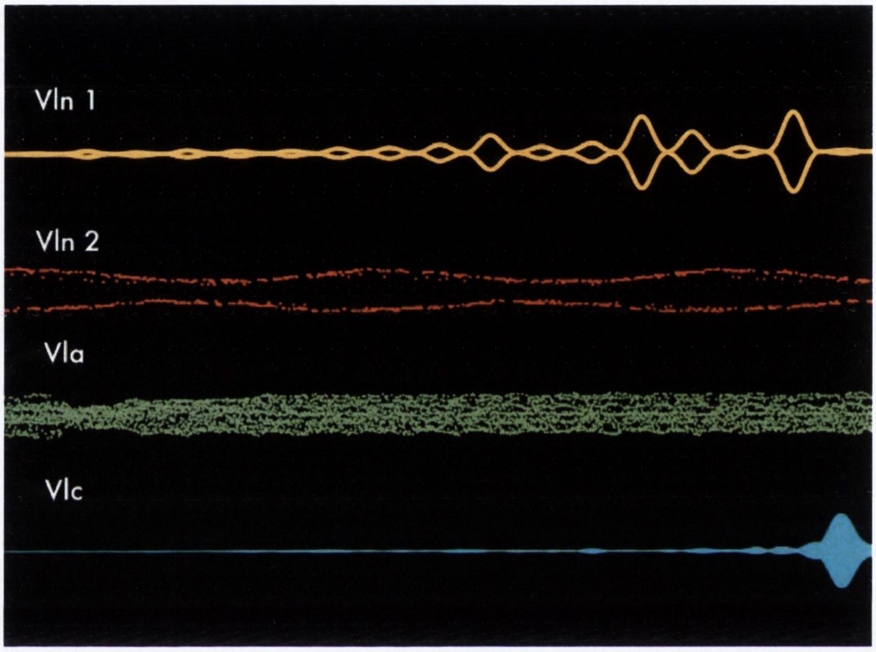

Fig. 81 Screenshot from the score from *Radio Aurora* (2007).

In considering the incorporation of traditional notational parameters into these trends and experimentations, I would suggest the implementation of extensive graphic notation libraries and tools into notation software platforms such as 'Finale' and 'Sibelius'.

Through this, the composer would have the option to add graphical elements to a traditionally notated score. Finally, these current experiments within notation highlight the possibilities now available for the representation of new music. Both are primarily directed towards the use of graphic notation. I believe that this represents the direction of future notational experiments: a software programme where the composer and performer execute the piece together.

11.3 Conclusion

In an article entitled 'Beyond Notation', the composer Trevor Wishart discusses some of the discrepancies between conventional notation and the experience of music. He speculates about the possibility of replacing conventional notation by computerized languages for digital sound-generation, proposing a music containing no unconscious operations at all. He argues:

> Total one-to-one correspondence between the notation procedure and the sound itself means that we can use notation to explore the internal architecture of sound. Ultimately, the notation – in fact a set of programmes that generate digital data – becomes a creative tool at a deeper level than the traditional Western system.[129]

Wishart's proposal did not consider an important factor. Composing music in this fashion would eliminate the composer from the communication of any kind of creative dialogue with the listener. Musical composition exists on two distinct levels: the level of *production* and the level of *reception*. Key communicative devices implemented in music and indeed notations are production and reception. The production is the formal structure a composer embodies in his/her music, and the reception is the ways in which the performer interprets and the way the listener experiences it.

Working with both notation systems involves the constant readjusting and redefining of musical material. This readjusting sees the 'outer' visions (structure, harmonic/rhythmic language) mirroring the 'inner' (aesthetic, methodological) vision. This 'outer' vision involves processes previously discussed - *exposition, juxtaposition* and *opposition*, the 'inner' referring to the psychology of composing music.

[129] Trevor Wishart, *Beyond Notation* (British Journal of Music Education), 311-26.

The title of this report, *Communication and Control,* refers to the most essential elements within any notational system. The differences between the notational systems examined are not only the varying levels of control and communication, but also encompass varying relationships that exist between the composer and performer. By controlling musical elements, I believe the composer can move towards a heightened sense of communication in composing music:

> Every move towards logic and coherence in composing is in fact a move towards communication. [130]

From experimentation to standardization, from the streaming and grouping of musical materials, between the conscious and unconscious of the creative mind, working with both forms of notation has shaped, reinforced and strengthened the aesthetic and work methodology. It has also developed not only my compositional processes but also to my working relationship with the performer.

Composers strive to disturb this pre-existing 'created unity' in the pursuit of greater levels of communication and control. Graphic notation still remains an experimental pursuit in music, systems for advancement and progression, ones seeking new modes of musical thought. The function I intended graphic notation to serve in my music was to find openness towards new, insightful modes of communication and control. Yet I found that it was no longer precise enough for me at this particular developmental stage in my compositional career. Ultimately, I found that traditional notation in the end provided me with a heightened sense of control and dictation in composing. Neither notational system can be seen as the correct one to utilize when writing music. Each has its benefits and limitations, its stability and discourse, and indeed different types of communication and control.

[130] Aaron Copland, *Music and Imagination* (Cambridge: Harvard University Press, 1961), 47.

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Appendix I

Modular Motion (Score)

For Viola, Cello and Electronics

MODULAR MOTION 10 mins
DIRECTIONS

For Viola, Violin, Cello and Electronics.

Module - a unit, section, or component with a specific function. Each of the modules presented in this score represent such components. These units are abstract and constitute geometric rather than symbolic representations of duration and pitch. The frequency range in the piece is relative to that of each instrument performing. Pitch is dictated by the location of the geometric shapes within each module (players must judge approximate pitch from this location).

The piece has four modules:

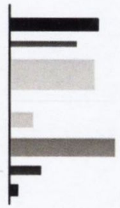
A 00:02:00 - 00:04:00
B 00:04:00 - 00:06:00
C 00:06:00 - 00:08:00
D 00:08:00 - 00:10:00

- Loops: The diameter of the circles determine duration and size of each circle indicates dynamical level.

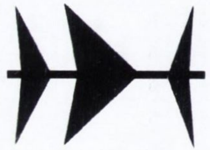
- A random collection of notes, dictated by the performer.

Bowing directions - 'calm'

Bowing directions - 'fiery'

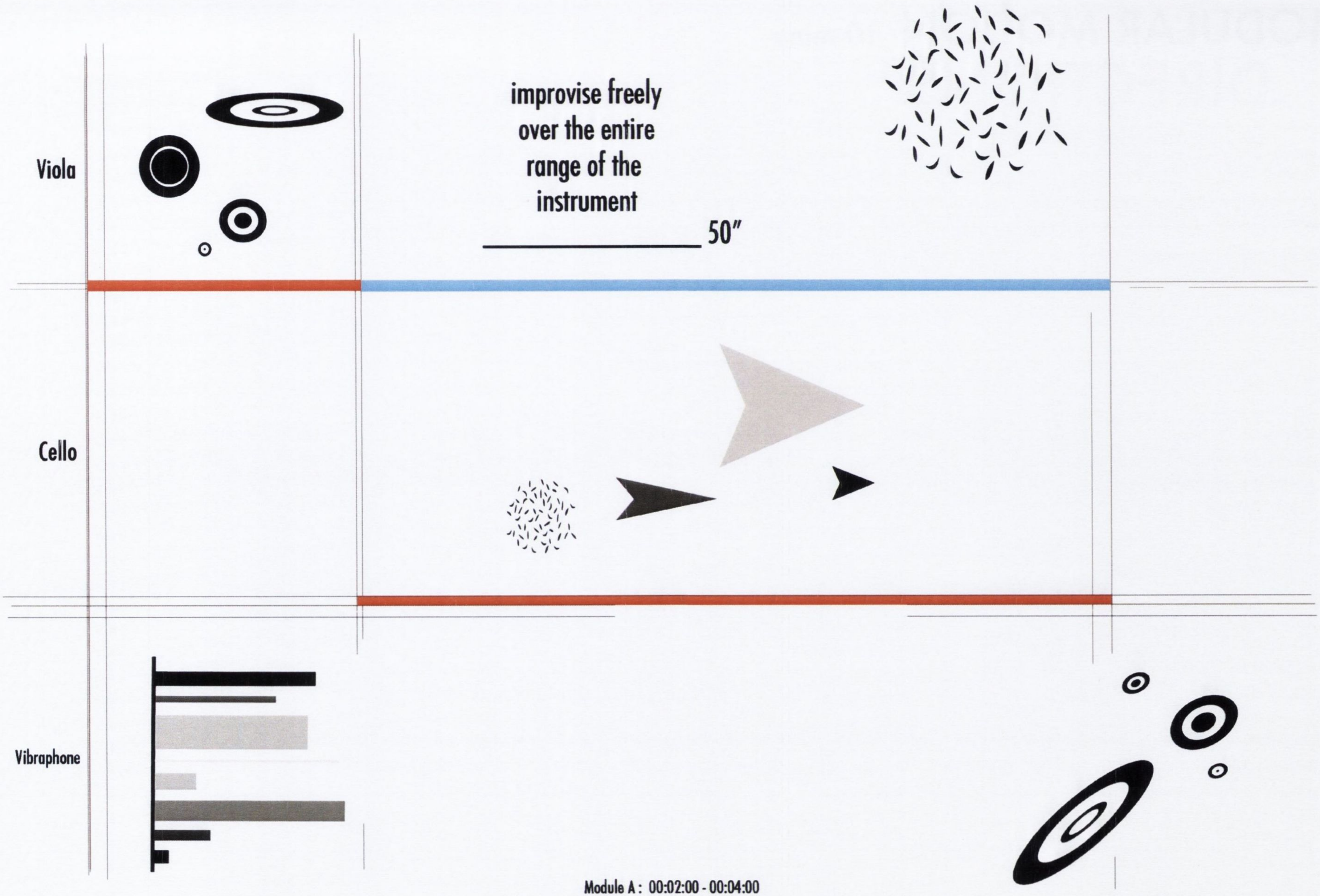


- These solids represent sustained tones. The amount of grey represents the dynamical range within the module while the height dictates duration.

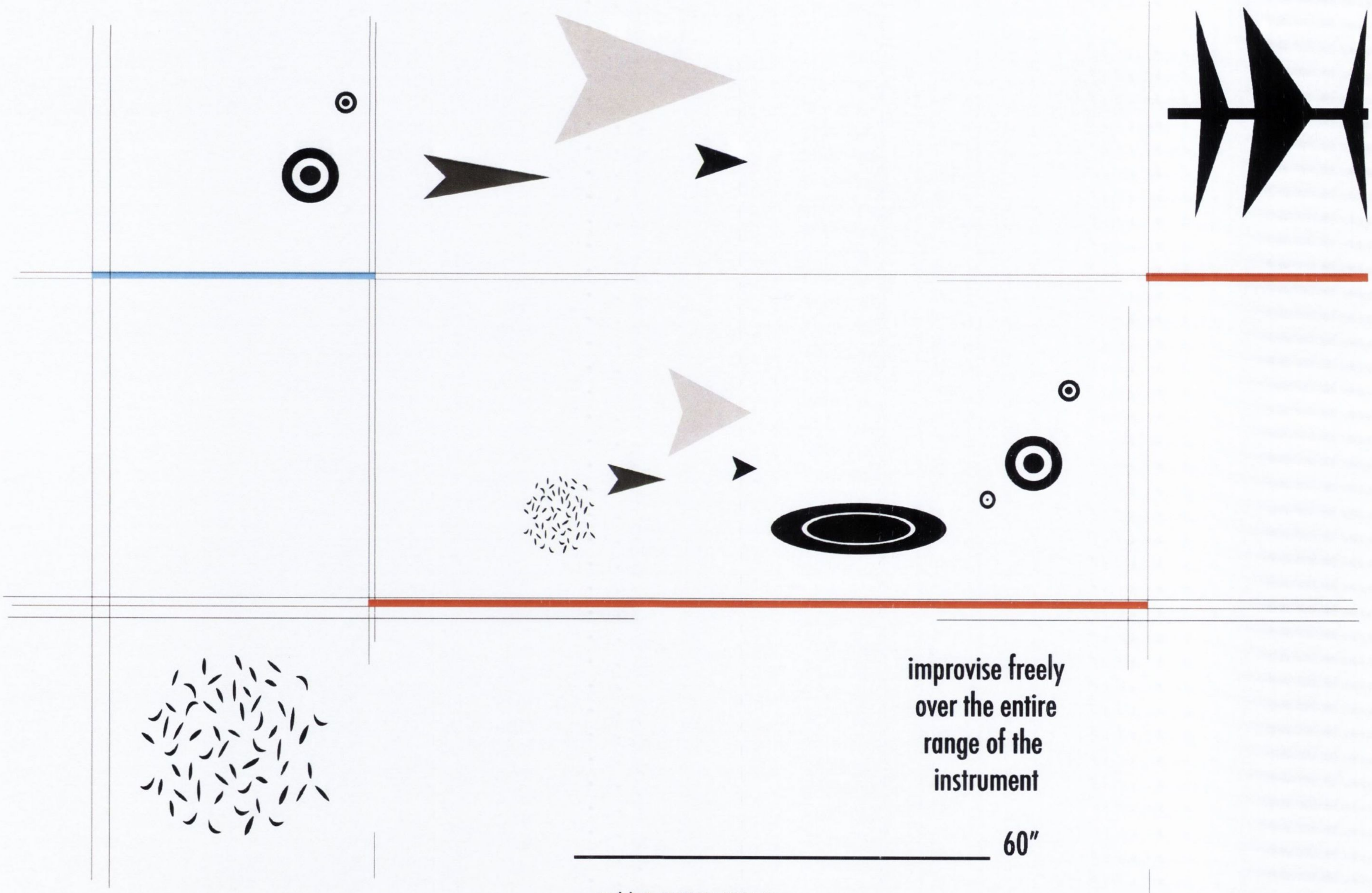


- The larger the shape, the more dynamic the atta

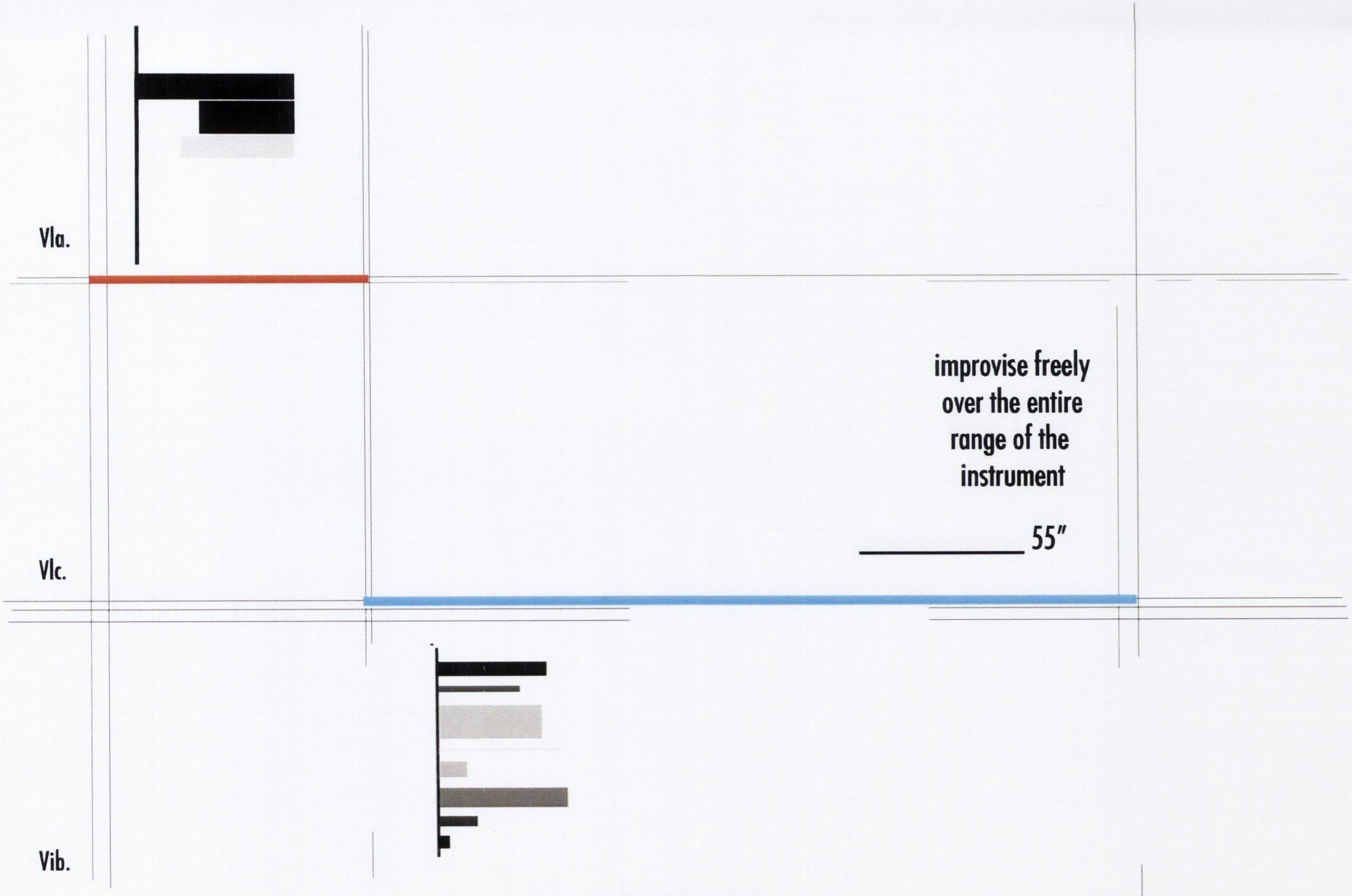
Bursts of white noise are used to signify the completion and introduction of each section. The benefit of using such a system is that the performer may expand, contract, or remain on a section until a cue is heard. In the event that a performer has not yet moved on to another module or is in the middle of a module when the aural cue is heard, the module may be continued on to the next section and terminated. The performer should also stay above the line belonging to each instrument. This represents a suttle contrast to the modules which rely on the performer's interpretation of graphic representations. The modules, along with the graphical symbols, act as a catalyst for the performer to respond to the piece in "intuitive time" rather than a metrically rational performance, thus presenting and contributing personal correlations of sight to sound.

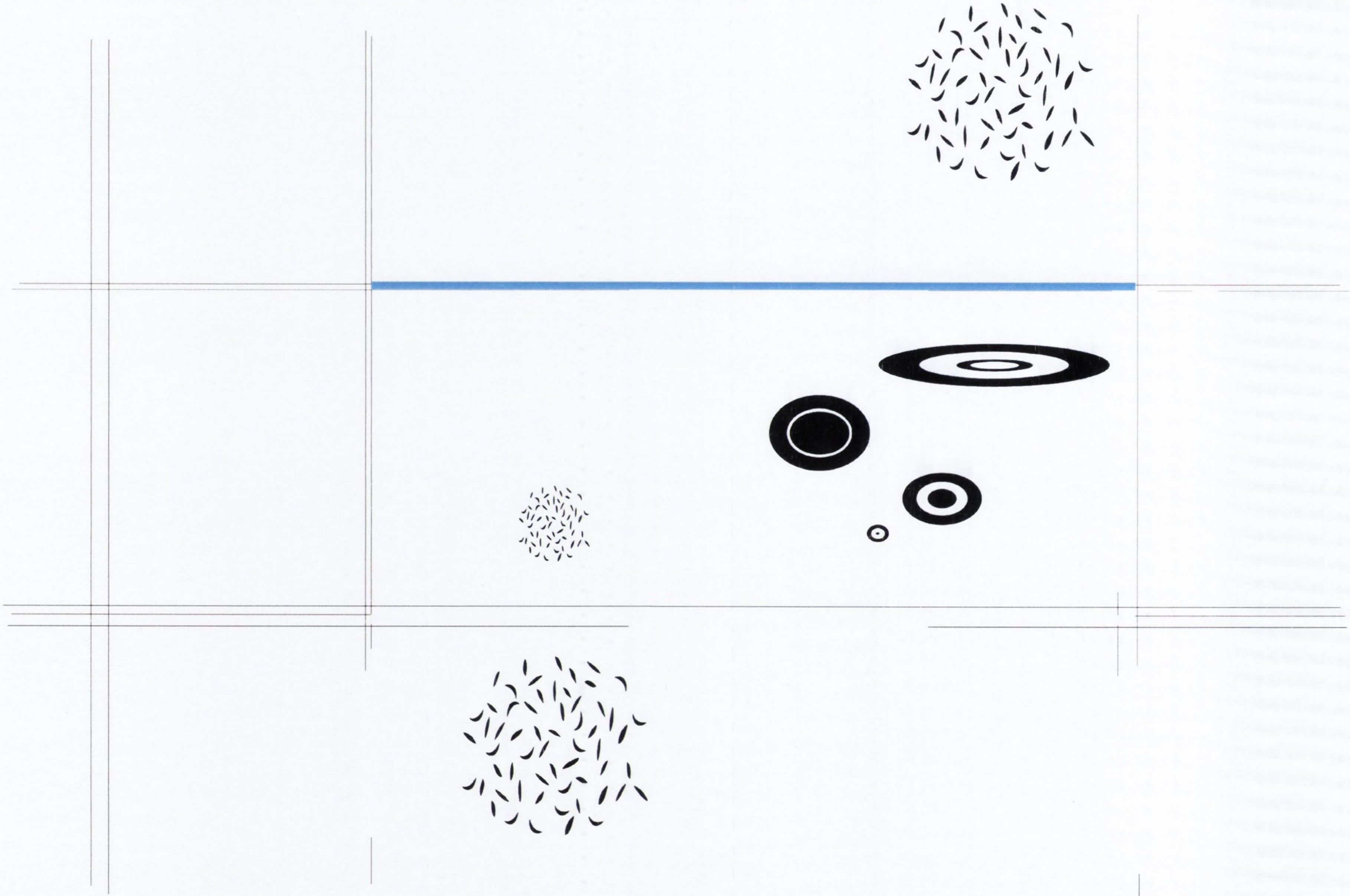


Module A : 00:02:00 - 00:04:00



Module B : 00:04:00 - 00:06:00


Vla.
Vlc.
improvise freely over the entire range of the instrument
55"
Vib.



Module D : 00:08:00 - 00:10:00

Page Four

Appendix II

Approximate Motion (Score)

For SATB and Electronics

APPROXIMATE MOTION 13 mins

DIRECTIONS

For SATB and Electronics.

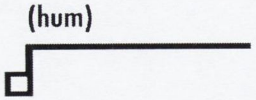
The title of this piece indicates approximate values in relation to pitch. It is up to the performer(s) to judge the 'approximate' pitch (pitch values are divided into high,middle and low range).Most figures are five seconds in duration, with gaps of silence from two to five seconds. The intention of this is to have the live electronic manipulation to 'echo' the performer's realization. Electronic manipulation processes the vocal noise only. The directions for such manipulation and each performer's intro/outro cues are documented in Index II while directions for the performers are given in Index I.

: The shape's position within the score dictates pitch.

: As above with silences when illustrated.

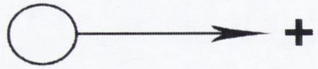
: A glissando into the lower register. The dynamical level is indicated by the heavy line.

: Syllables sung in a sustained manner with a swell.



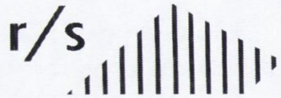
: Square notehead indicates that the pitch is to be hummed.

: Voice wavering.

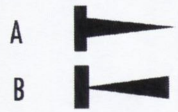


: Mouth open, then gradually closing mouth.

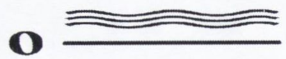
: Mouth open, then closed. Can be implemented sung or unsung.



: Flutter - Tongue on letters R/S. Relative dynamic level is shown by the length of the lines.



: A - Exhaling B - Inhaling (Sung or unsung).

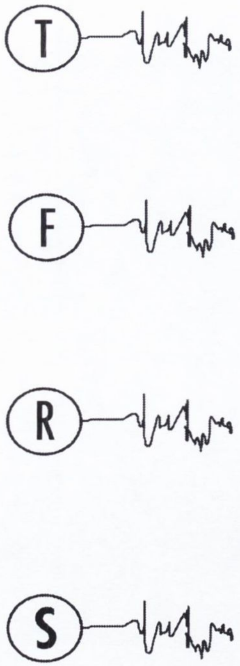


: A slow, wide vibrato (Pitch approximate).

: Voiced, but breathy.

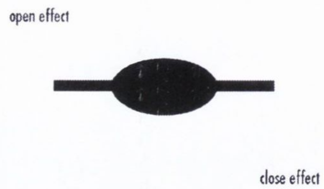
Index I

◇ : Whispered (Pitched or Unpitched).

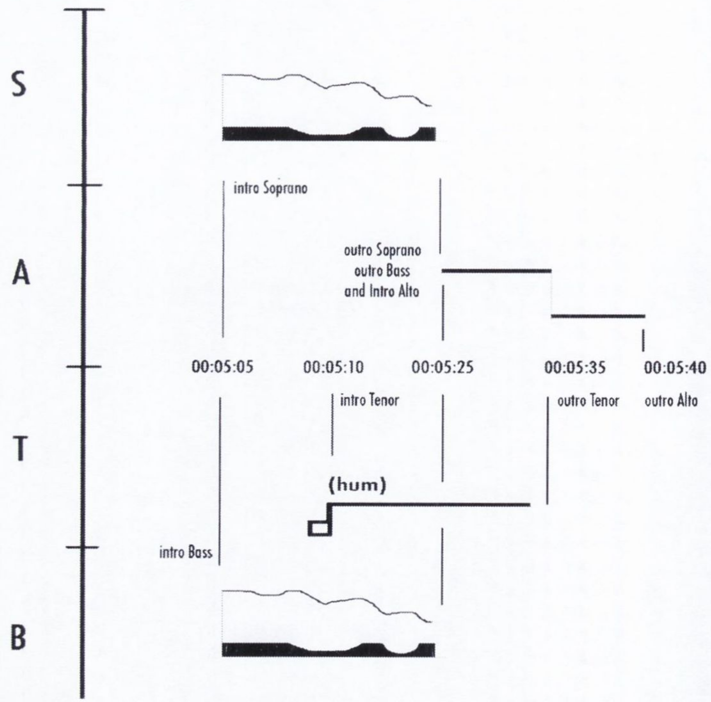


: A hissing sound with fluttering on the indicated letter.

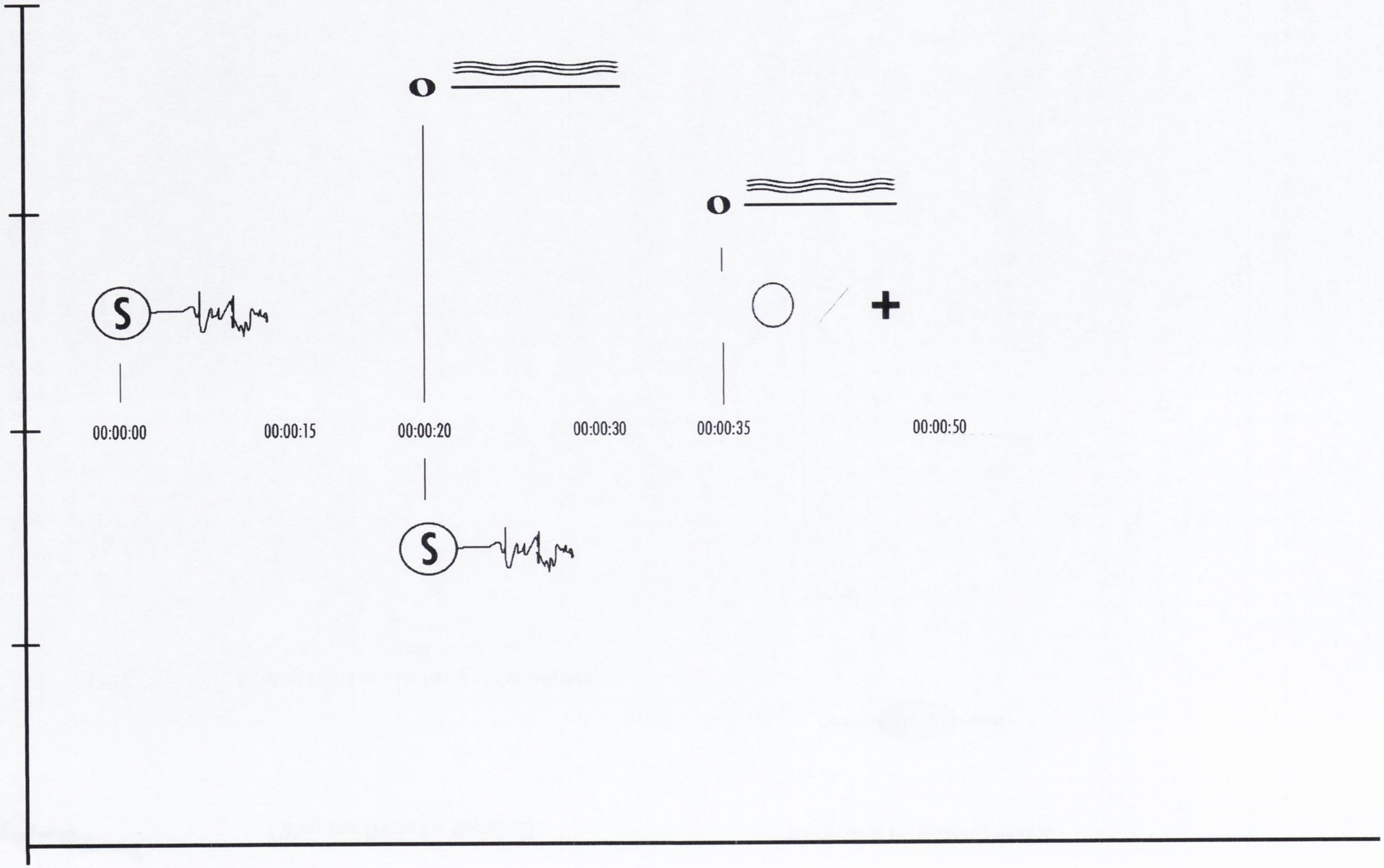
DIRECTIONS FOR ELECTRONIC MANIPULATION:



EXAMPLE OF CUES FOR PERFORMERS:



Index II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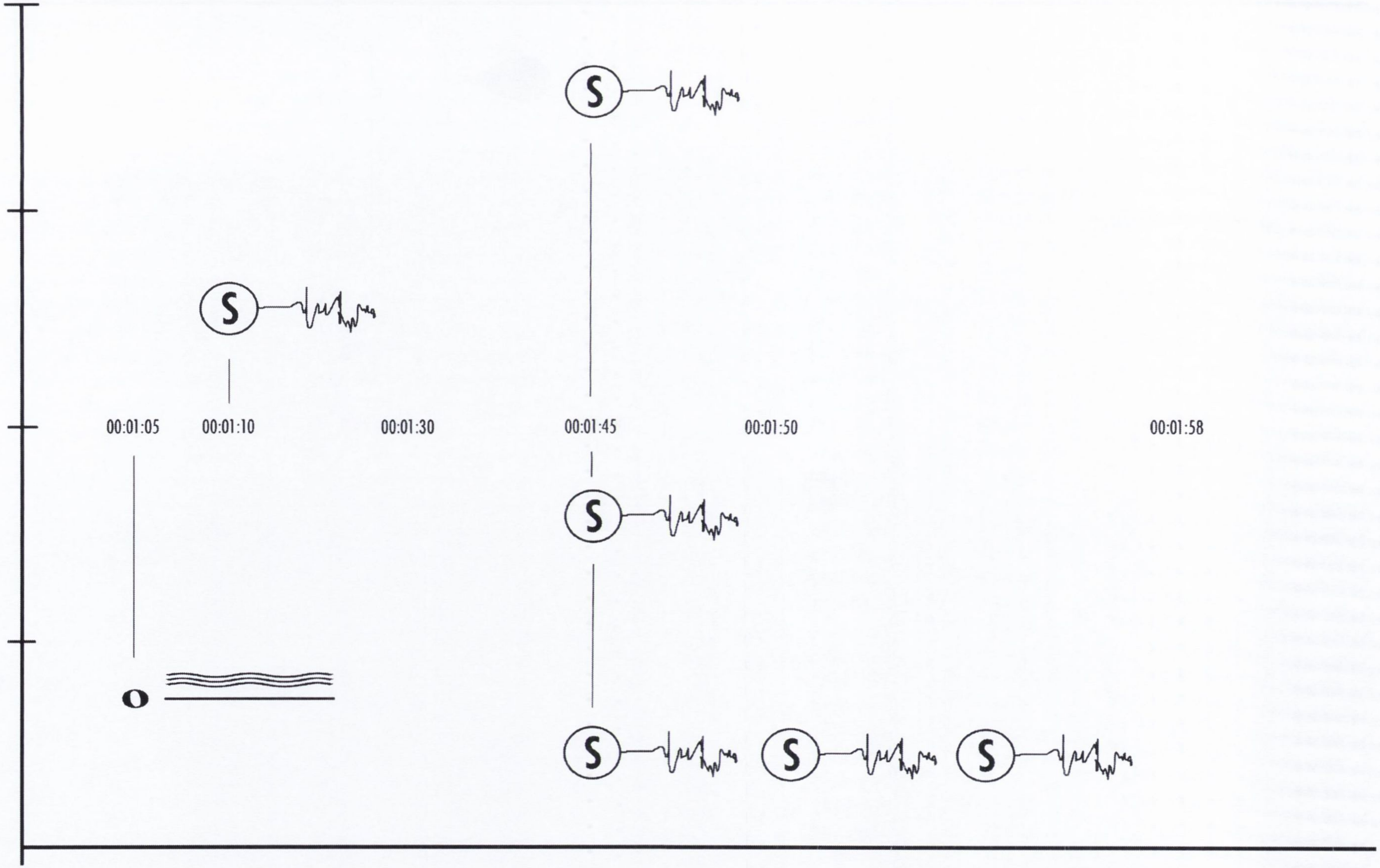
S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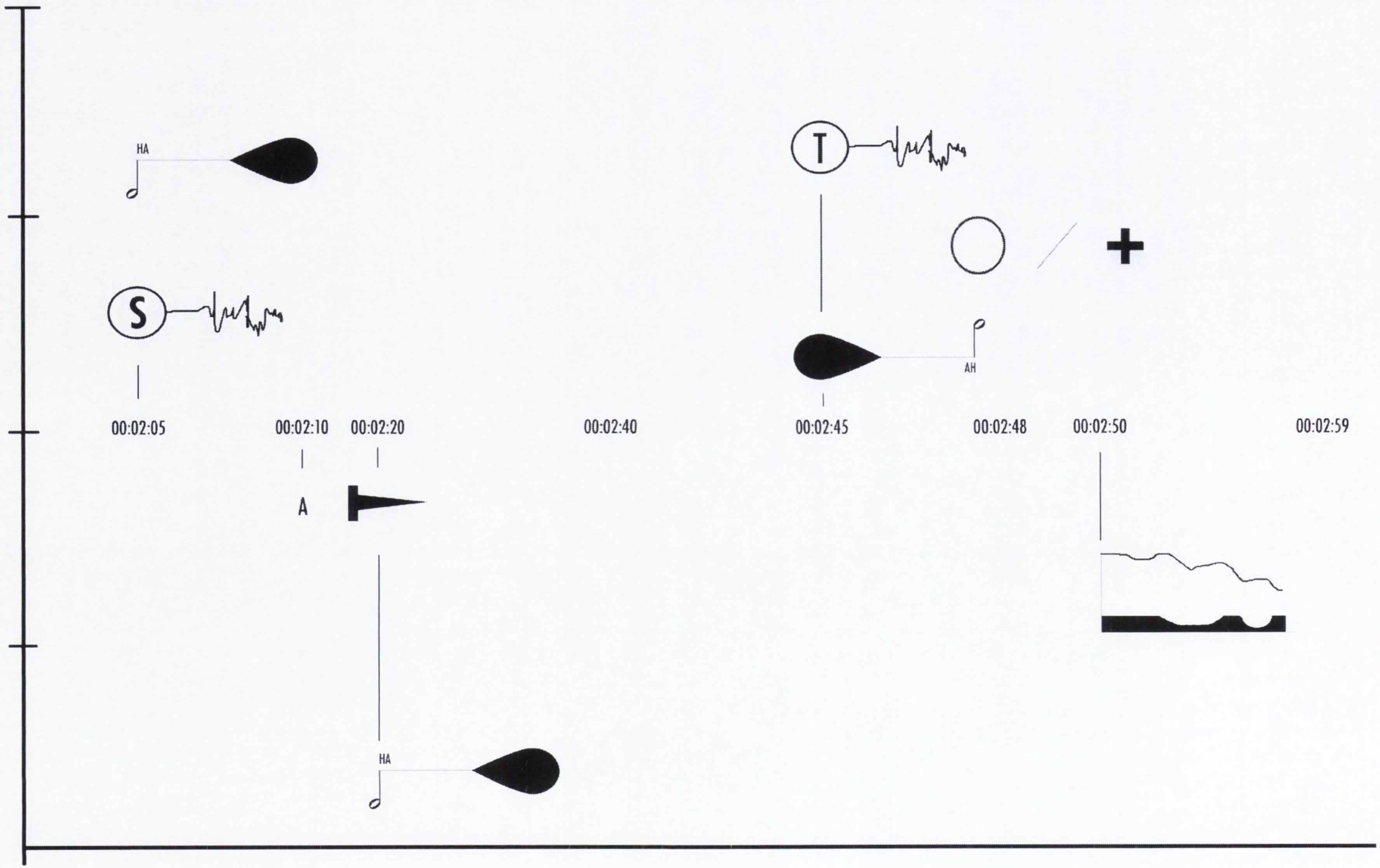
HA
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S
AH
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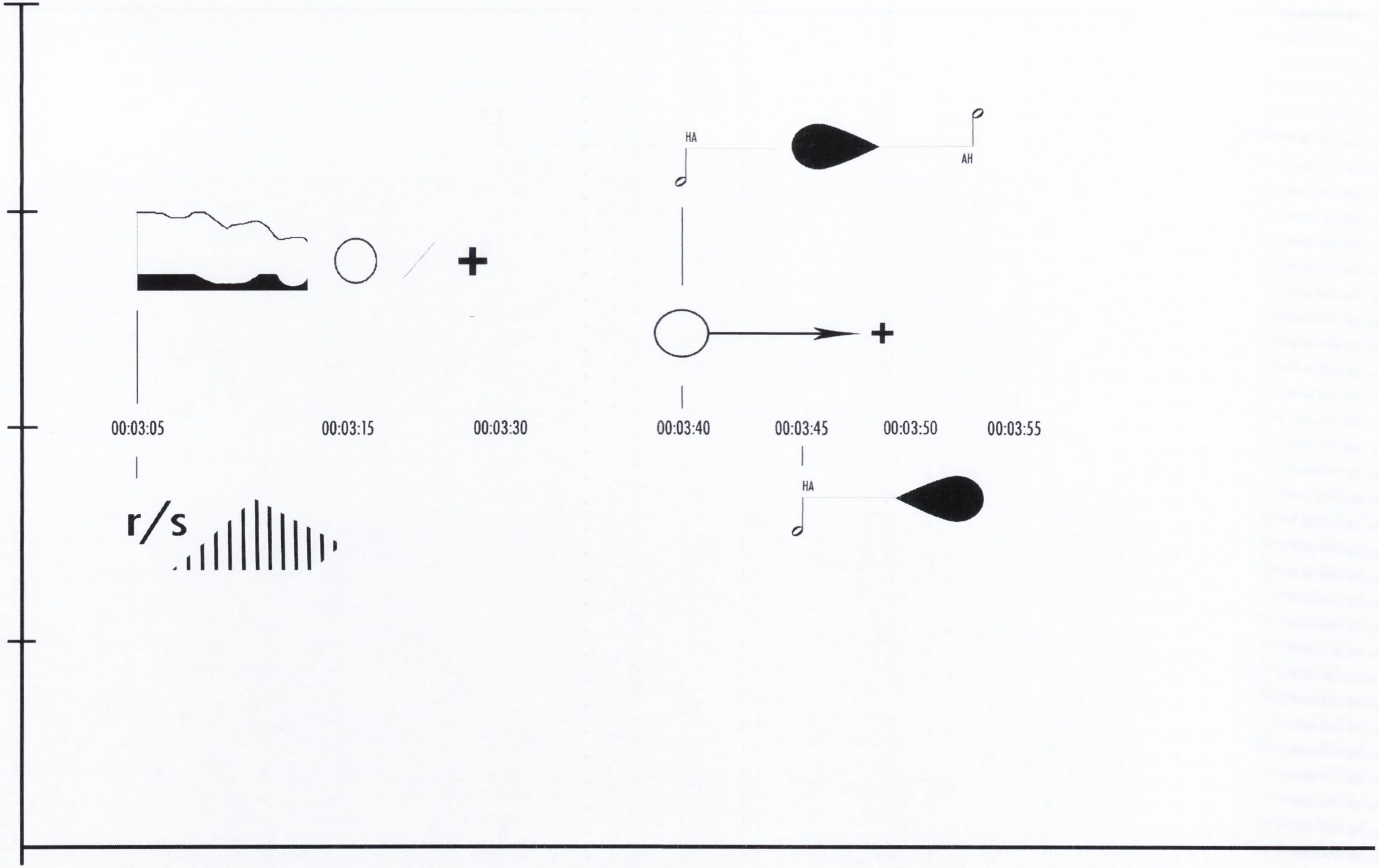
A
HA


HA
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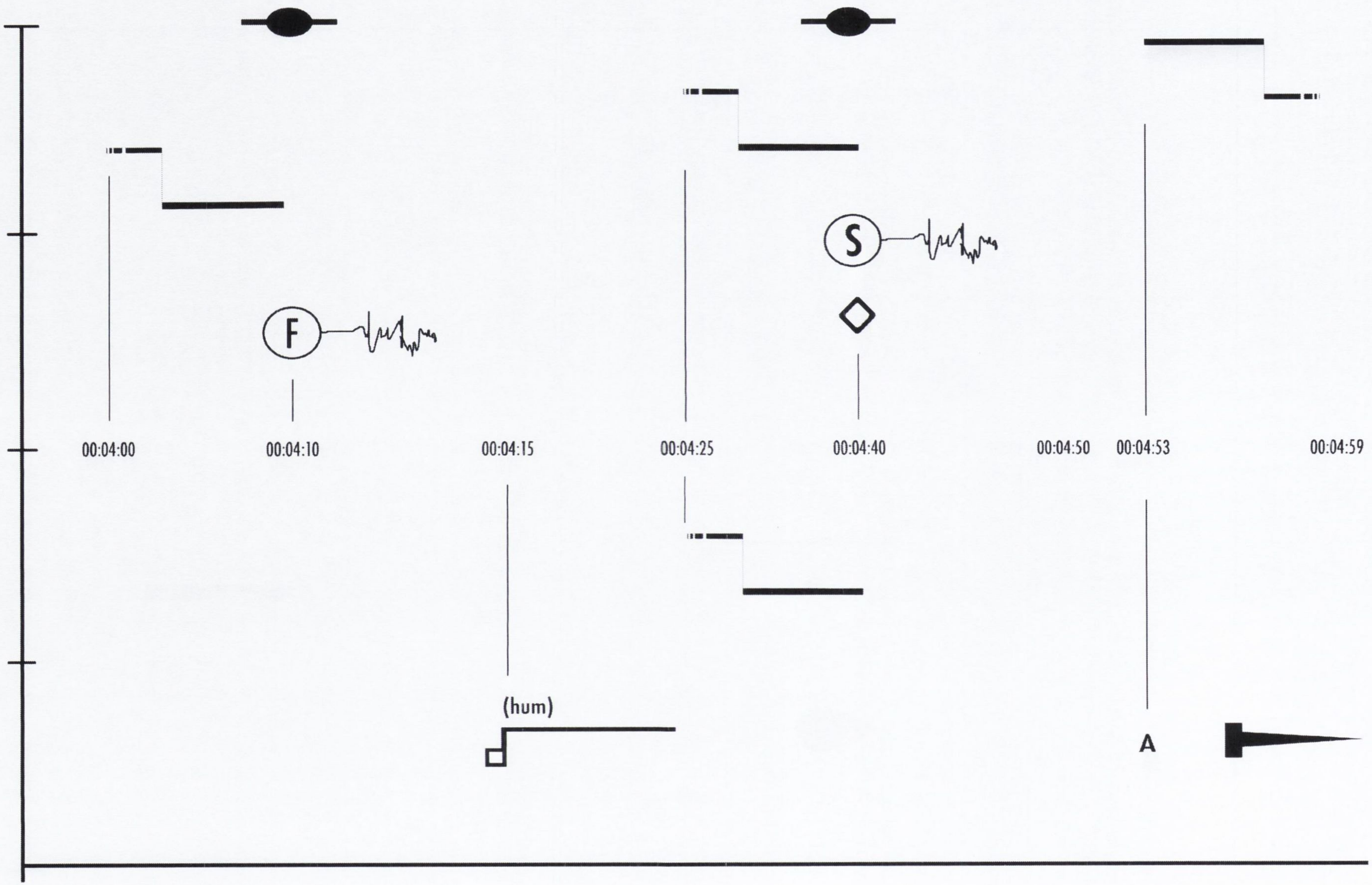
HA
r/s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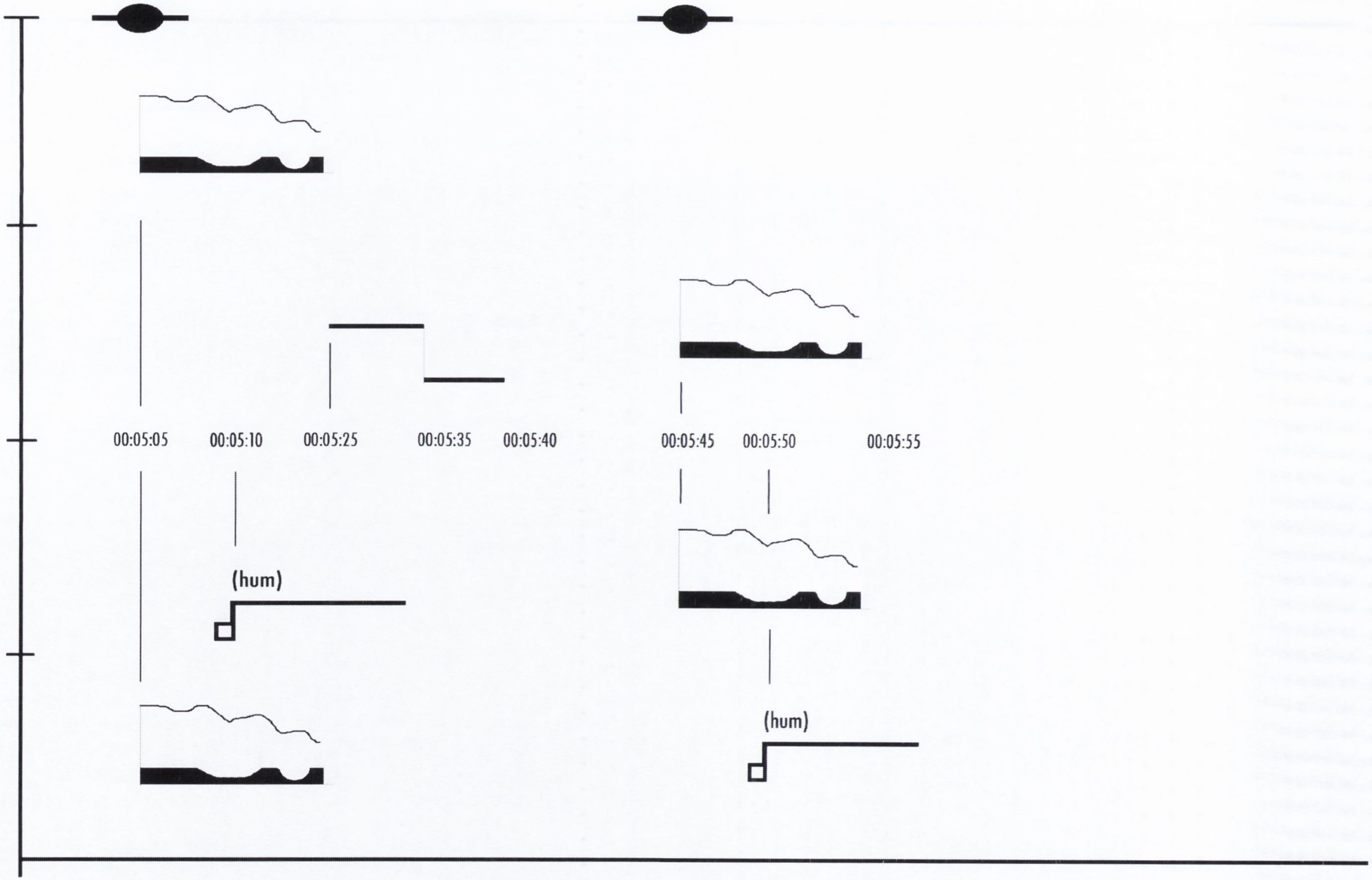
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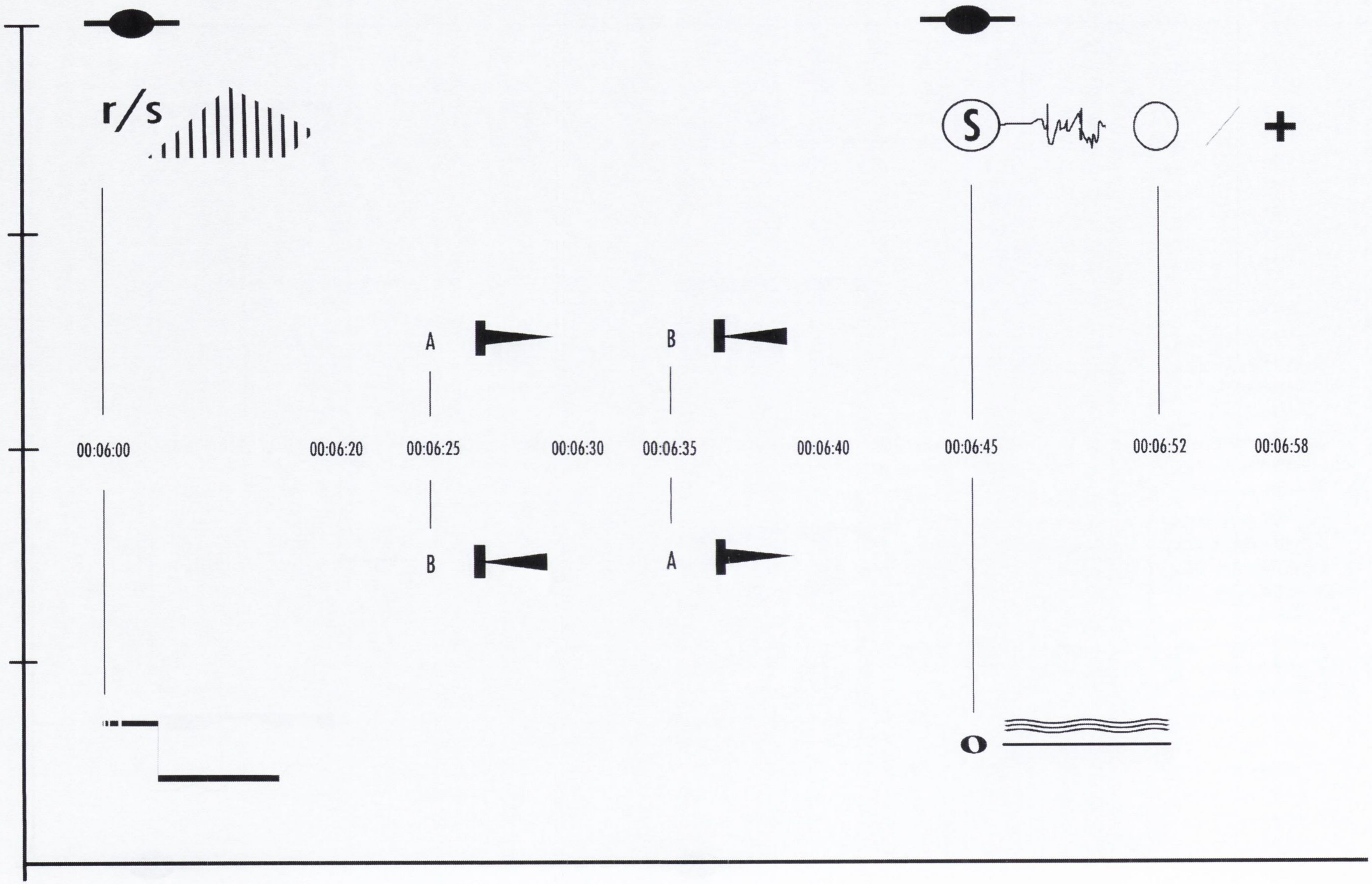
(hum)
(hum)



r/s
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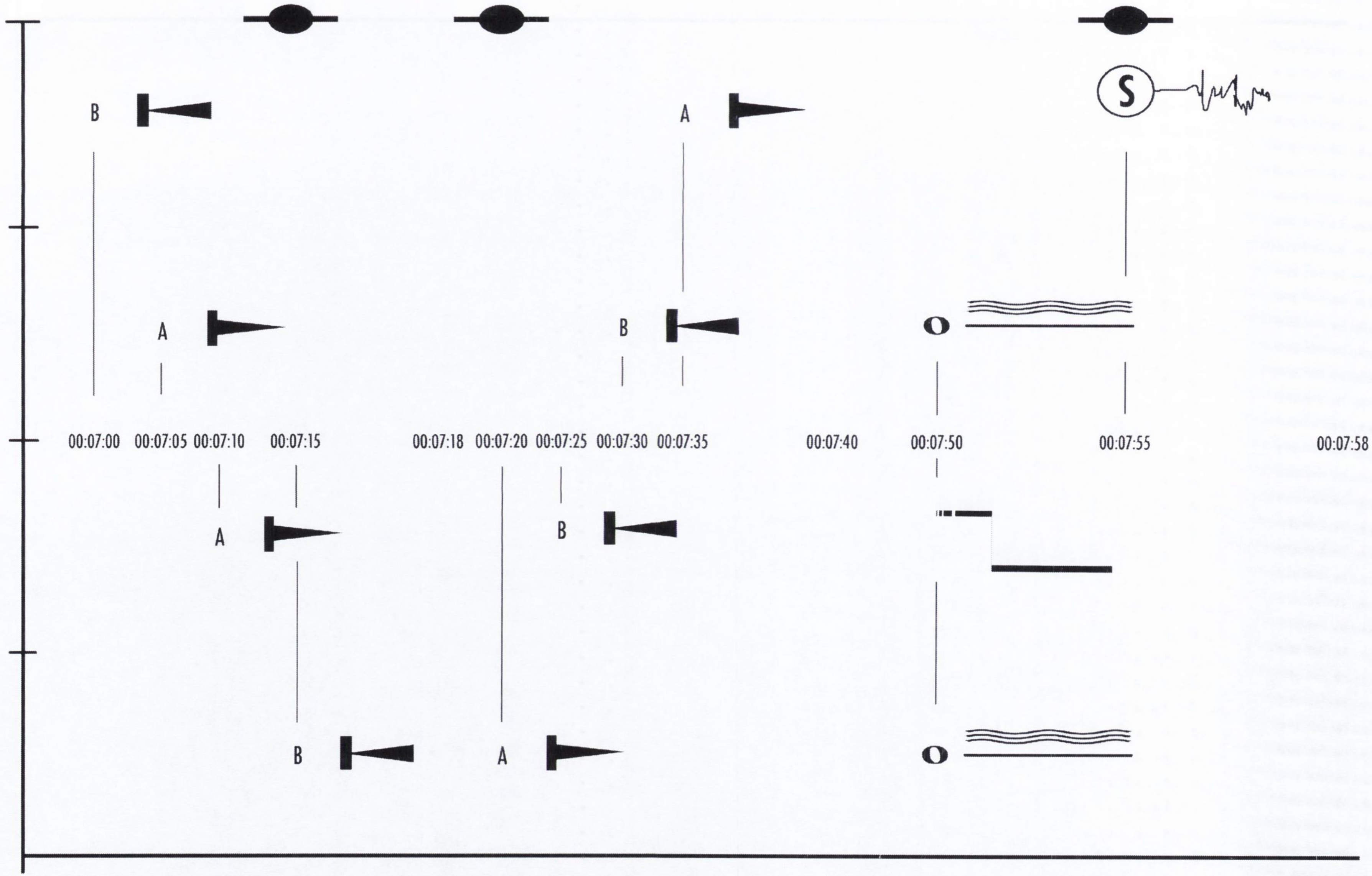
S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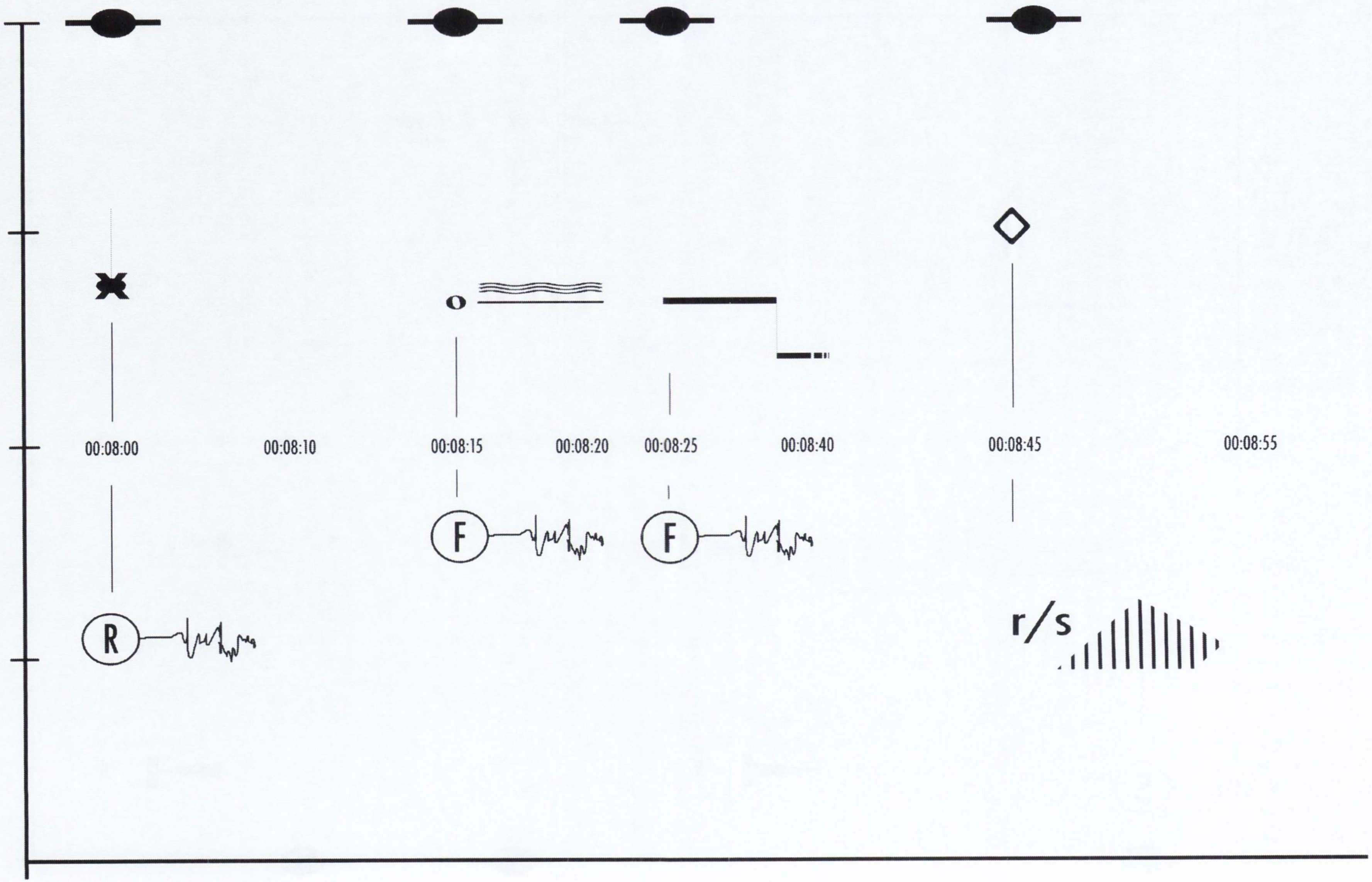
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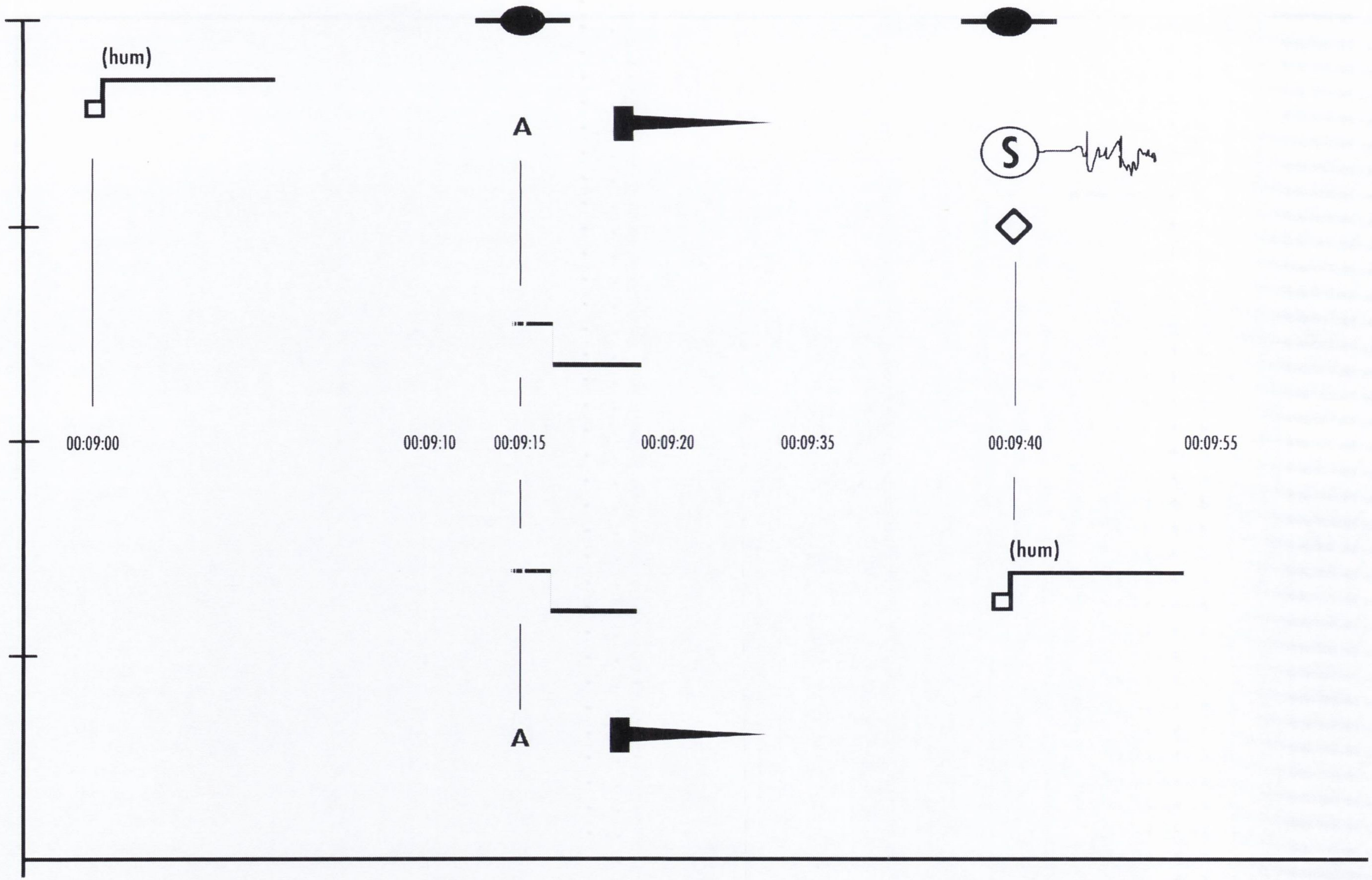
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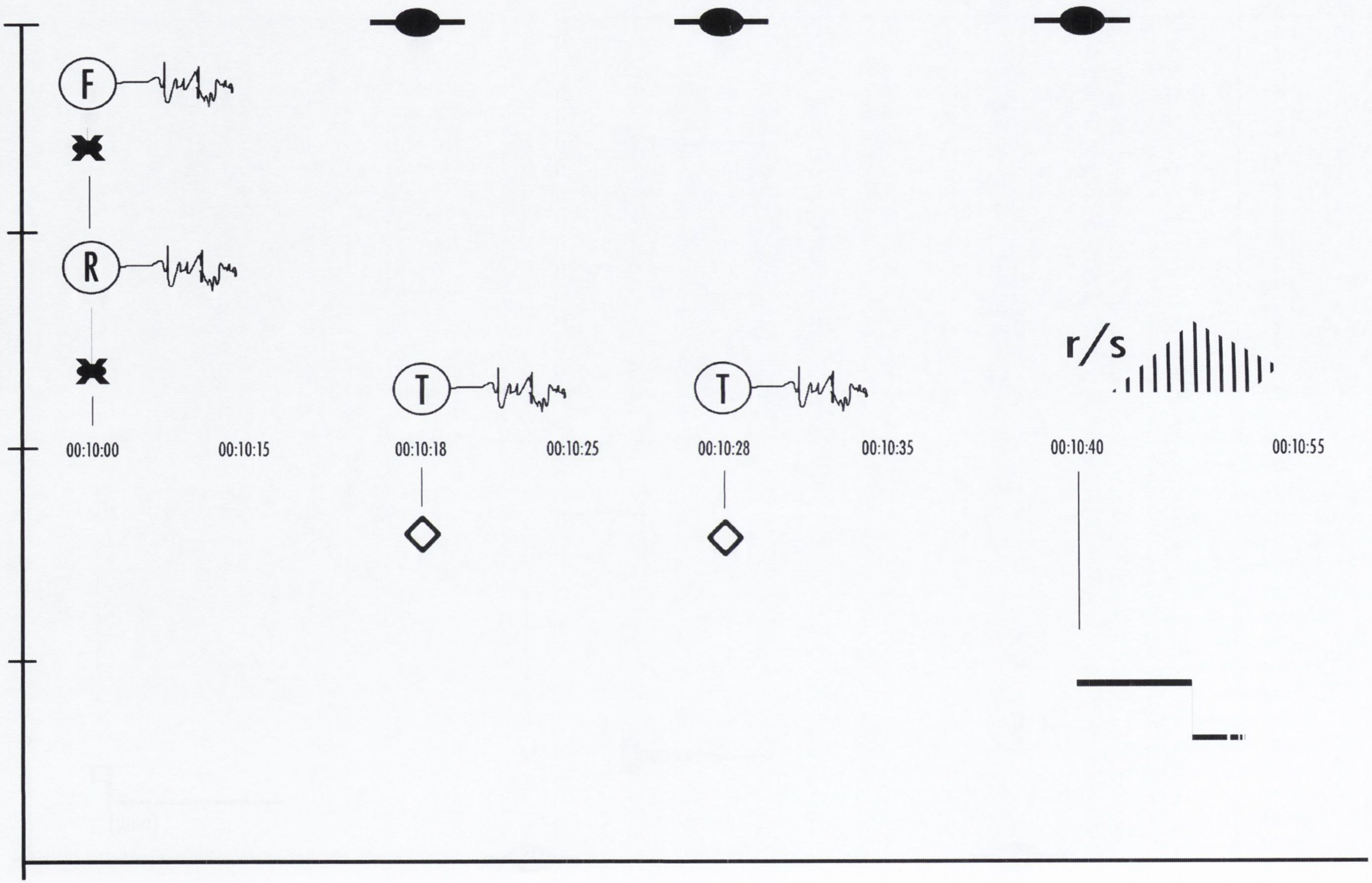
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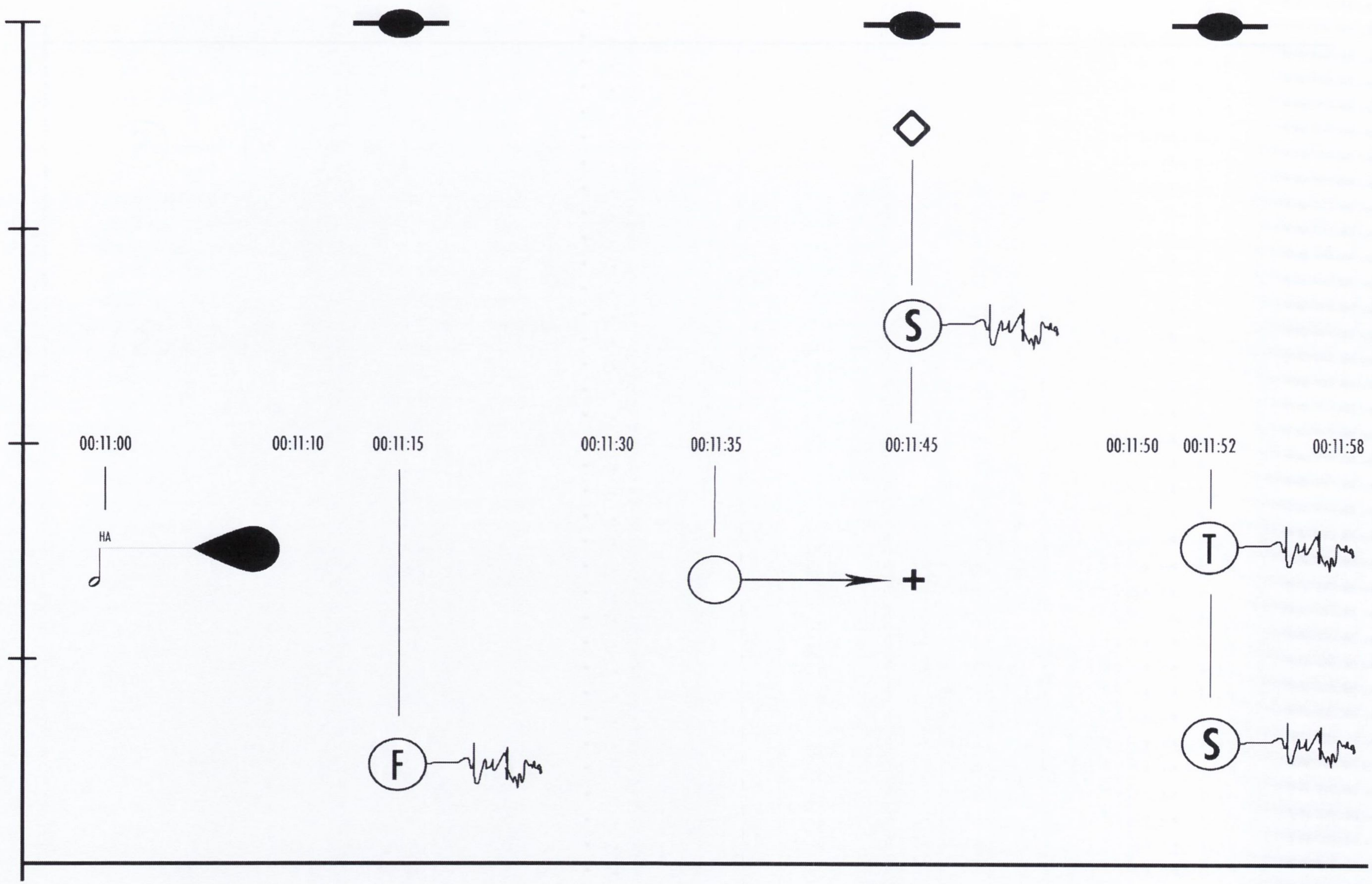
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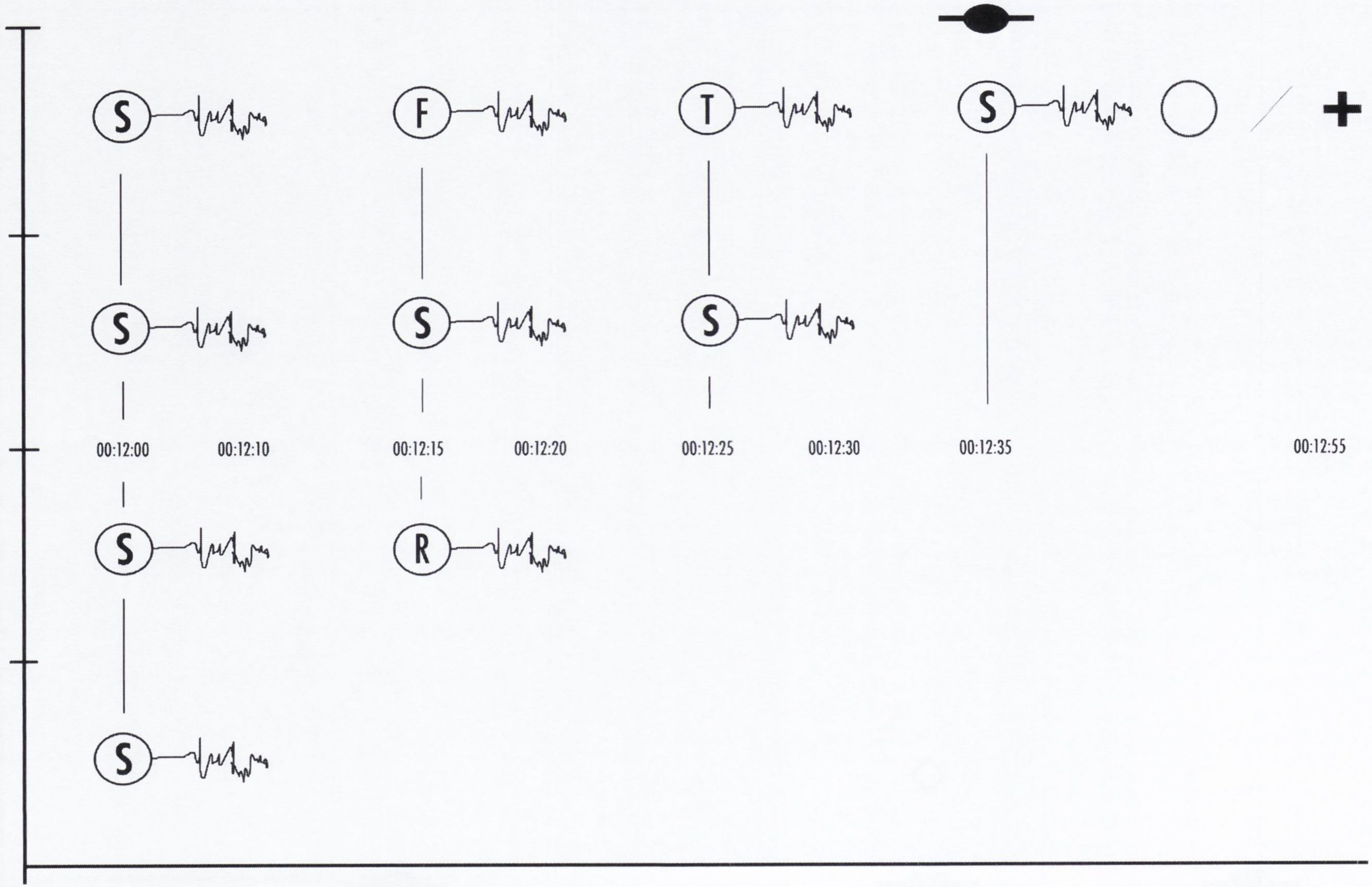
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Appendix III

Framed Motion (Score)

For String Quartet and Electronics

FRAMED MOTION 15 min 10″

DIRECTIONS

For String Quartet and Electronics

Framed Motion is structured in the following way: each instrument has a 'frame'. The direction in which the performers read each frame, in a circular fashion,was simply another method in trying to expand the ways in which traditional scores are read. It also leaves room for the conductor and performer to reaggange the frames in any fashion they wish.

Within each frame, there are seven sequences containing themes and directions for the performer. The directions for reading each frame is given in Index II while Index I explains the notation used. In *Framed Motion,* where the performer/listener is not faced by an absolute center of reference, the performer/listener constitutes his/her own system of auditory relationships in which carefully chosen sounds of different timbres, each apparently standing in isolation rather than linking up together, make up the overall architecture and aesthetic of the piece.

1. Bow at the heel of the bow.

2. Strike with the hair of the bow.

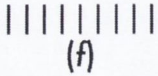
3. Bow on the tailpiece.

4. Play between the bridge and the tailpiece.

5. Tap between the bridge and the tailpiece with the hair and wood of the bow simultaneously (percussive effect).

6. A pizzicato glissando.

7. A tremolo glissando (arco).



8. Hit the strings with the wood of the bow in a 'pulsed' fashion.

9. Play harmonics.

10. Tap on the body of the instrument with the knuckles.

Index I

11. Indication that the frame
is to be played 'solo'.

12. Indication that the frame
is to be played with one other instrument.

13. Indication that the frame
is to be played with two other instruments.

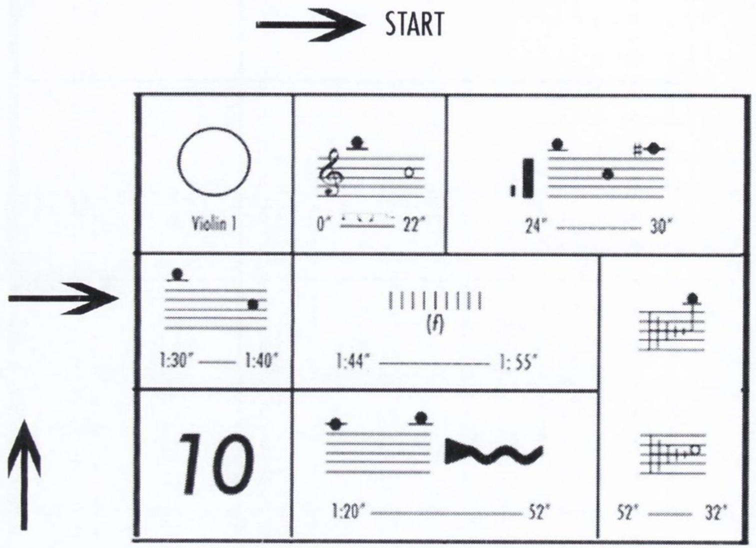
14. Indication that the frame
is to be played with all instruments.

10

15. Numbers in the empty fields indicate
silence of 10 seconds..

16. Transition from (1) a sustained pitch to noise tone
(2) noise tone to a sustained pitch.

17. Strike the string with the hair of the bow, and
glissando in the indicated direction.

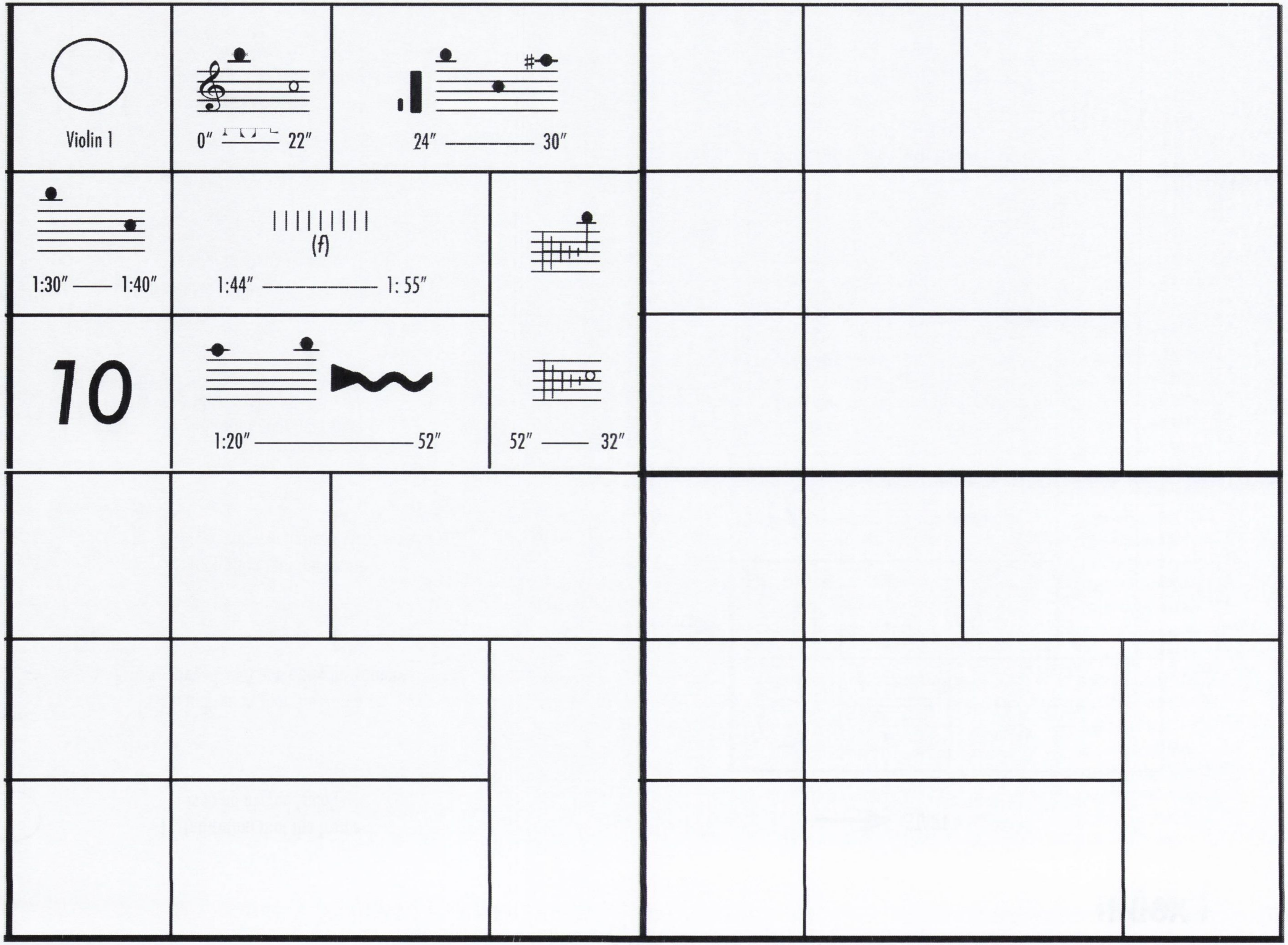


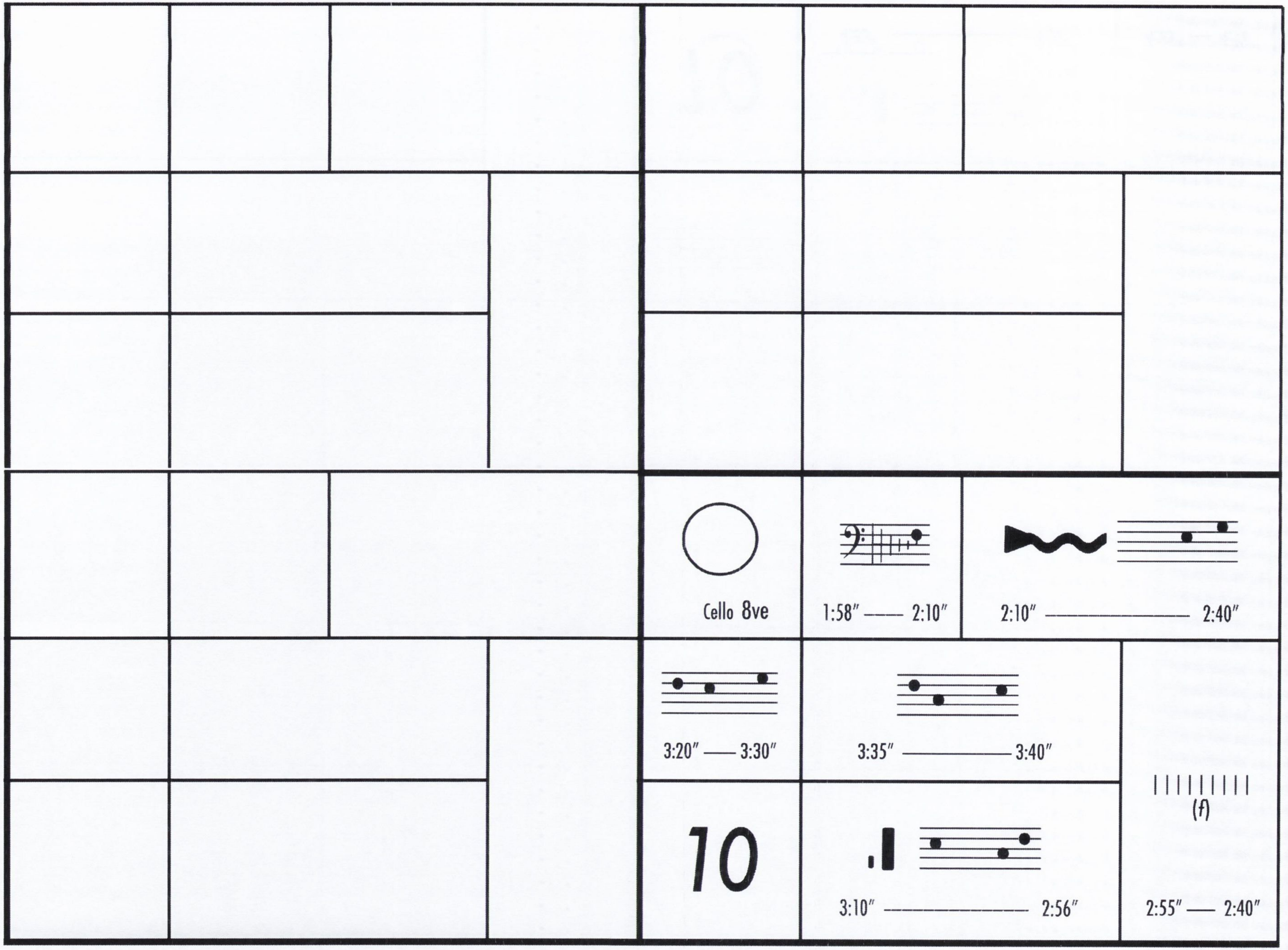
Directions for reading the frames of the score:

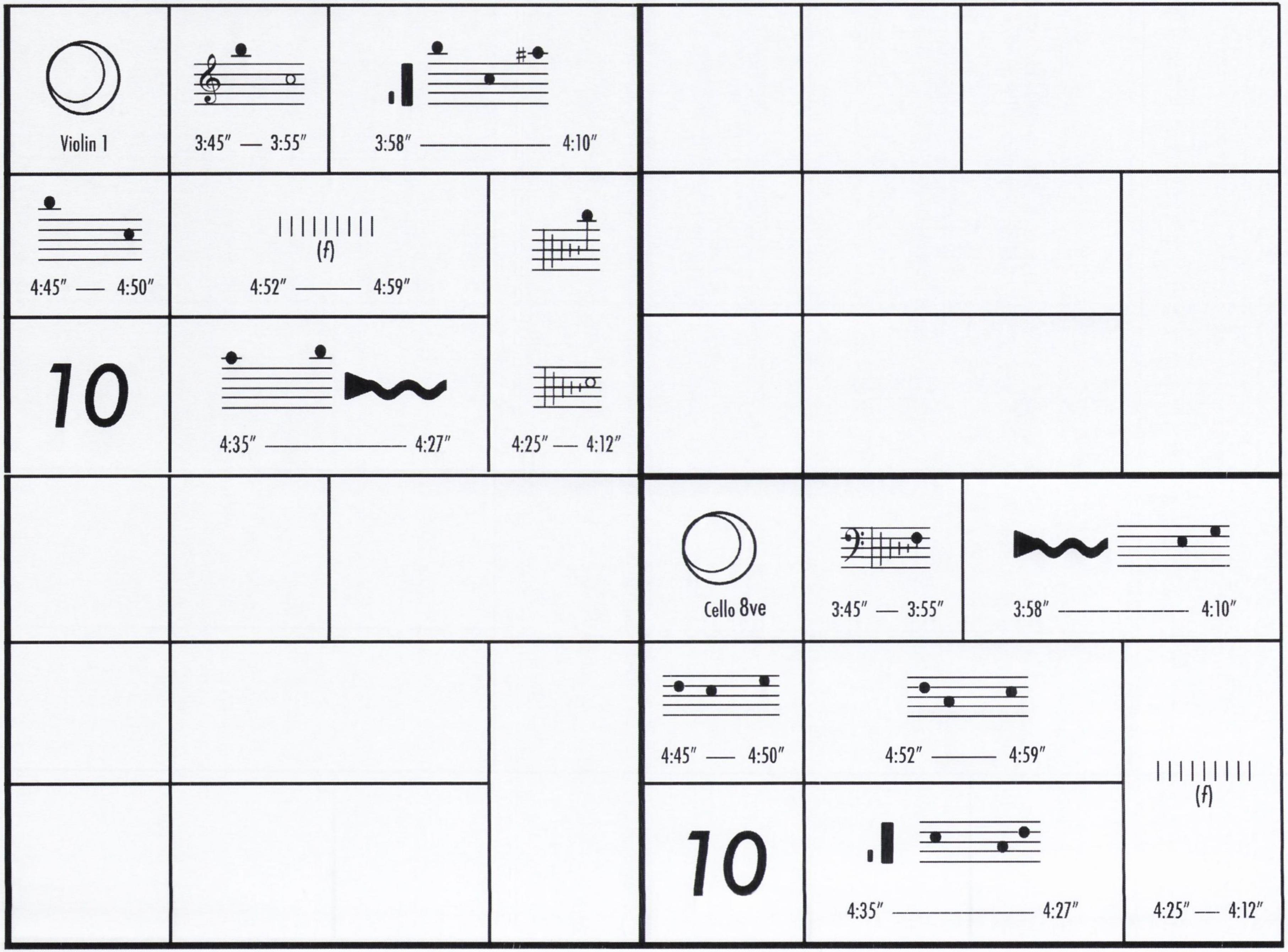
Note * -

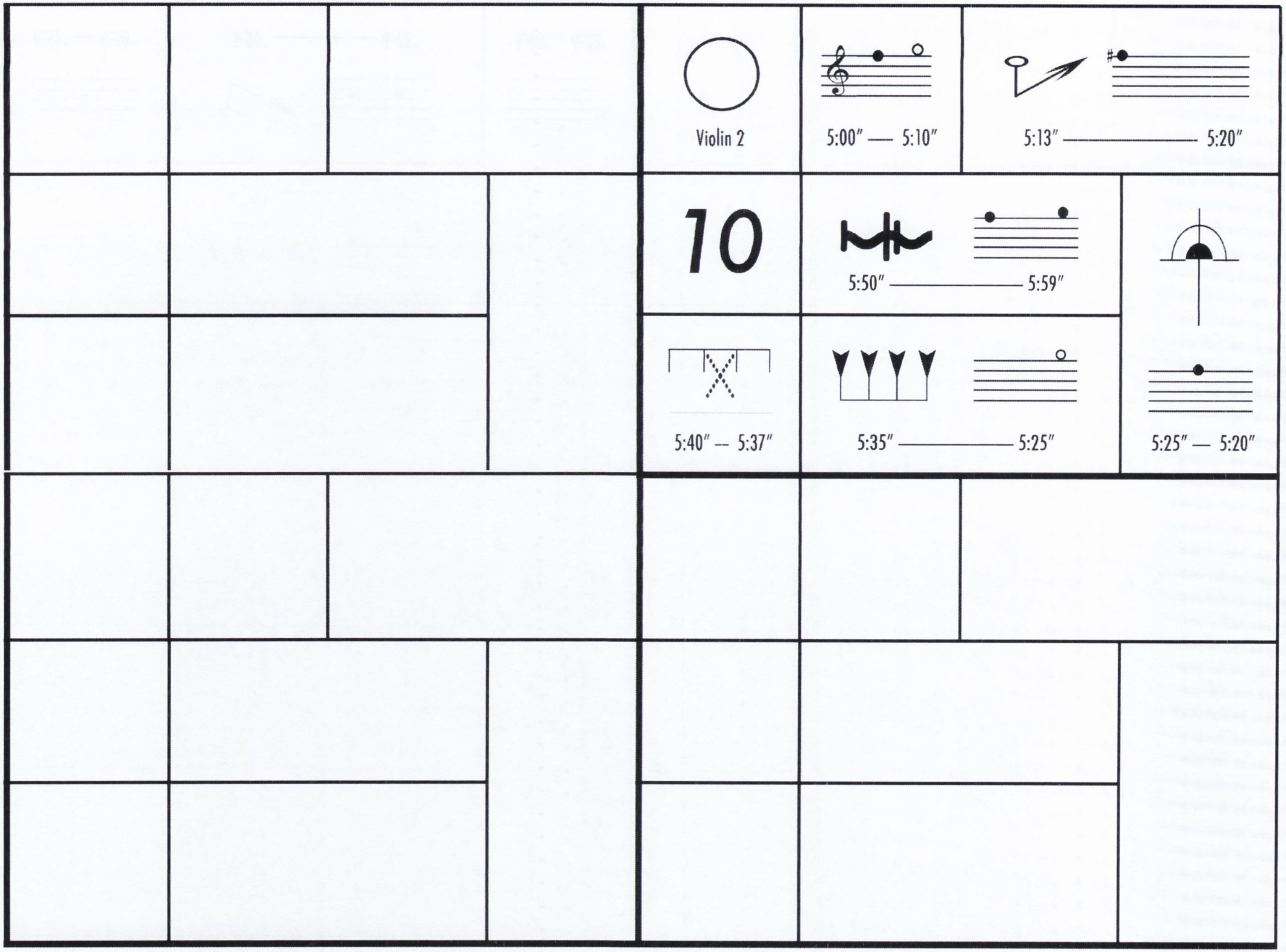
On page 10, all instruments are required to play the pitches within the violin frame simultaneously, hence the viola and cello must transpose to the corresponding pitches with the frame. On pages 12 and 13, Viola and cello are played an octave higher, indicated by 8ve.

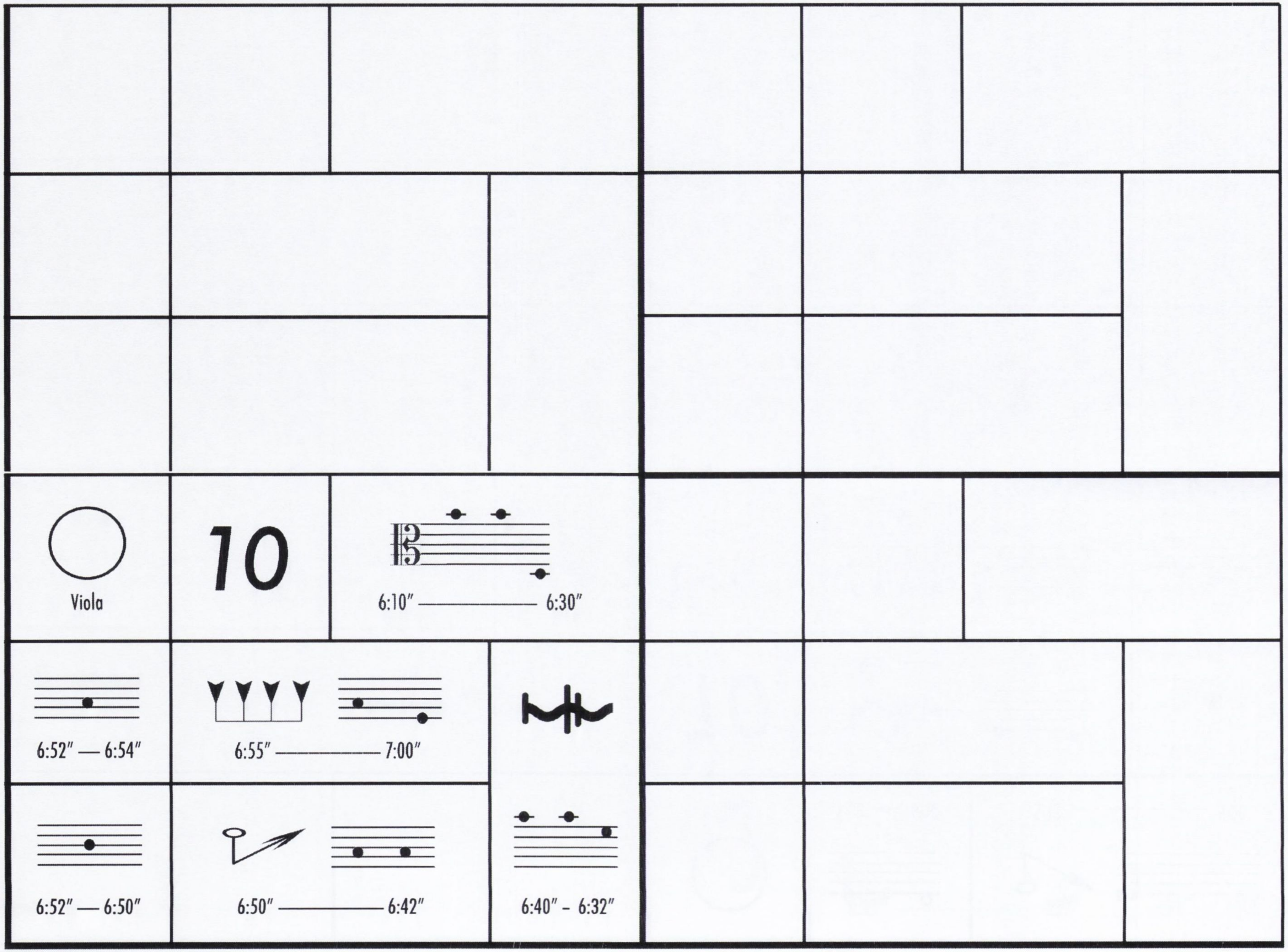
Index II

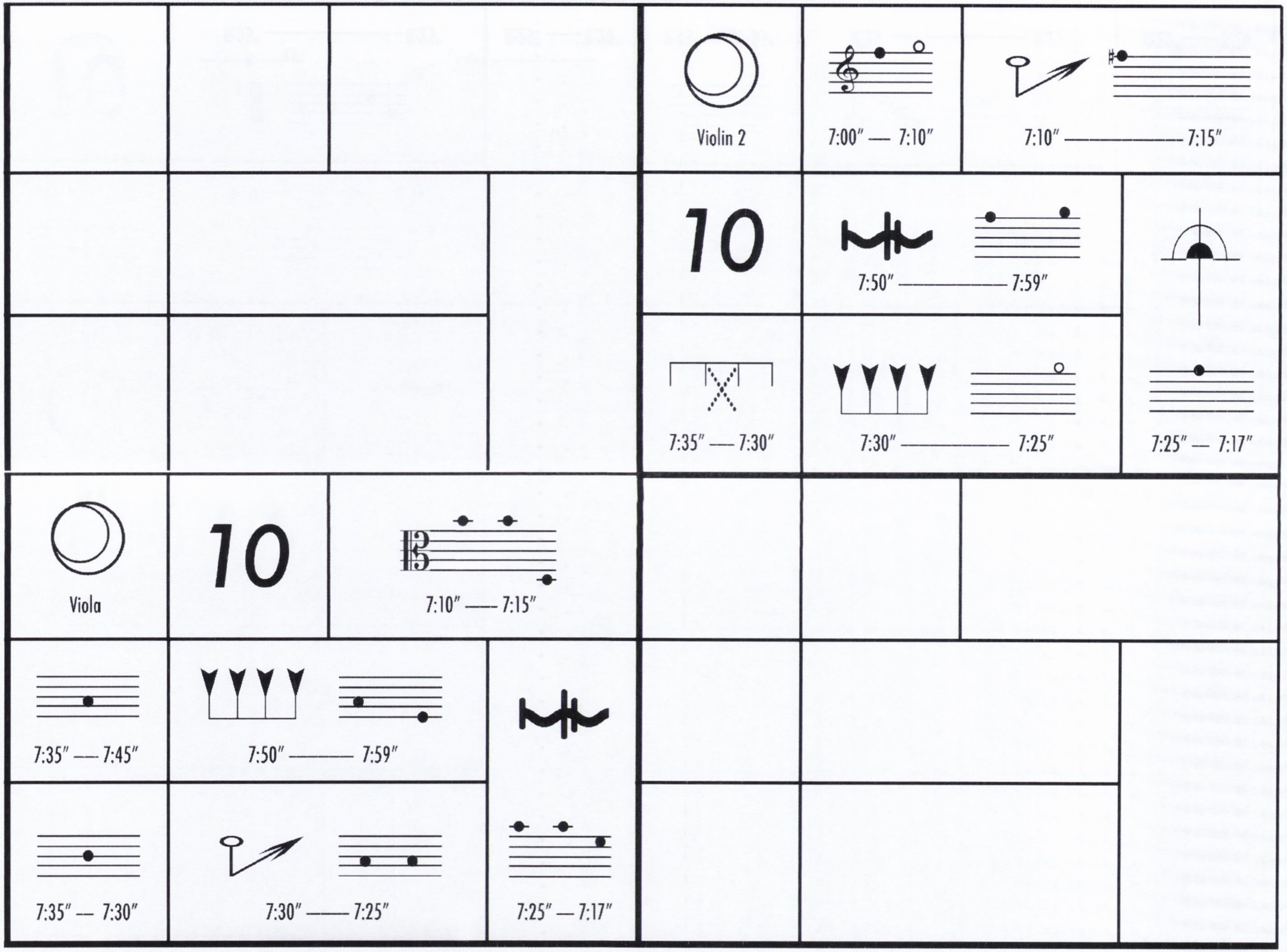

Violin 1
0″ 22″
24″ 30″
1:30″ 1:40″
(f)
1:44″ 1: 55″
10
1:20″ 52″
52″ 32″

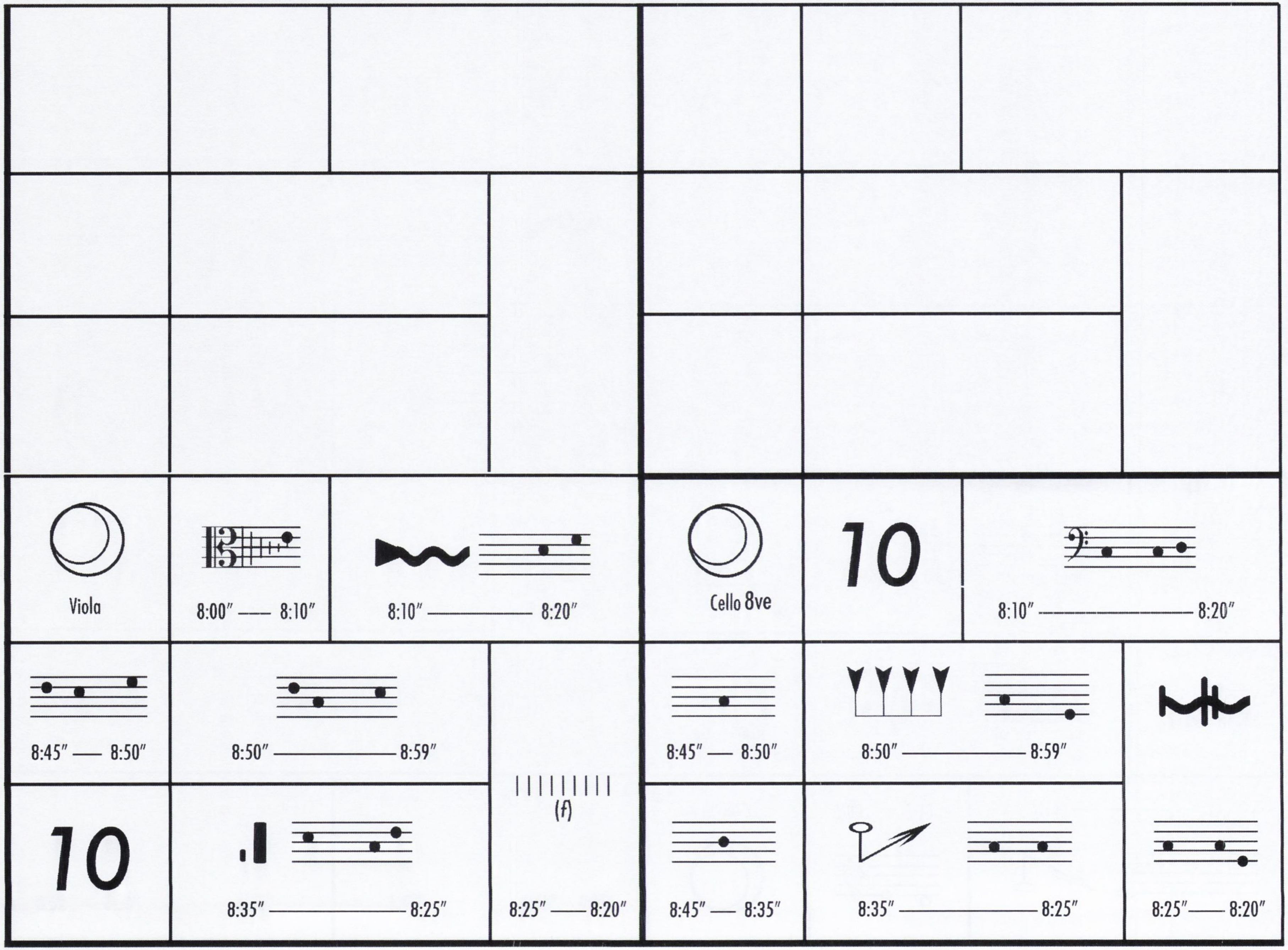

Cello 8ve
1:58″ —— 2:10″
2:10″ —— 2:40″
3:20″ —— 3:30″
3:35″ —— 3:40″
(f)
10
3:10″ —— 2:56″
2:55″ —— 2:40″

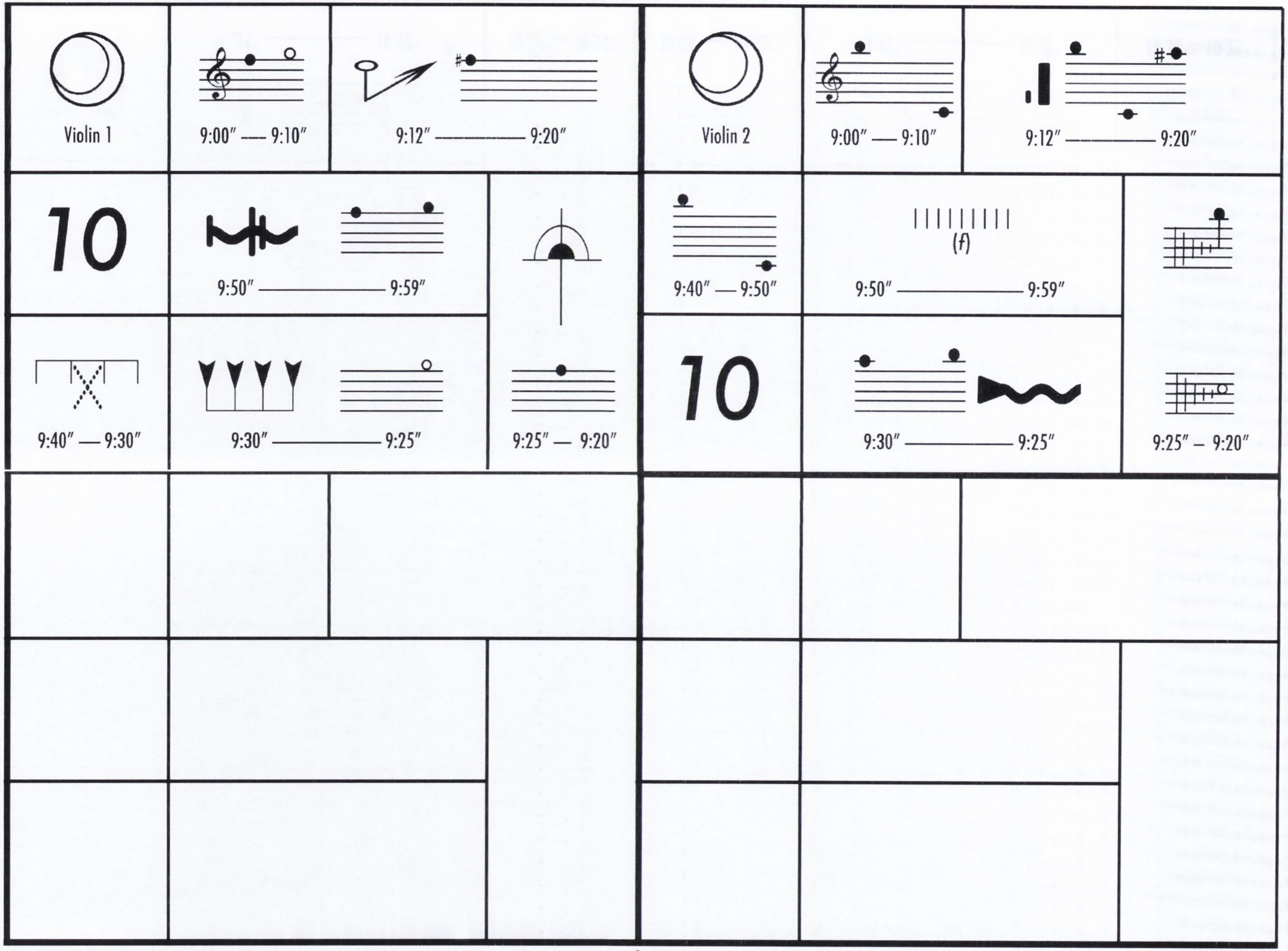

Violin 1
3:45″ — 3:55″
3:58″ — 4:10″
4:45″ — 4:50″
(f)
4:52″ — 4:59″
10
4:35″ — 4:27″
4:25″ — 4:12″
Cello 8ve
3:45″ — 3:55″
3:58″ — 4:10″
4:45″ — 4:50″
4:52″ — 4:59″
(f)
10
4:35″ — 4:27″
4:25″ — 4:12″

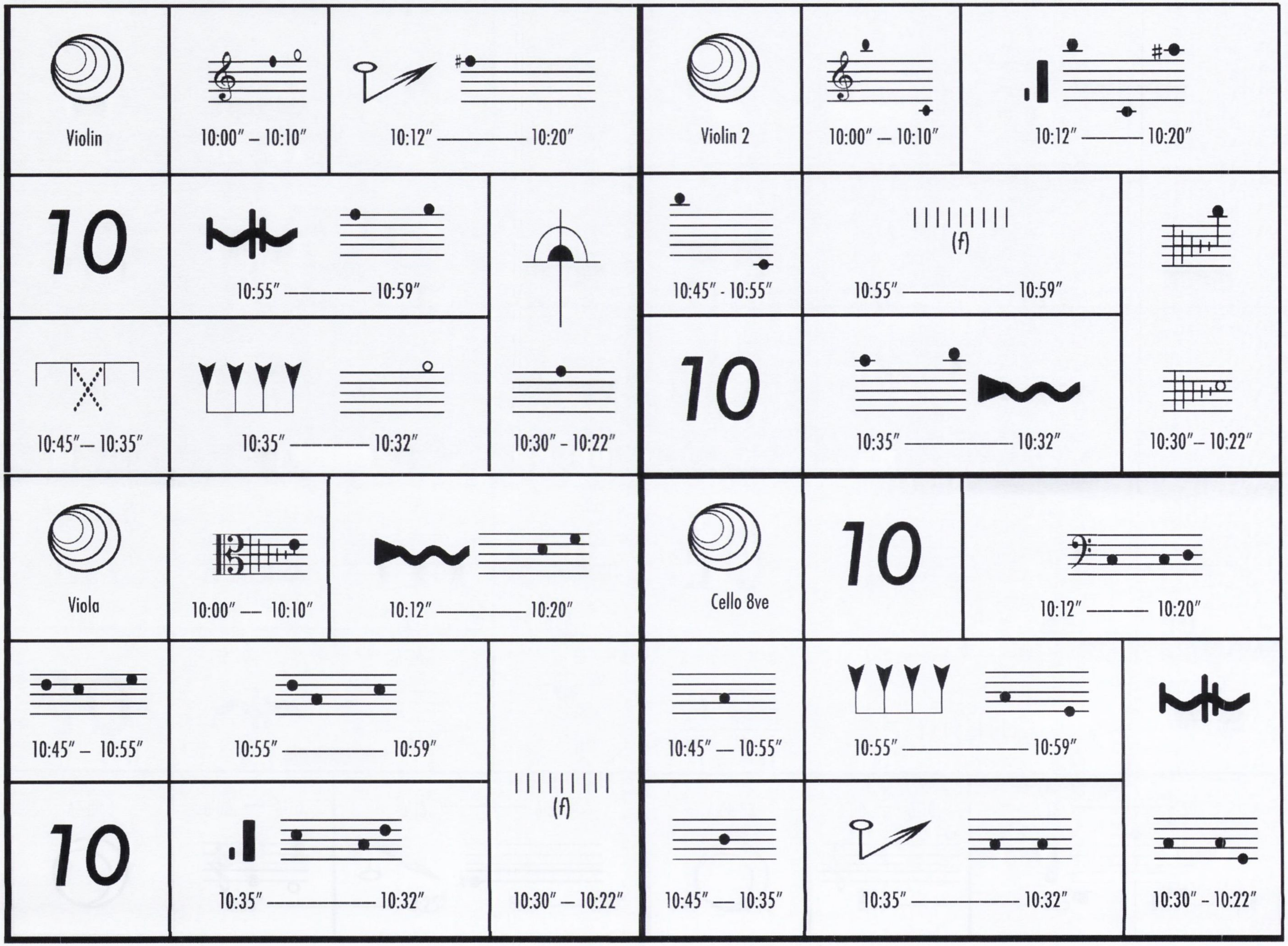

Violin 2
5:00" — 5:10"
5:13" —— 5:20"
10
5:50" —— 5:59"
5:40" -- 5:37"
5:35" —— 5:25"
5:25" — 5:20"

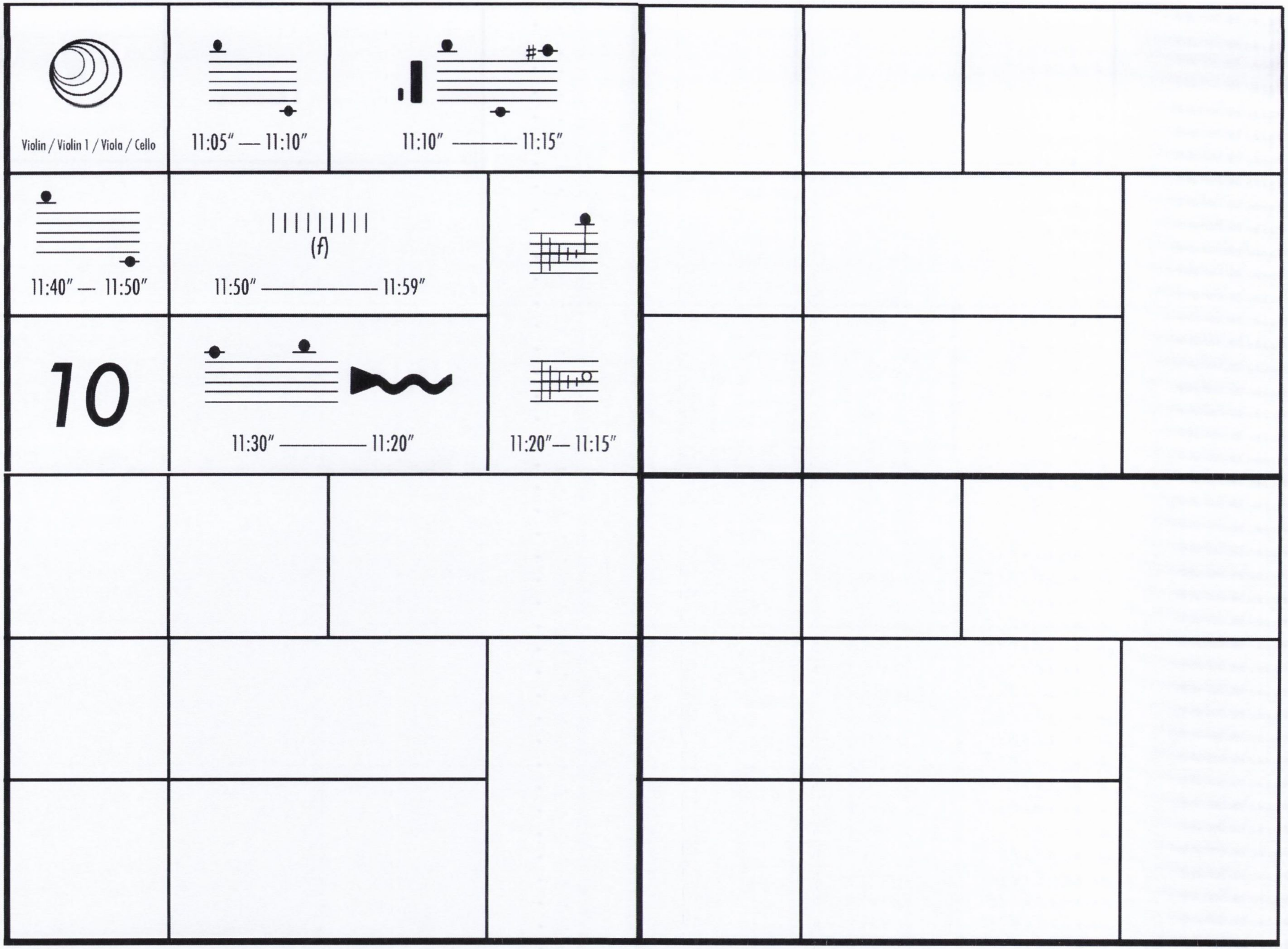

Viola
10
6:10″ — 6:30″
6:52″ — 6:54″
6:55″ — 7:00″
6:52″ — 6:50″
6:50″ — 6:42″
6:40″ - 6:32″

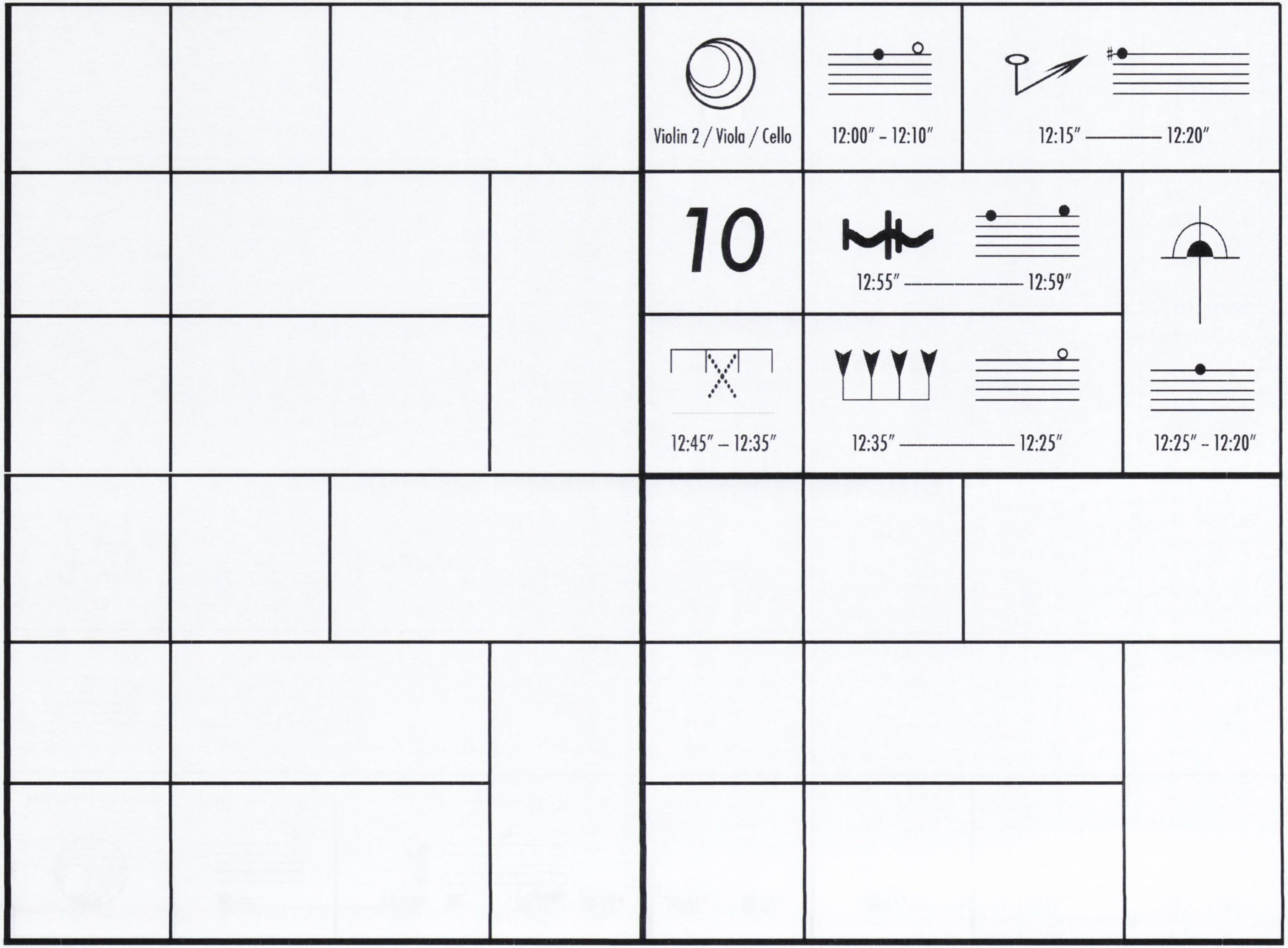

Violin 2
7:00″ — 7:10″
7:10″ —————— 7:15″
10
7:50″ ————— 7:59″
7:35″ — 7:30″
7:30″ ————— 7:25″
7:25″ — 7:17″
Viola
10
7:10″ — 7:15″
7:35″ — 7:45″
7:50″ ——— 7:59″
7:35″ — 7:30″
7:30″ —— 7:25″
7:25″ — 7:17″

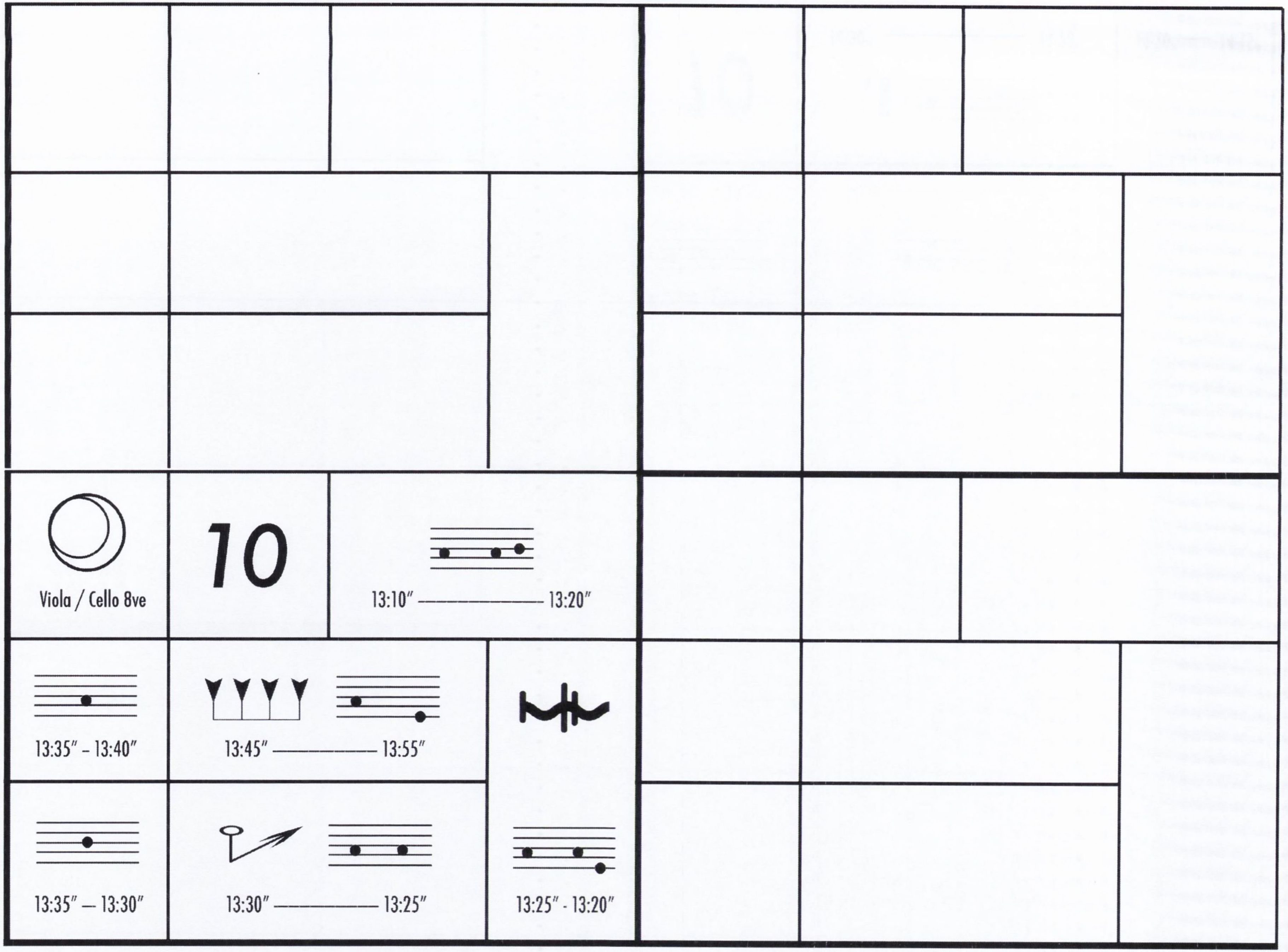

Viola
8:00″ — 8:10″
8:10″ — 8:20″
Cello 8ve
10
8:10″ — 8:20″
8:45″ — 8:50″
8:50″ — 8:59″
8:45″ — 8:50″
8:50″ — 8:59″
(f)
10
8:35″ — 8:25″
8:25″ — 8:20″
8:45″ — 8:35″
8:35″ — 8:25″
8:25″ — 8:20″

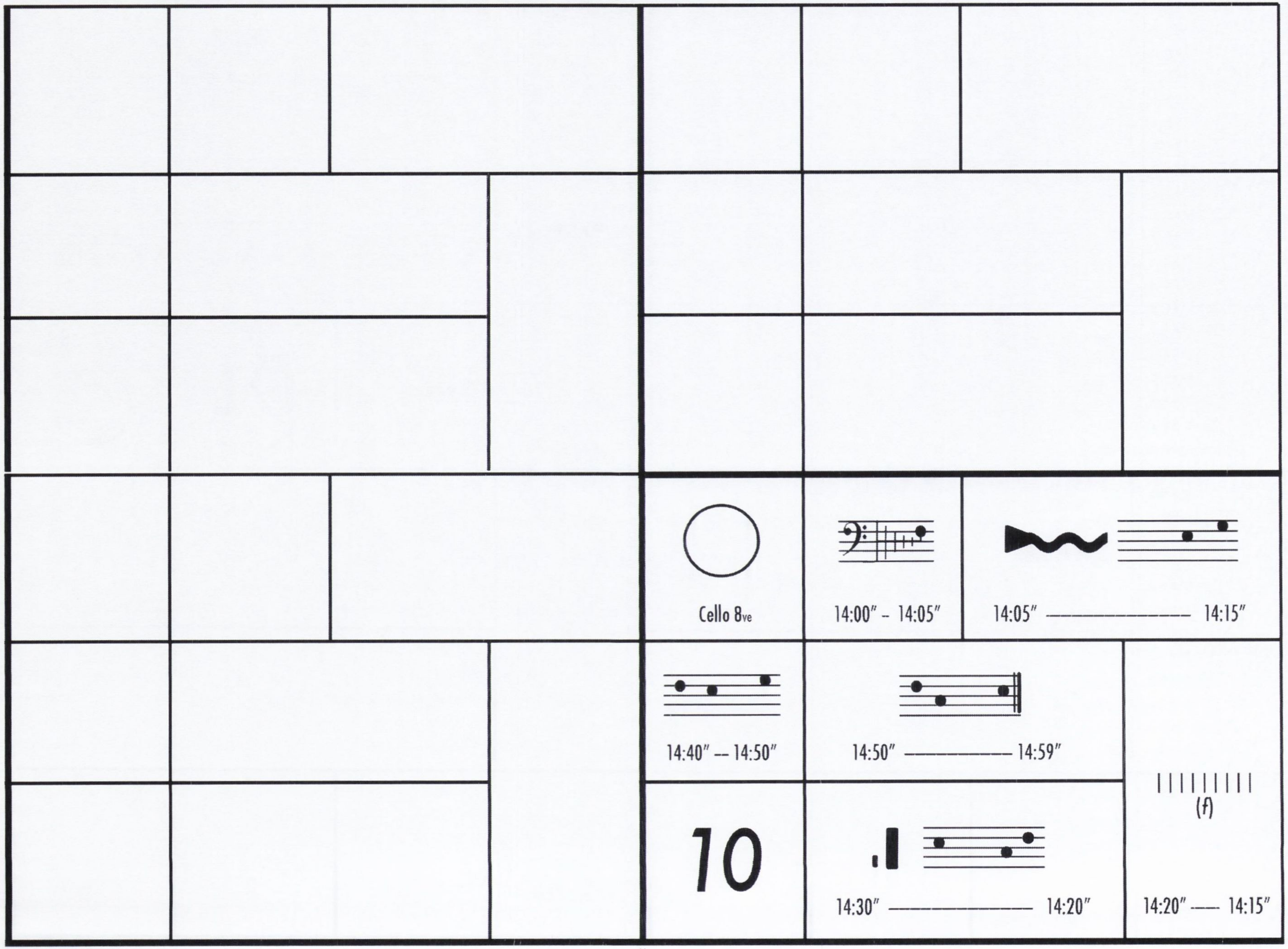

Violin 1
9:00" — 9:10"
9:12" — 9:20"
Violin 2
9:00" — 9:10"
9:12" — 9:20"
10
9:50" — 9:59"
9:40" — 9:50"
(f)
9:50" — 9:59"
9:40" — 9:30"
9:30" — 9:25"
9:25" — 9:20"
10
9:30" — 9:25"
9:25" – 9:20"


Violin
10:00″ – 10:10″
10:12″ ———— 10:20″
Violin 2
10:00″ – 10:10″
10:12″ ——— 10:20″
10
10:55″ ———— 10:59″
10:45″ - 10:55″
(f)
10:55″ ————— 10:59″
10:45″– 10:35″
10:35″ ——— 10:32″
10:30″ - 10:22″
10
10:35″ ———— 10:32″
10:30″– 10:22″
Viola
10:00″ — 10:10″
10:12″ ———— 10:20″
Cello 8ve
10
10:12″ ——— 10:20″
10:45″ – 10:55″
10:55″ ———— 10:59″
10:45″ — 10:55″
10:55″ ————— 10:59″
10
10:35″ ———— 10:32″
(f)
10:30″ – 10:22″
10:45″ — 10:35″
10:35″ ———— 10:32″
10:30″ - 10:22″


Violin / Violin 1 / Viola / Cello
11:05" — 11:10"
11:10" ——— 11:15"
11:40" — 11:50"
(f)
11:50" —————— 11:59"
10
11:30" ———— 11:20"
11:20"— 11:15"


Violin 2 / Viola / Cello
12:00" - 12:10"
12:15" —— 12:20"
10
12:55" —— 12:59"
12:45" – 12:35"
12:35" —— 12:25"
12:25" - 12:20"


Viola / Cello 8ve
10
13:10″ —————— 13:20″
13:35″ – 13:40″
13:45″ ———— 13:55″
13:35″ — 13:30″
13:30″ ———— 13:25″
13:25″ - 13:20″


Cello 8ve
14:00" - 14:05"
14:05" ——— 14:15"
14:40" -- 14:50"
14:50" ——— 14:59"
(f)
10
14:30" ——— 14:20"
14:20" —— 14:15"

Appendix IV

Passing / Parting / Release (Score)

For Large Ensemble and Electronics

Instrumentation:

Flute
Oboe

Clarinet in B ♭

Bass Clarinet
Bassoon

Trombone
Tuba

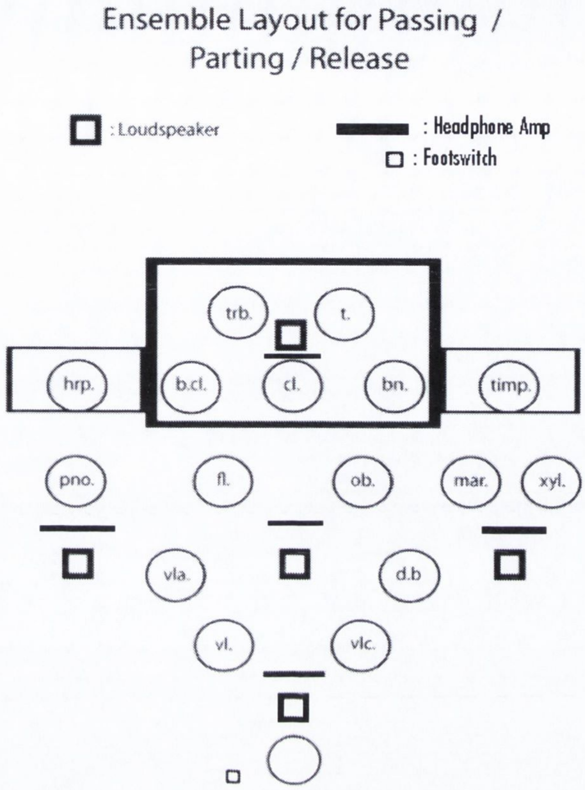
Tympani
Xylophone
Marimba

Piano
Harp

Violin
Viola
Cello
Double Bass

Duration: 19' 25”

Score in C



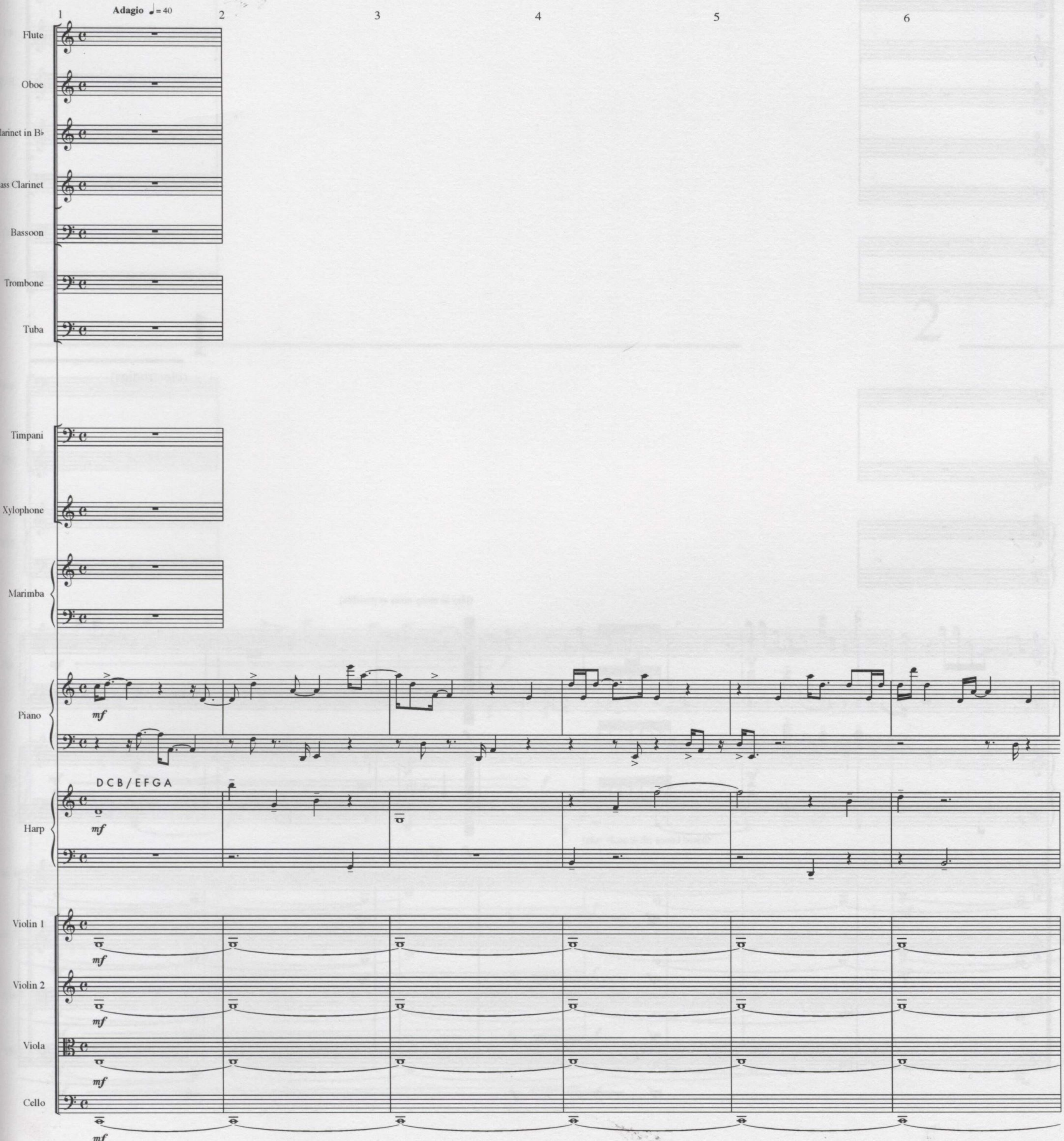
Notes on the use of electronics:

The conductor, through the use of a foot-switch, should trigger the electronic playback. The introduction points of the electronic parts are numbered in the score (where indicated). The provision of at least 6 headphone amps (see above diagram) should be available to the performers to ensure ensemble synchronization.

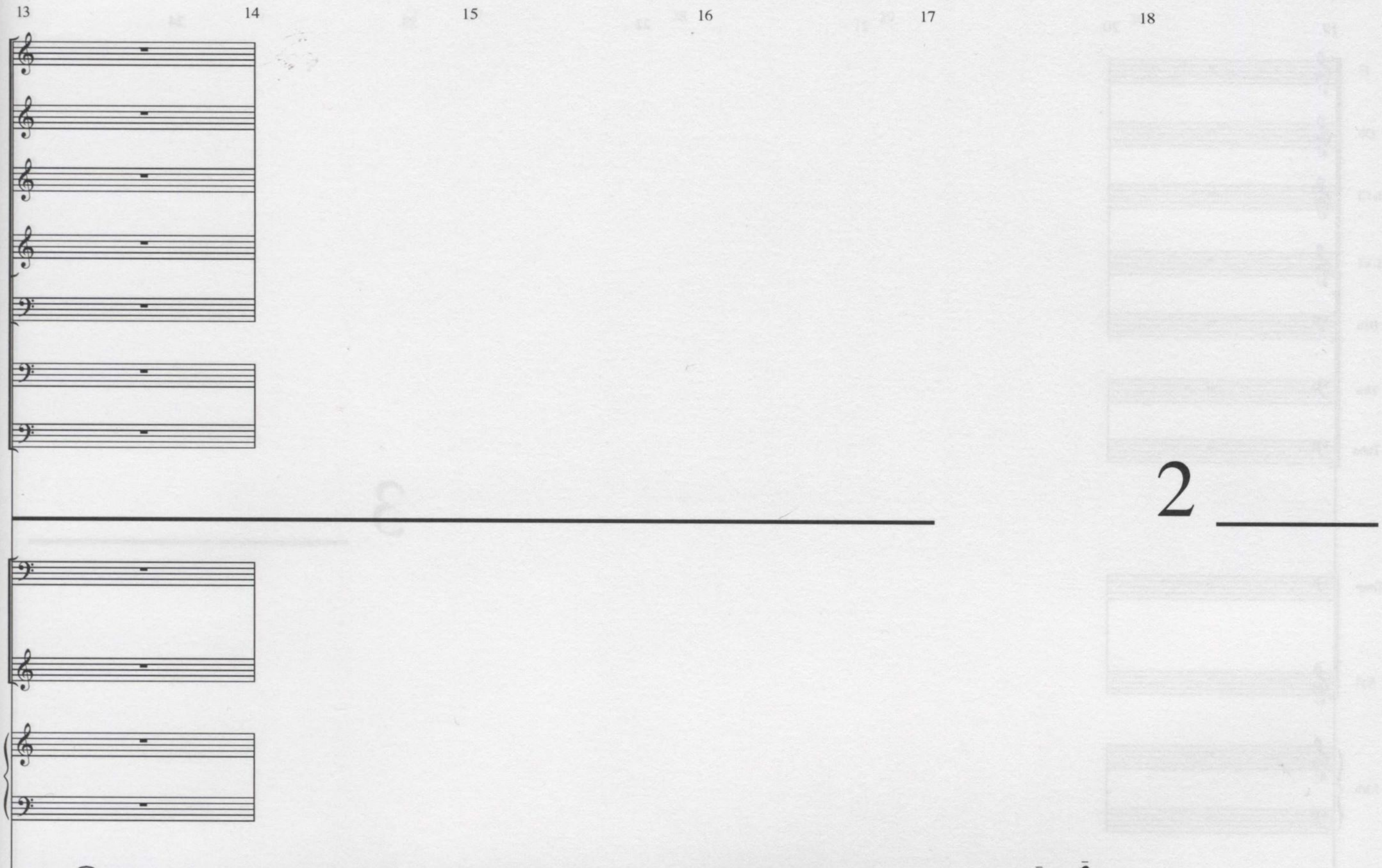
1. Passing

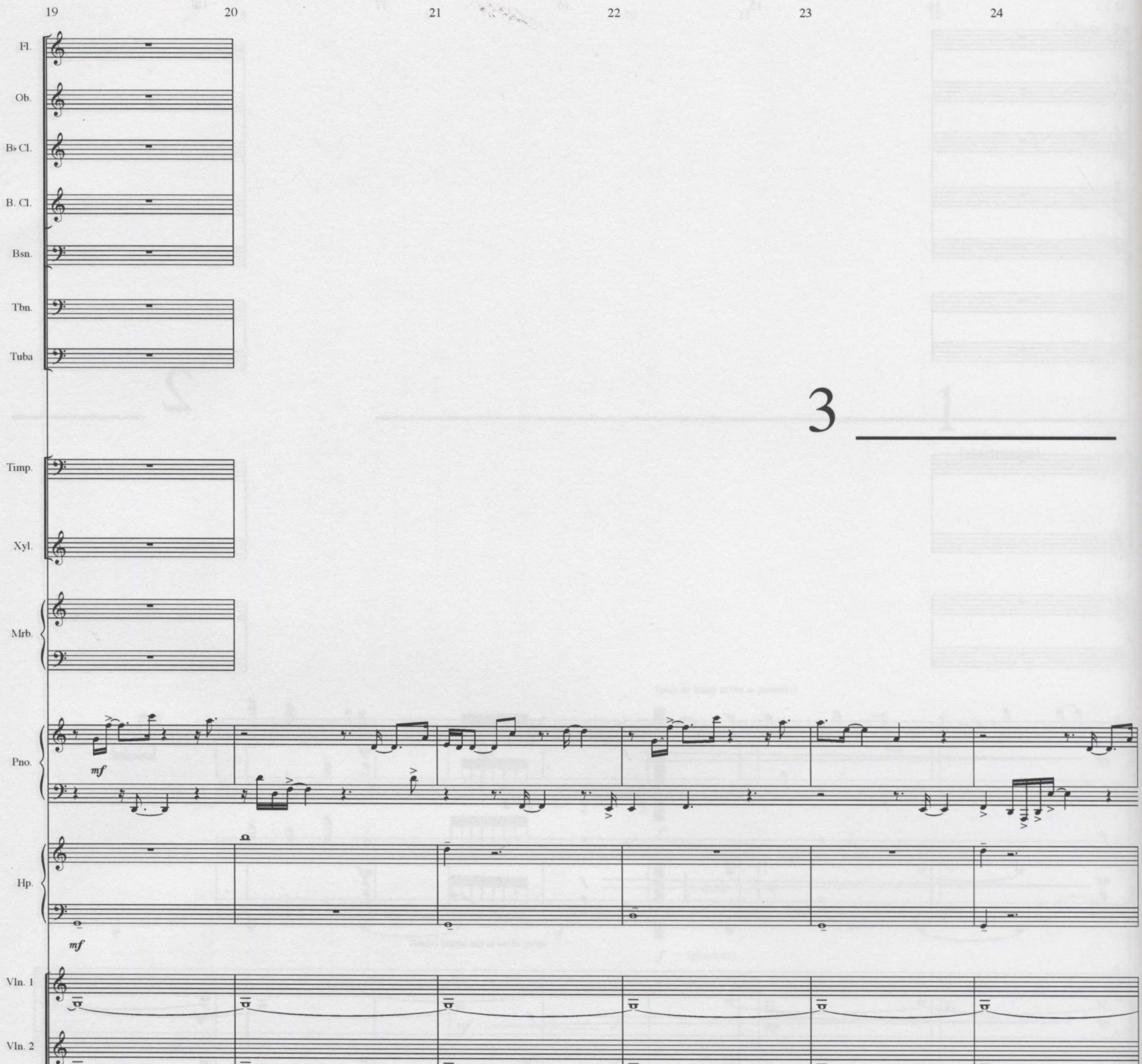
C

Neil O Connor

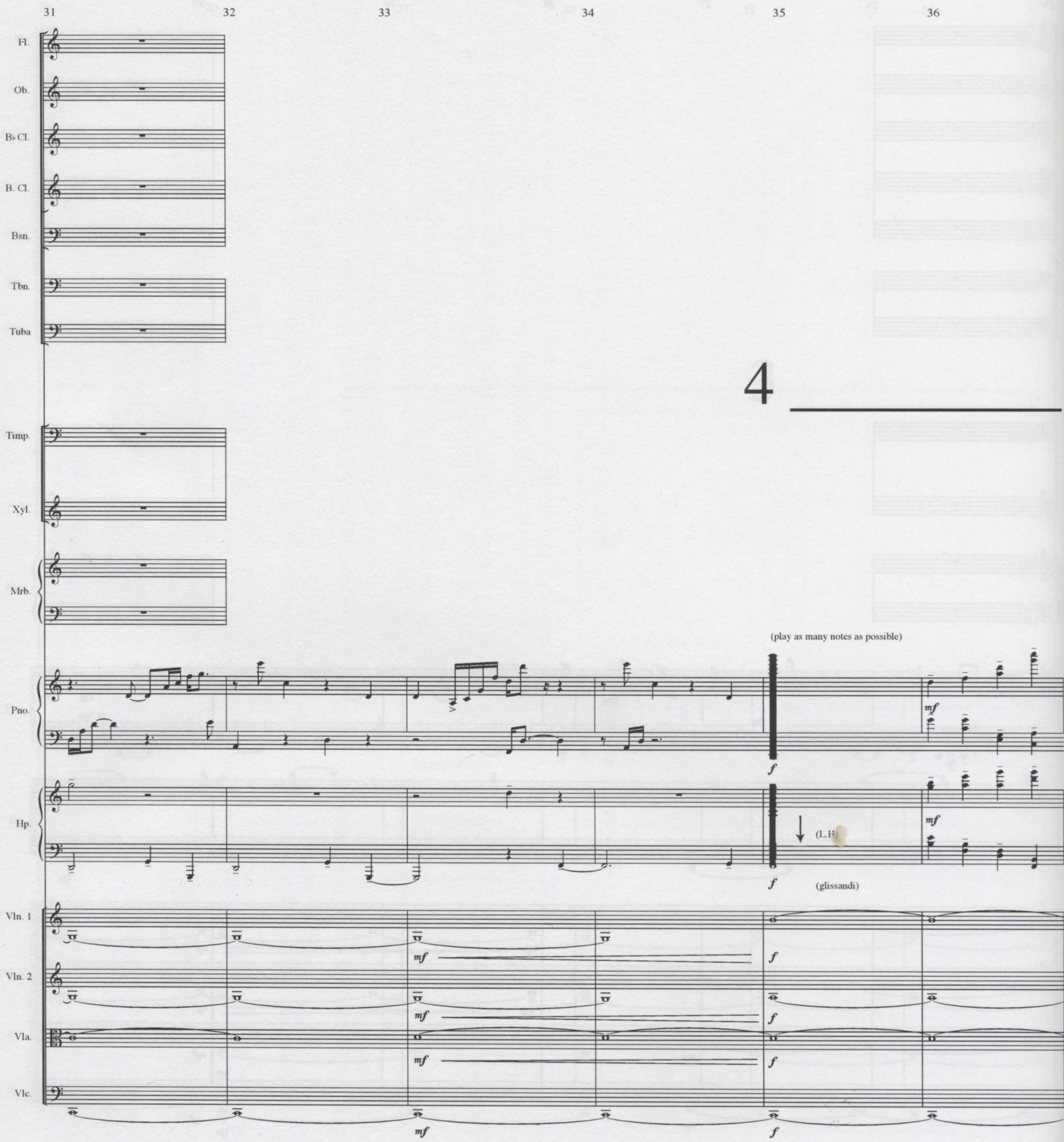


7
8
9
10
11
12
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
1
(electronics)
(play as many notes as possible)
(L.H)
(glissando)

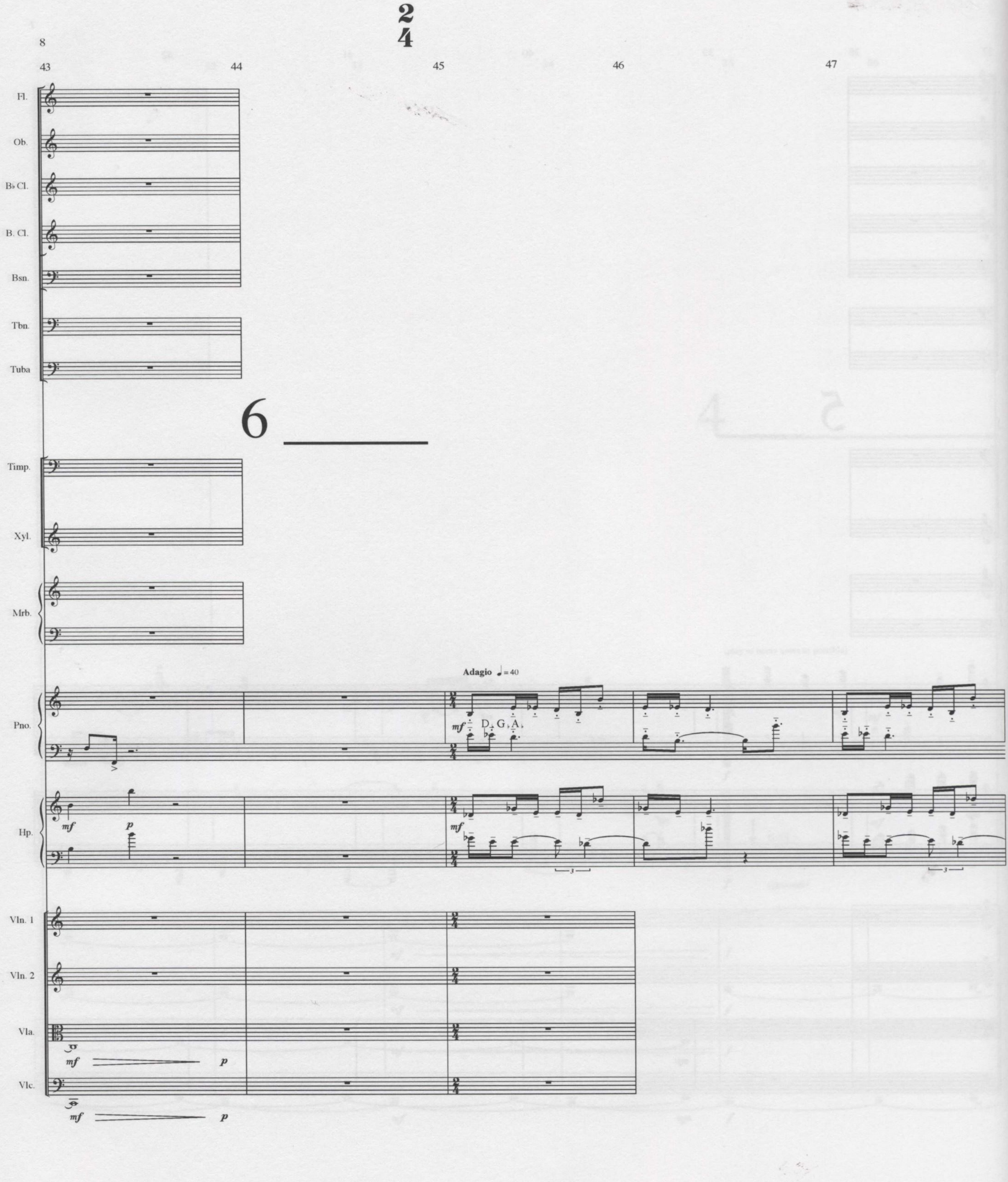

13
14
15
16
17
18
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
2
Timp.
Xyl.
Mrb.
Pno.
mf
f
Hp.
(play close to the sound board)
Vln. 1
Vln. 2
Vla.
Vlc.


19
20
21
22
23
24
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
3
Timp.
Xyl.
Mrb.
Pno.
mf
Hp.
mf
Vln. 1
Vln. 2
Vla.
mf
Vlc.
mf

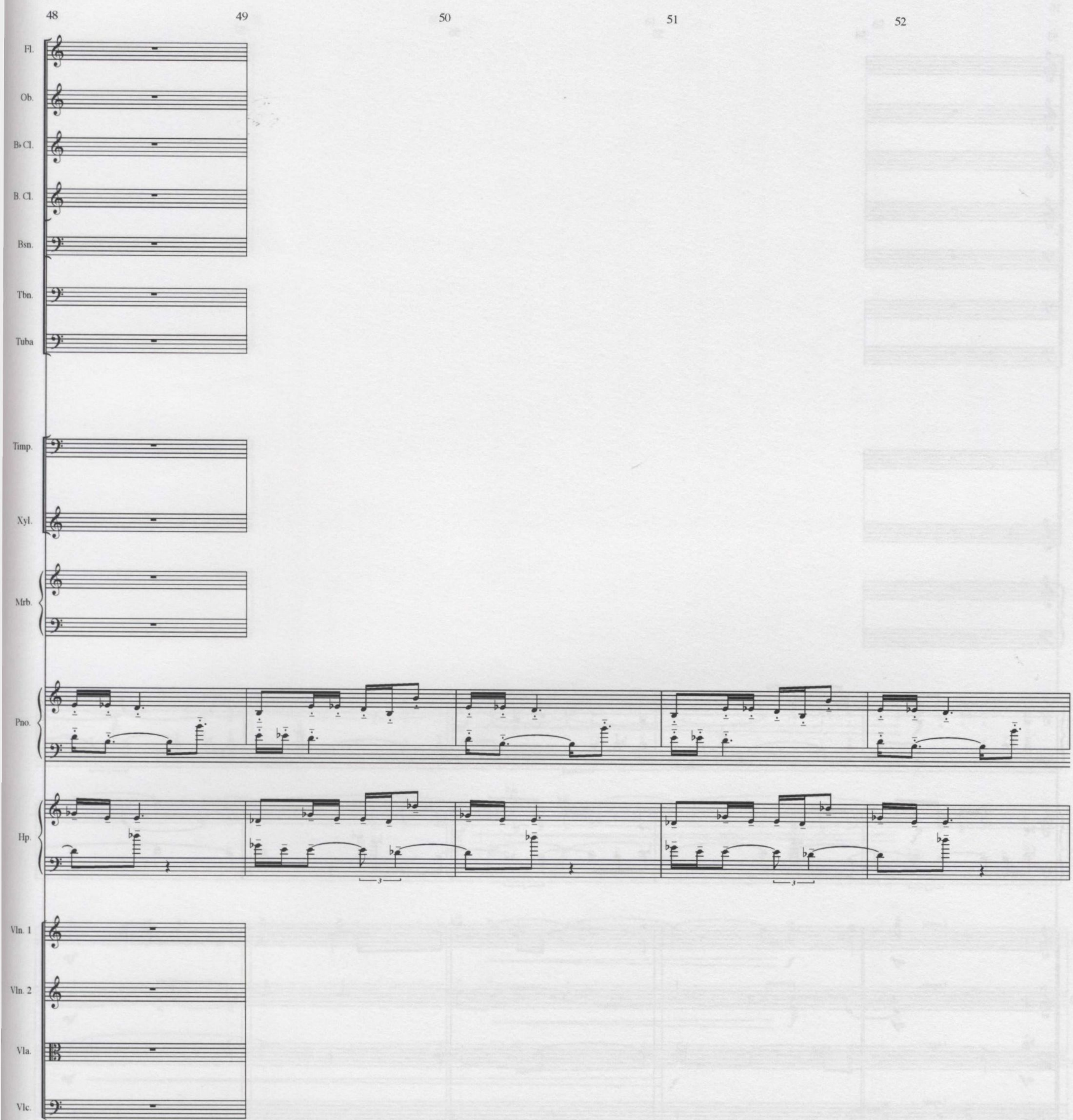

25
26
27
28
29
30
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
mf

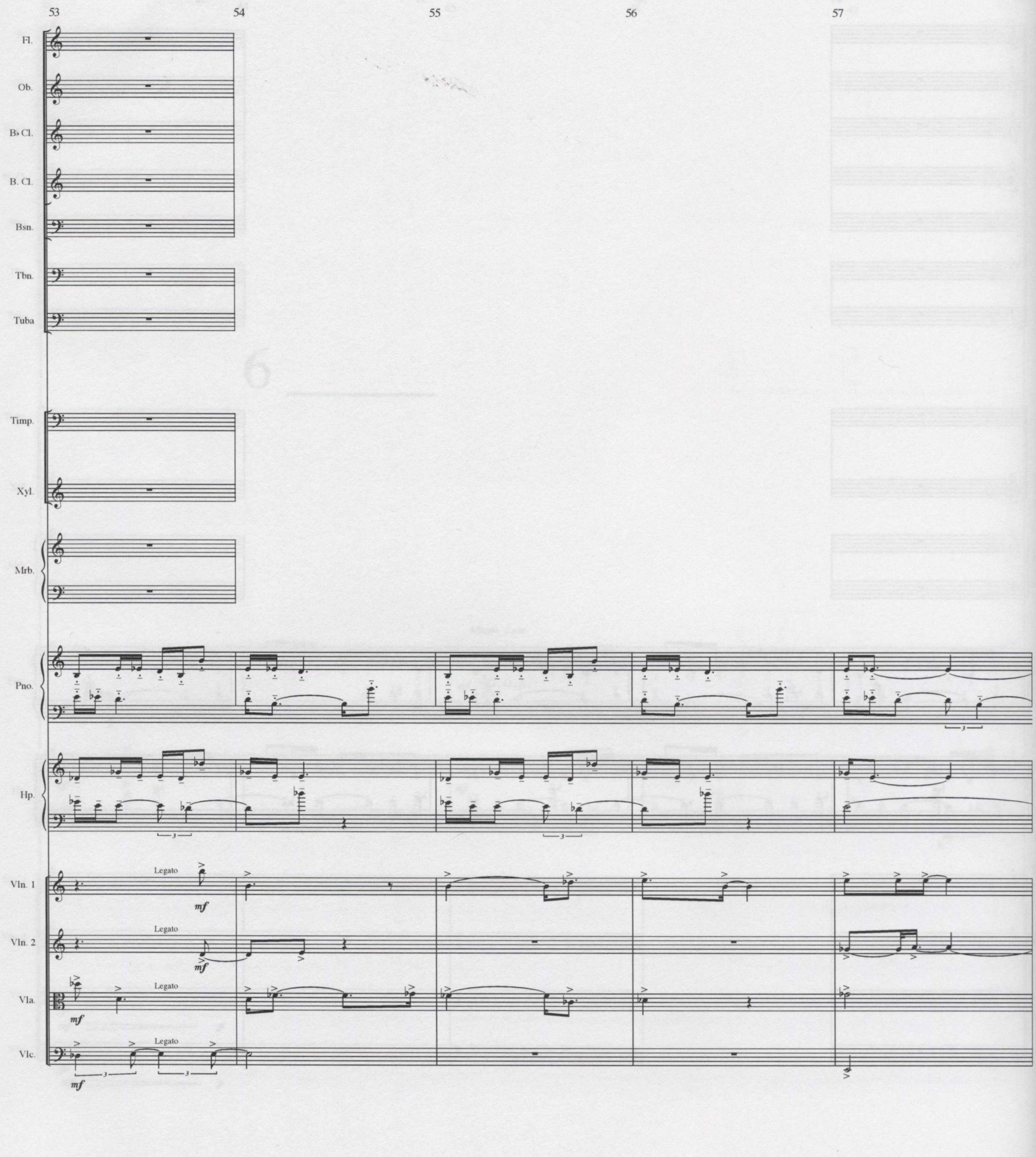

31
32
33
34
35
36
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
4
Timp.
Xyl.
Mrb.
(play as many notes as possible)
Pno.
Hp.
(L.H)
(glissandi)
Vln. 1
Vln. 2
Vla.
Vlc.
mf
f


37
38
39
40
41
42
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
5
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
p
mf
mf
mp
mp

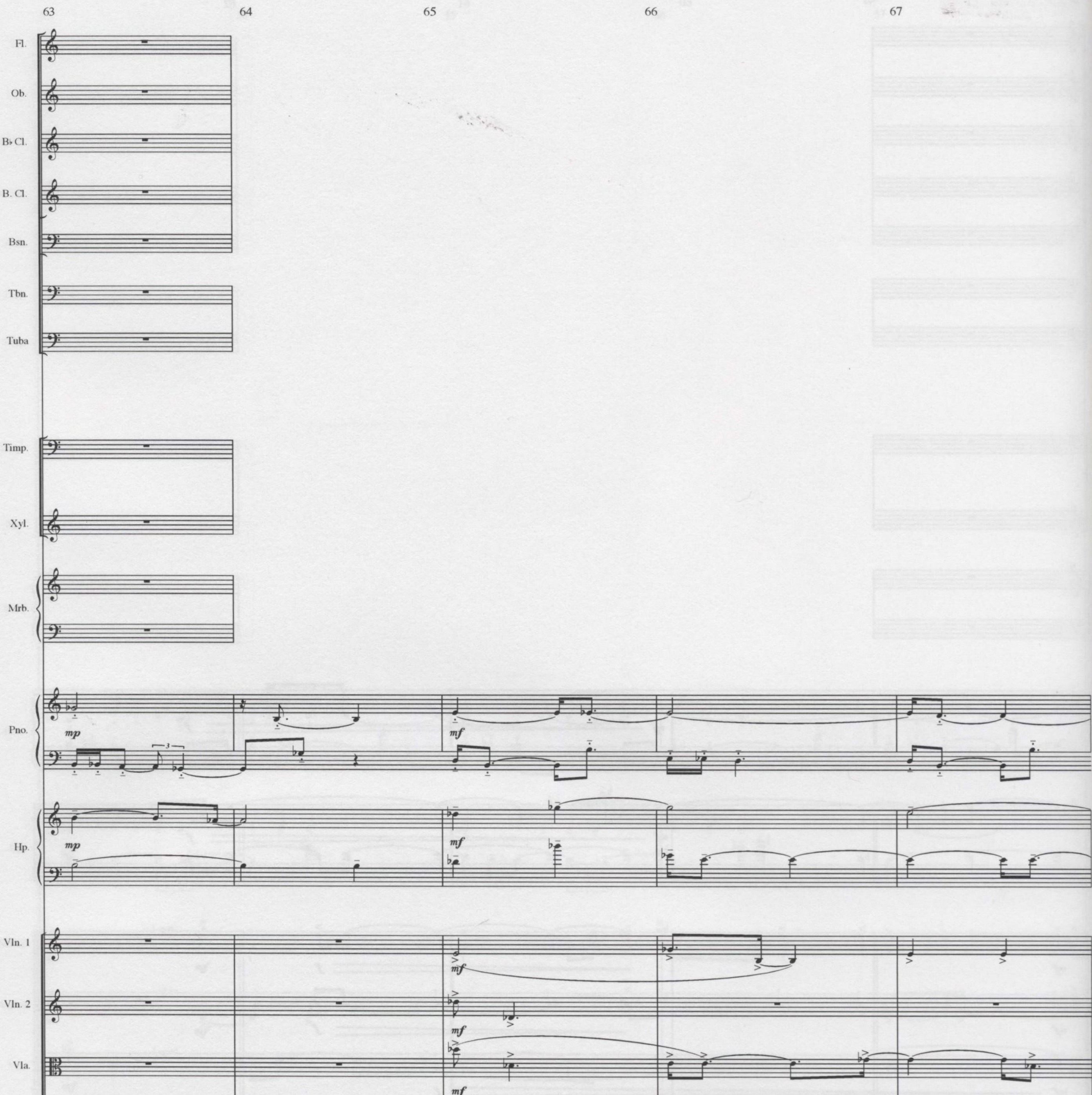


43
44
45
46
47
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
6
Timp.
Xyl.
Mrb.
Adagio ♩ = 40
Pno.
mf
D♭ G♭ A♭
Hp.
mf
p
Vln. 1
Vln. 2
Vla.
mf
p
Vlc.
mf
p


48
49
50
51
52
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.


53
54
55
56
57
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
Legato
mf
Legato
mf
Legato
mf
Legato
mf


58
59
60
61
62
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
mf
f
Hp.
mf
f
Vln. 1
mf
f
Vln. 2
mf
f
Vla.
mf
f
Vlc.
mf
f

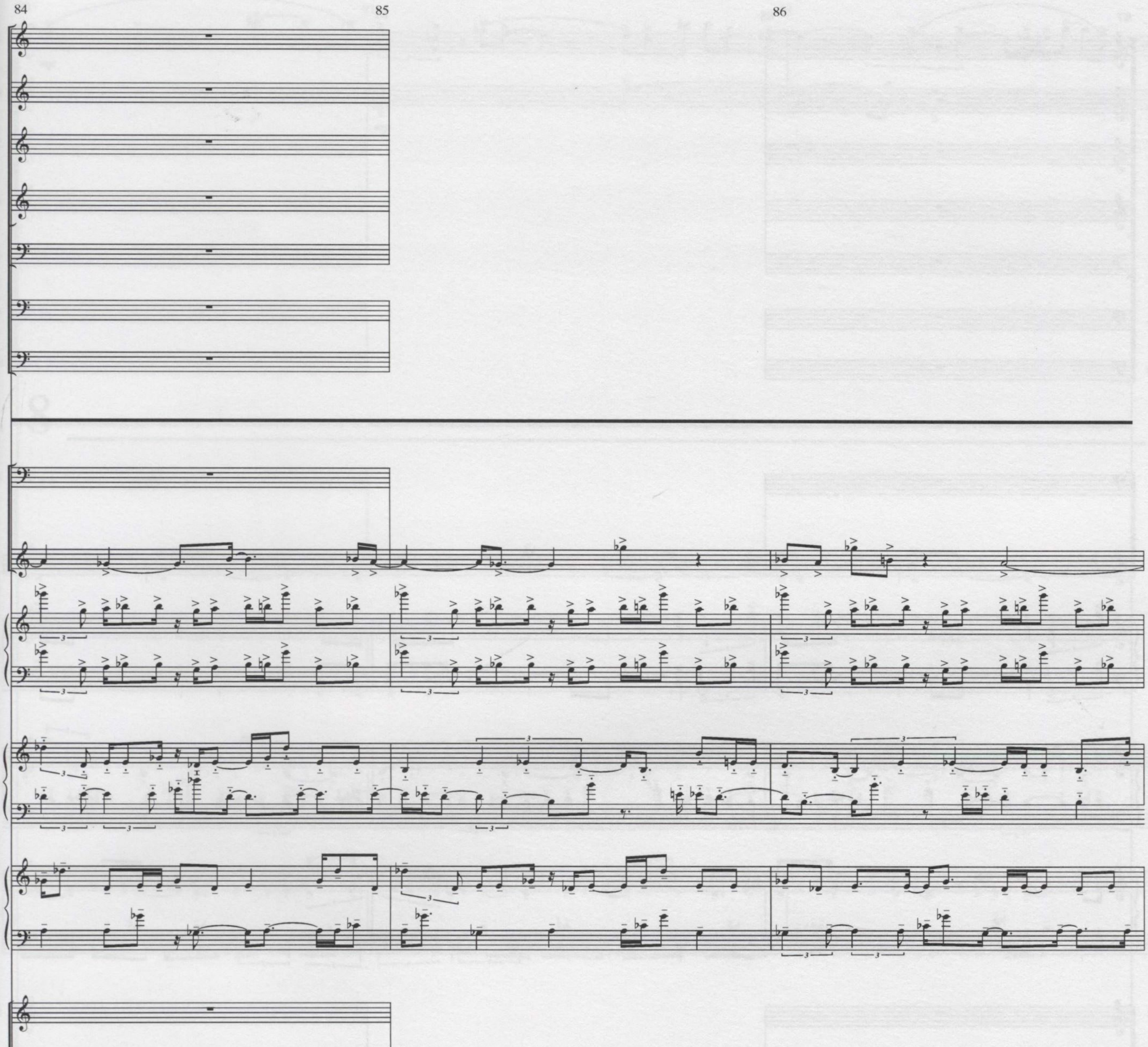

63
64
65
66
67
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
mf

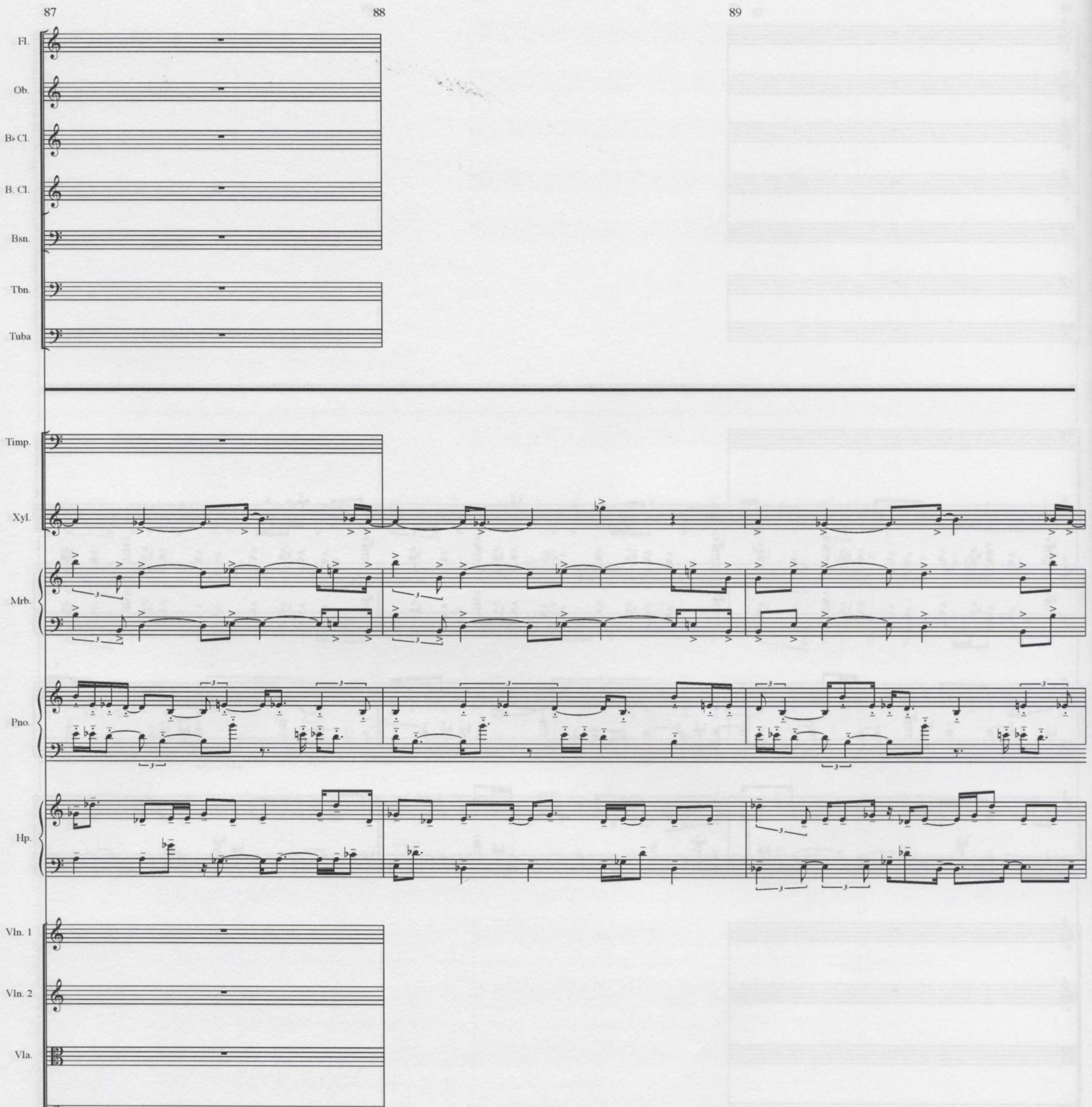

68
69
70
71
72
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
mp
3
3

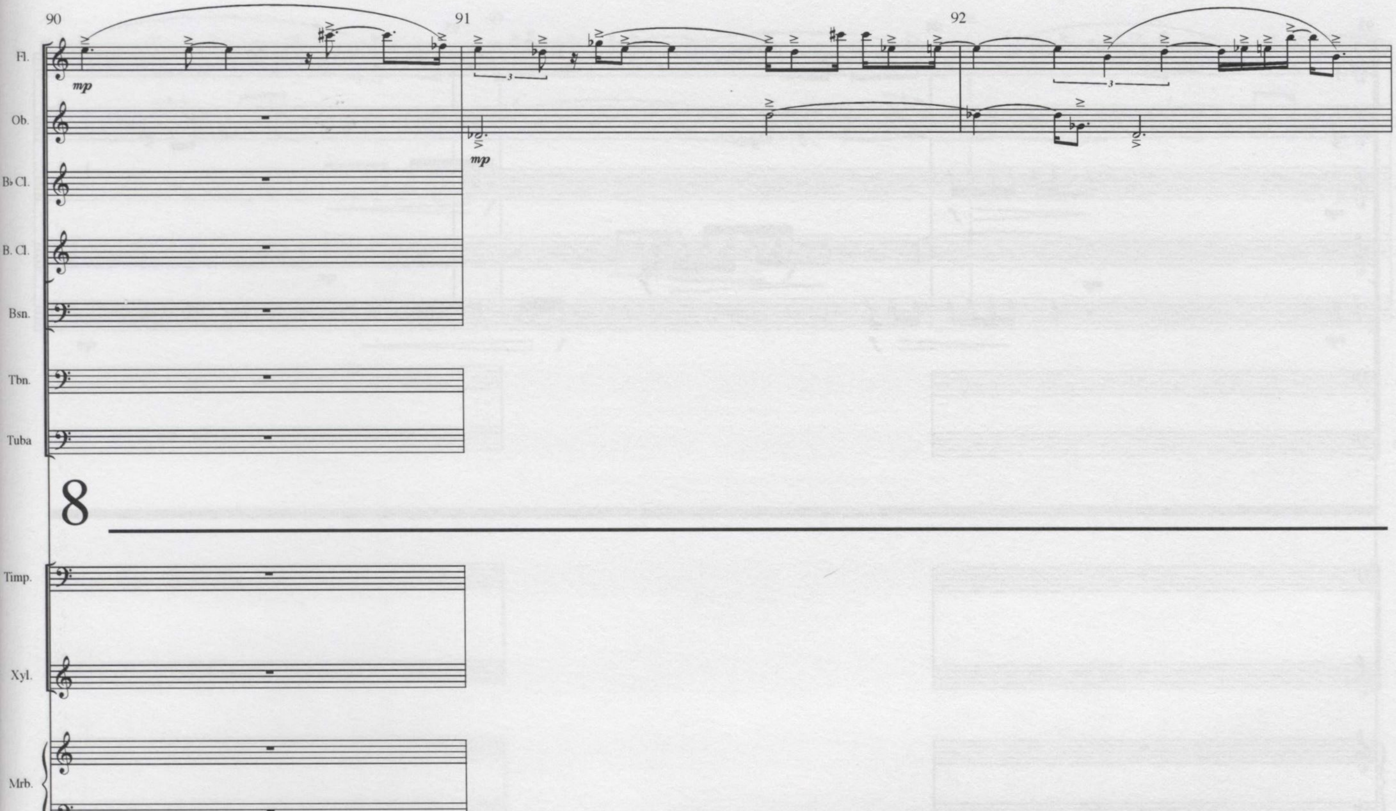

73
74
75
76
77
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mf
f

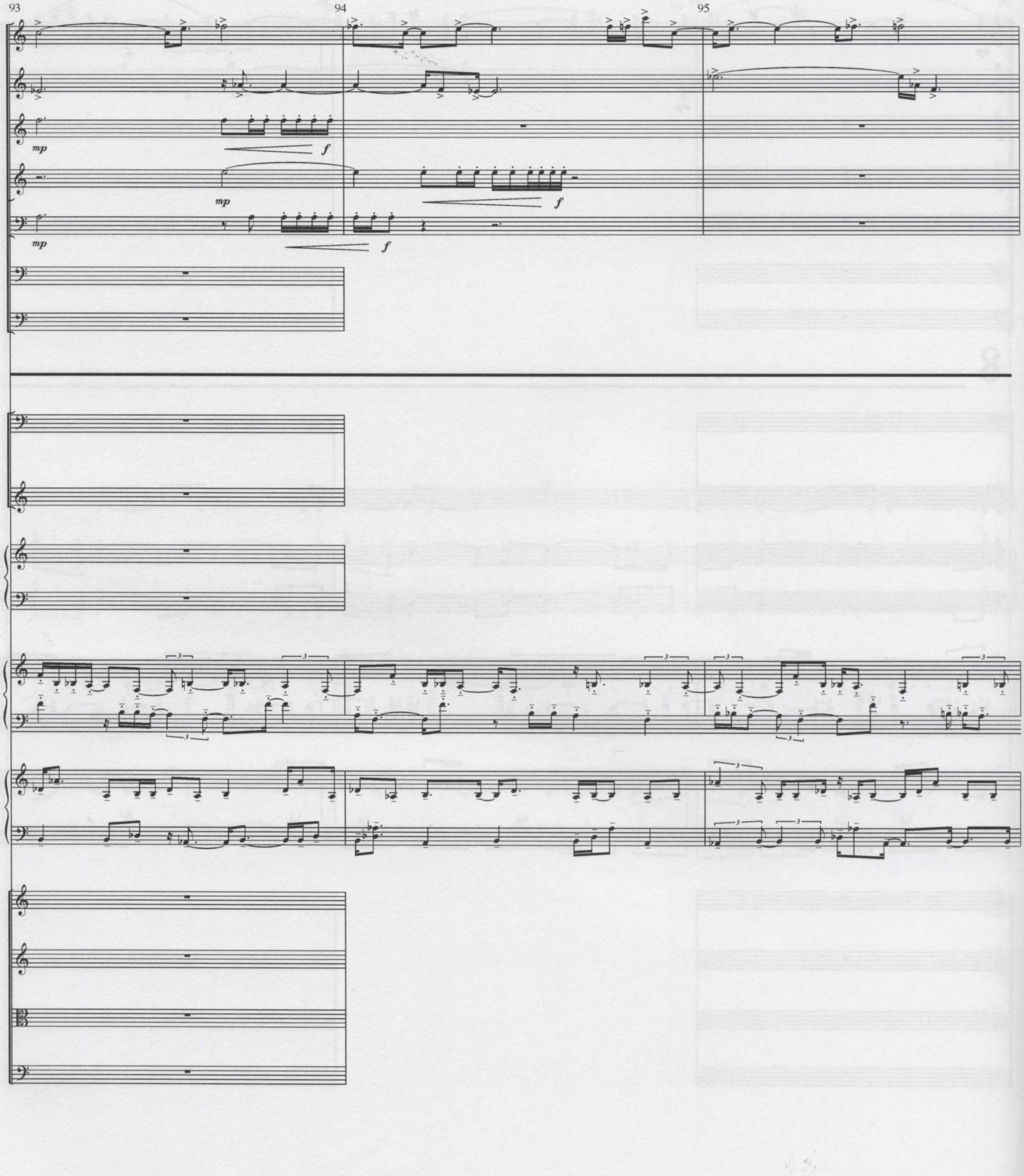

78
79
80
7
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mf

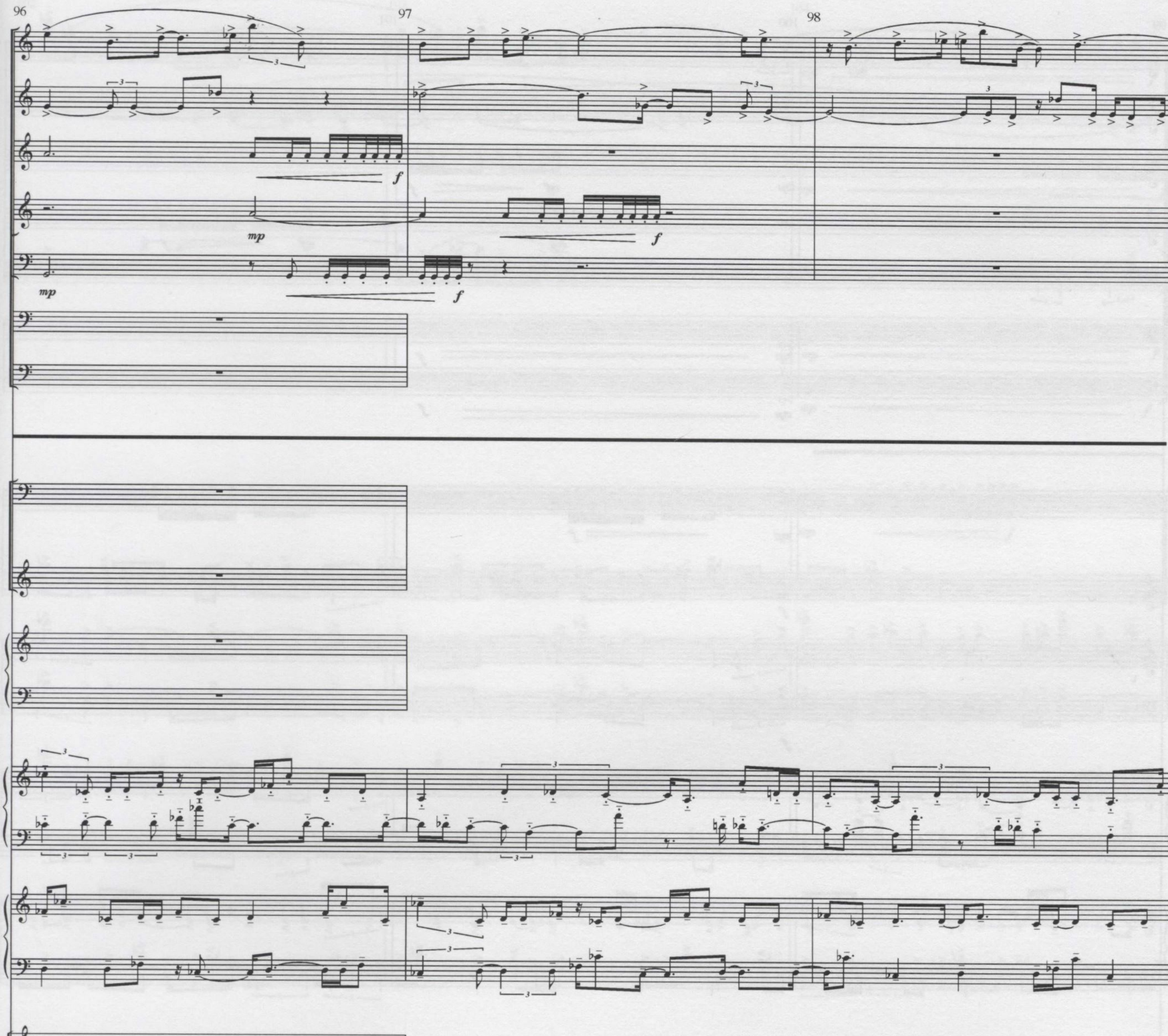

81
82
83
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.

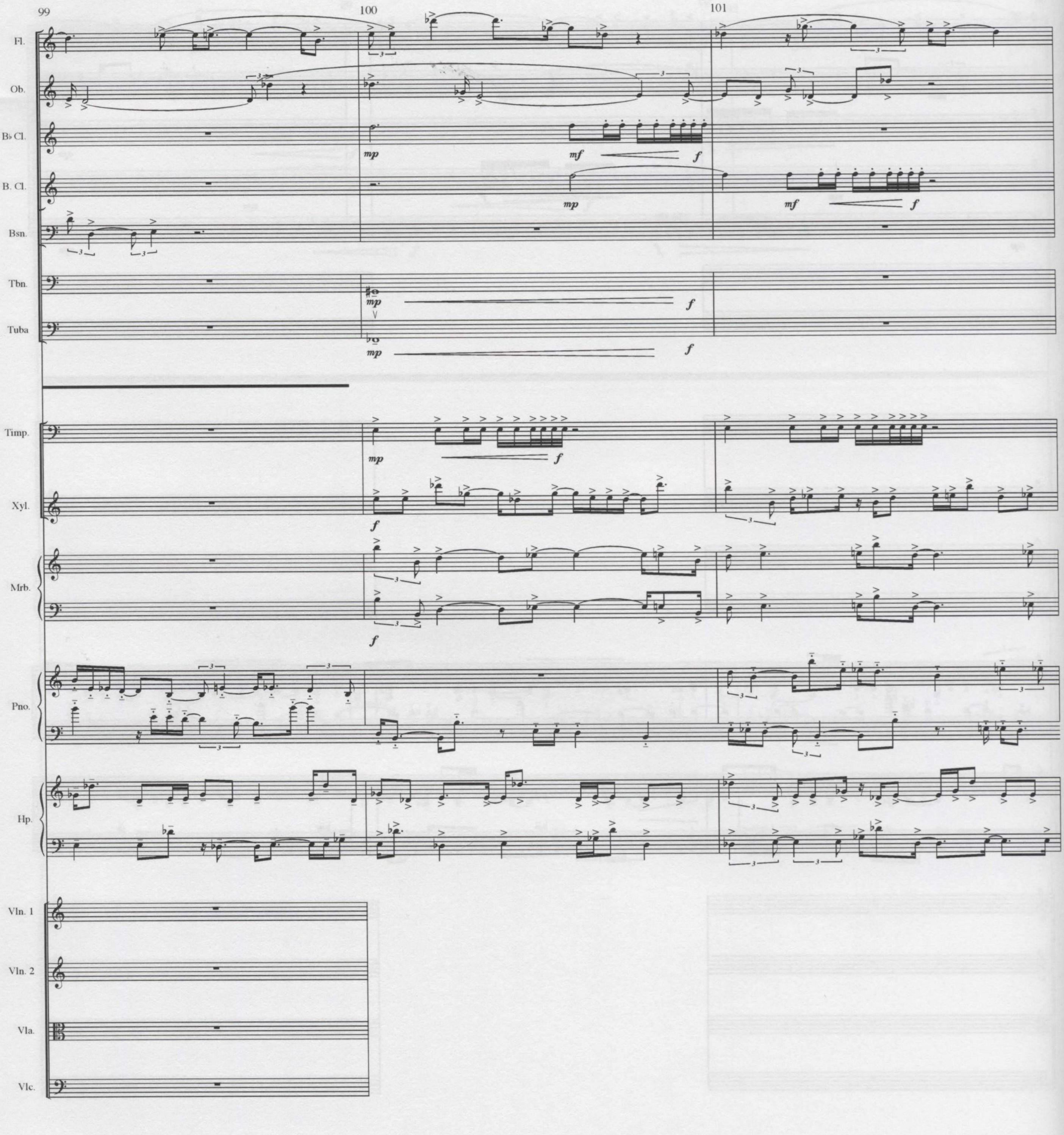

84
85
86
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.

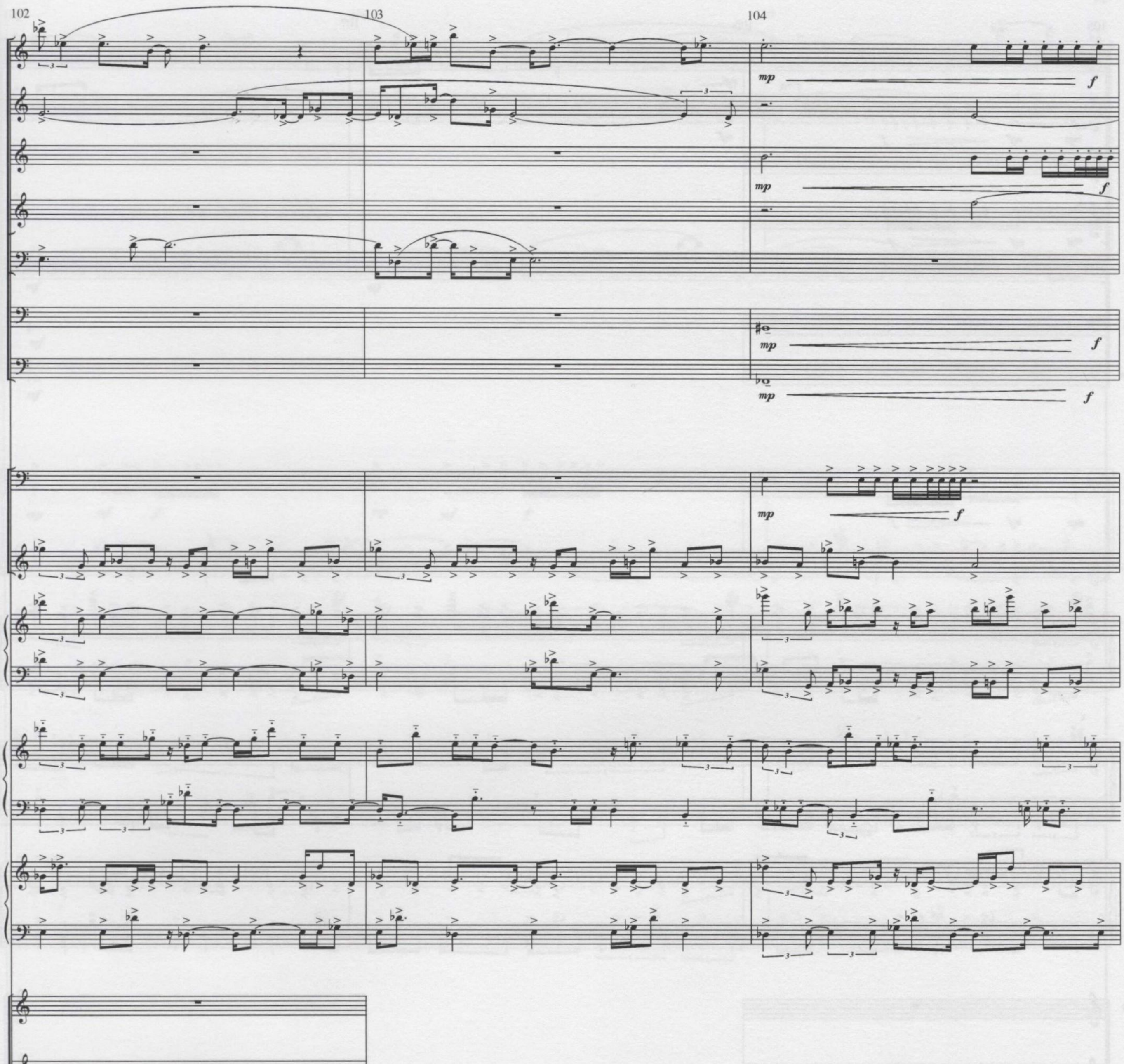

87
88
89
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.

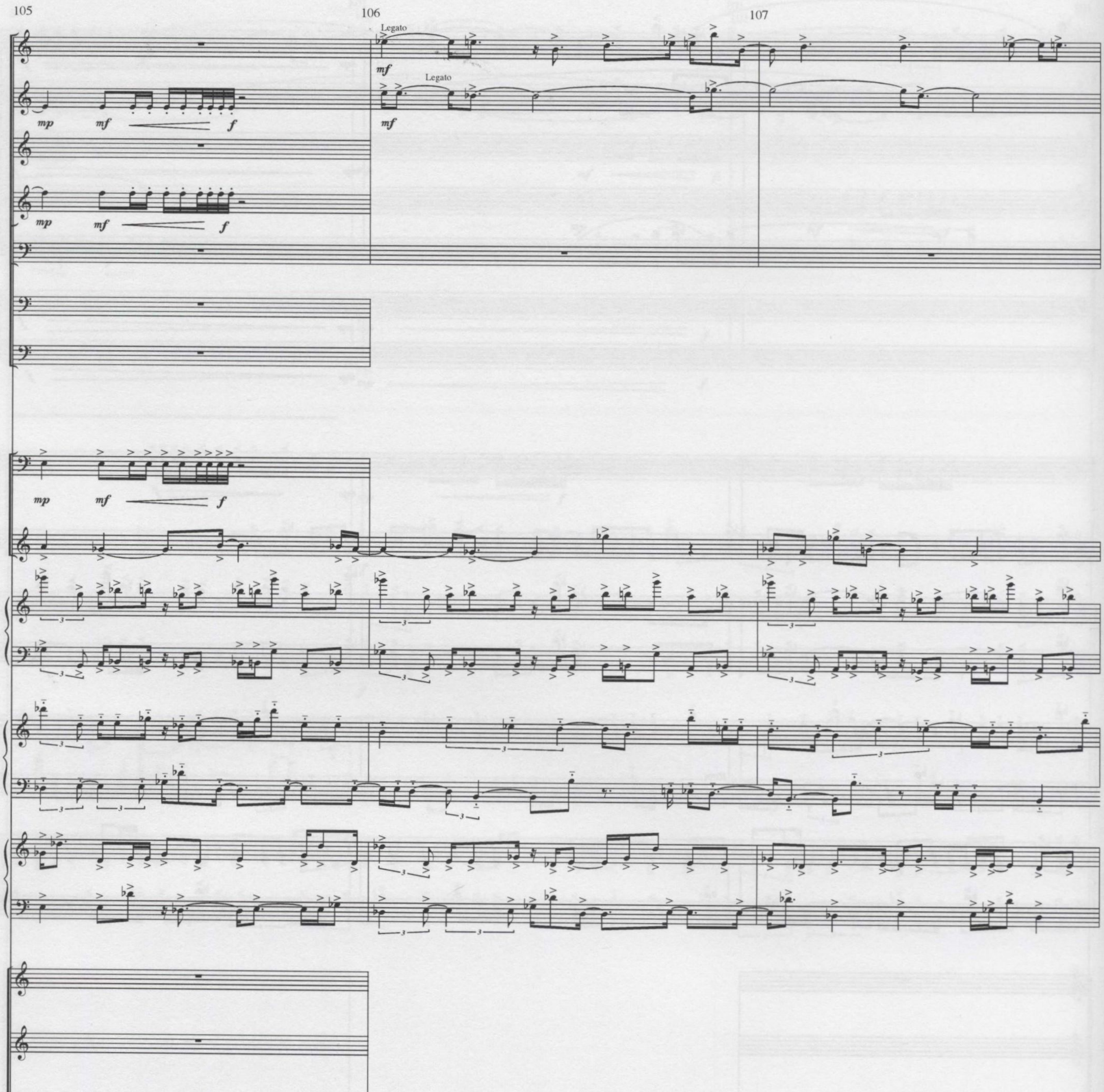

90
91
92
Fl.
mp
Ob.
mp
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
8
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.

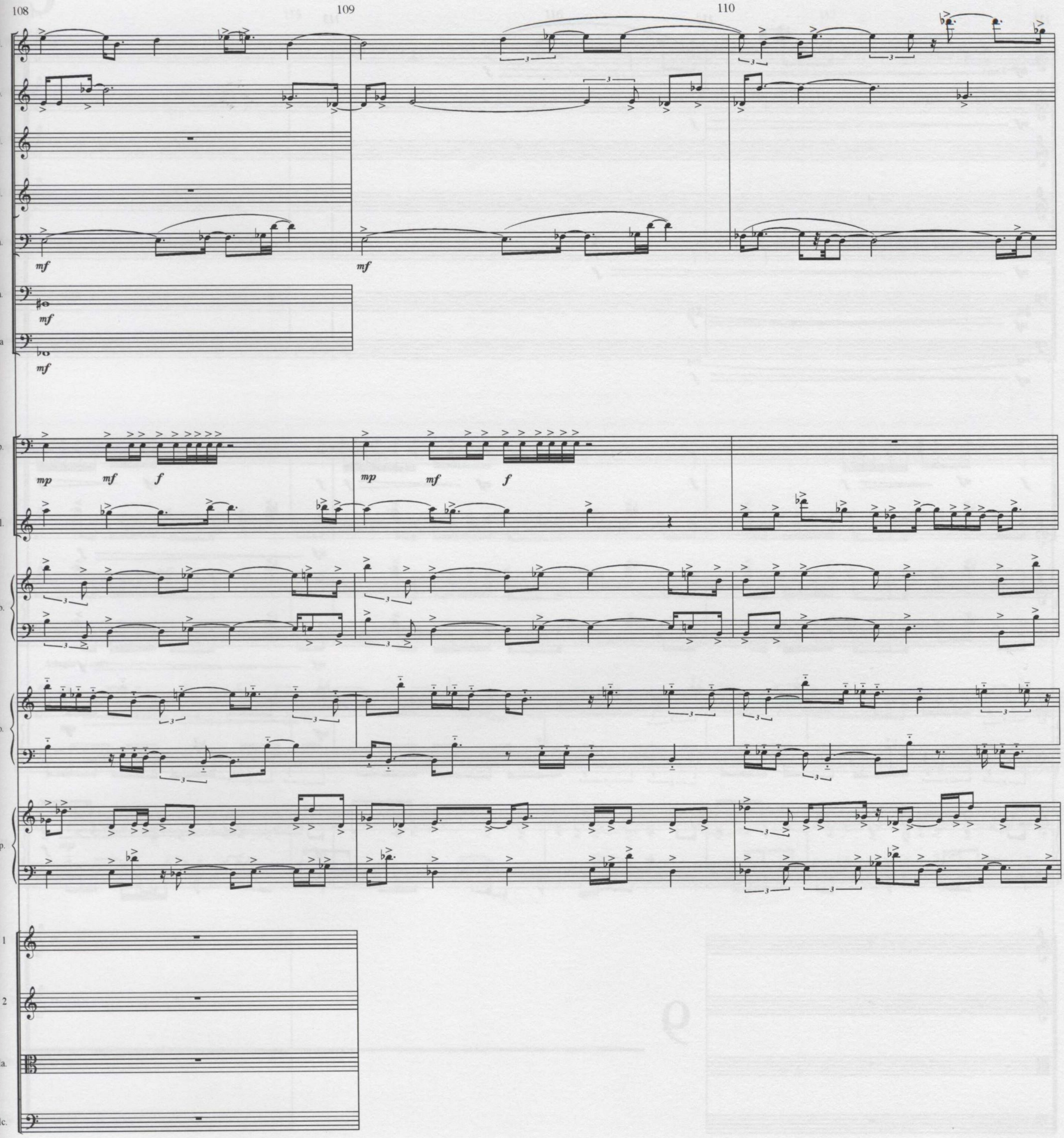

93
94
95
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
f

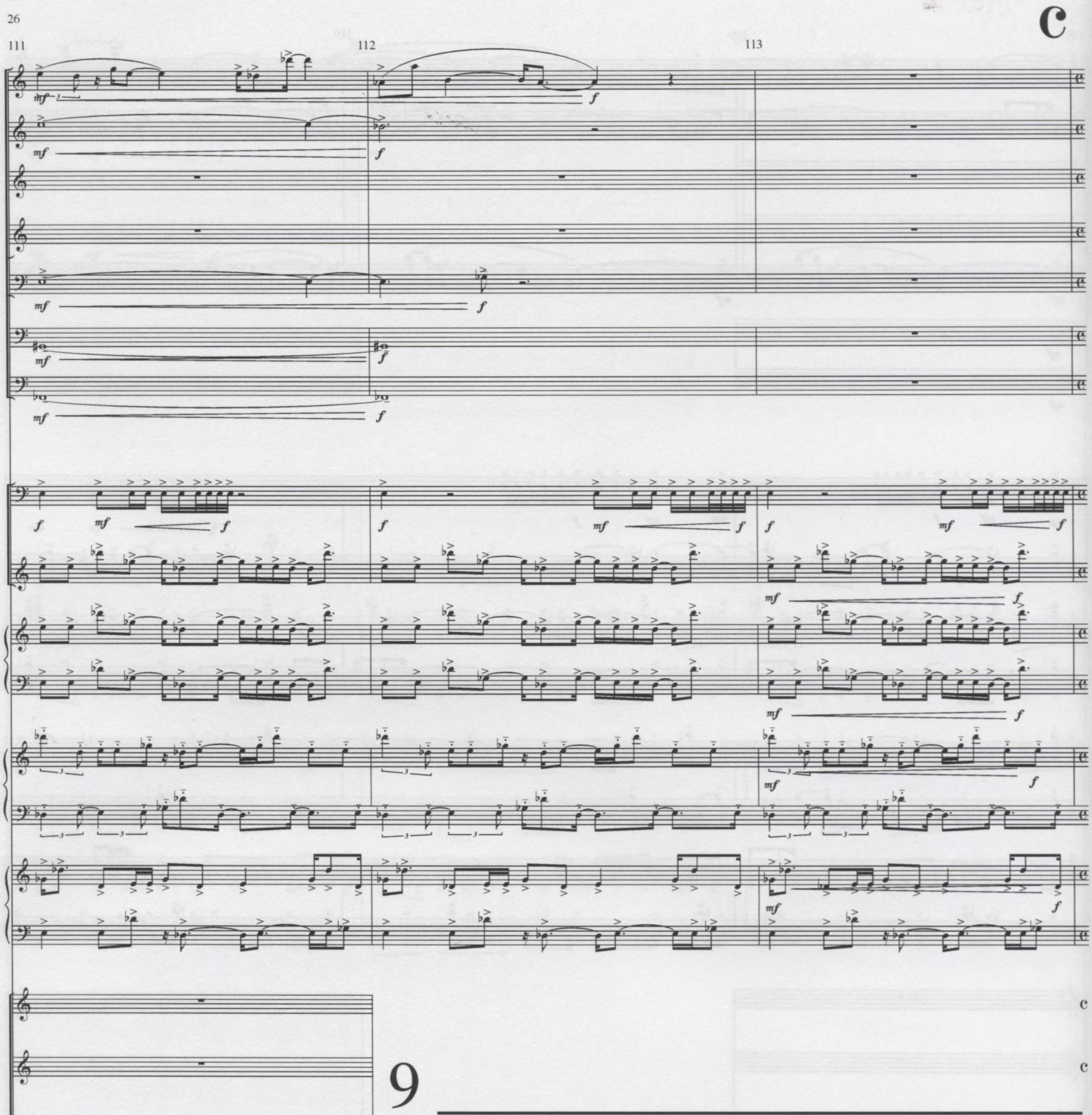

96
97
98
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
f

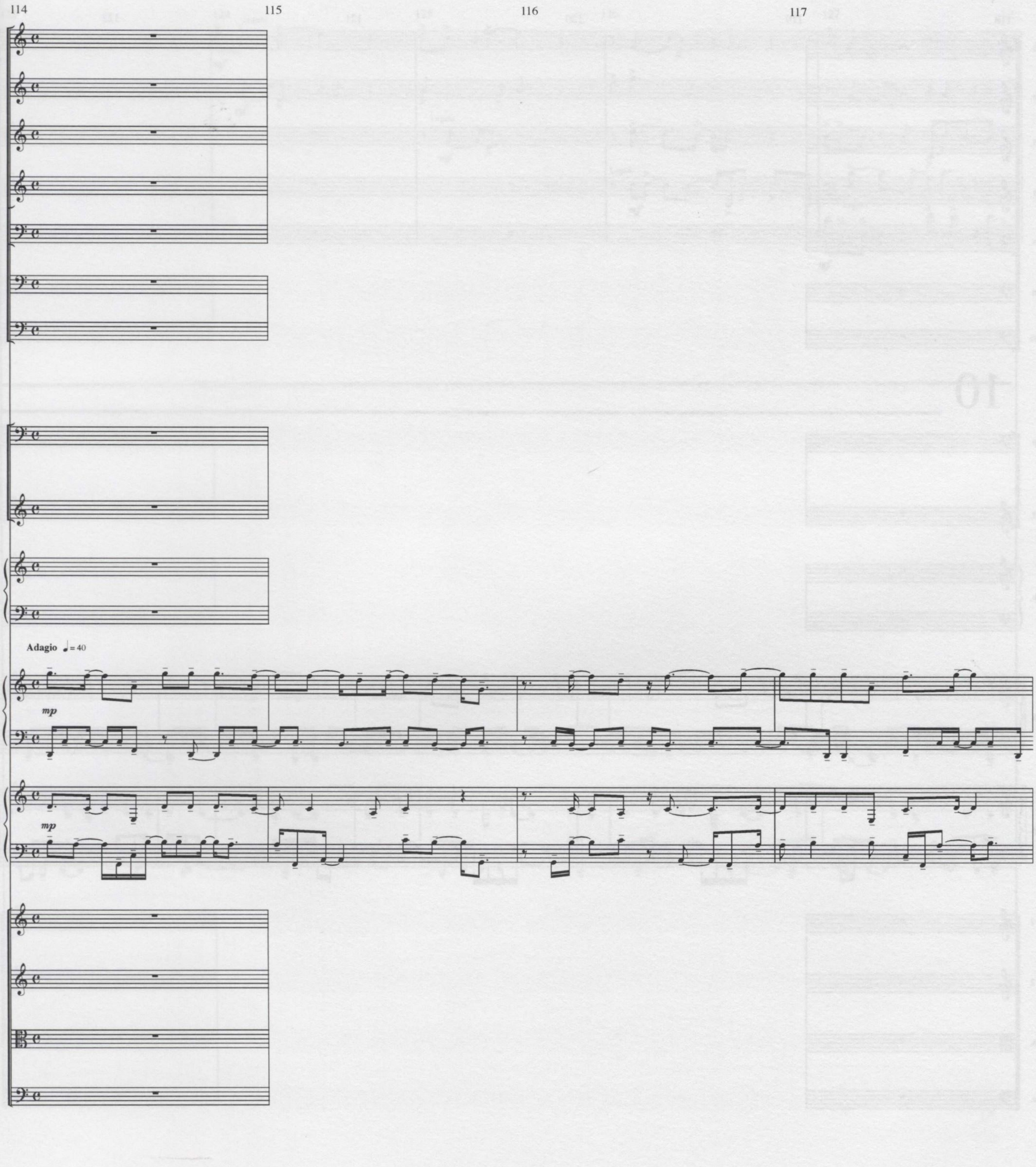

99
100
101
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
mf
f

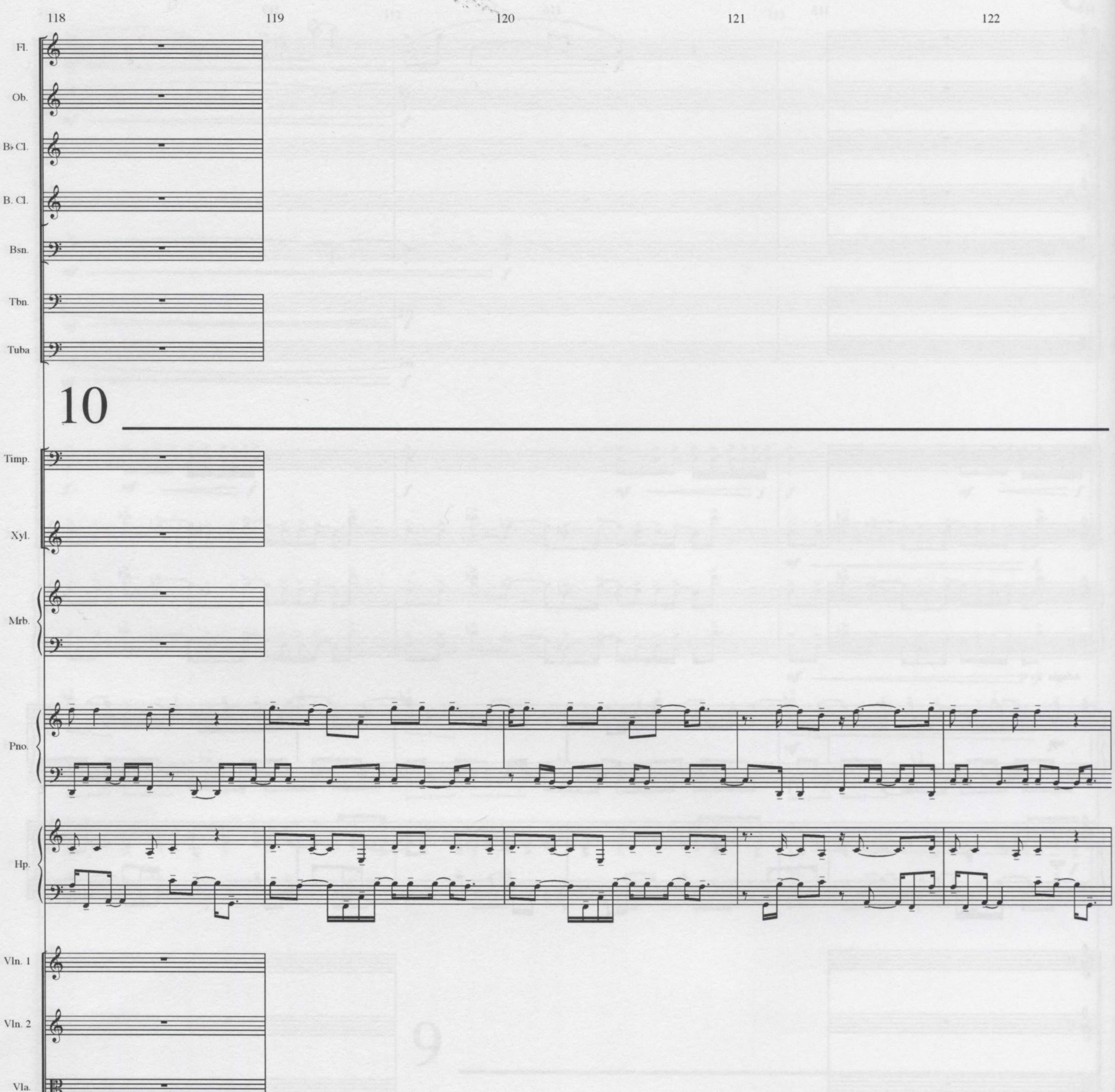

102
103
104
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
f

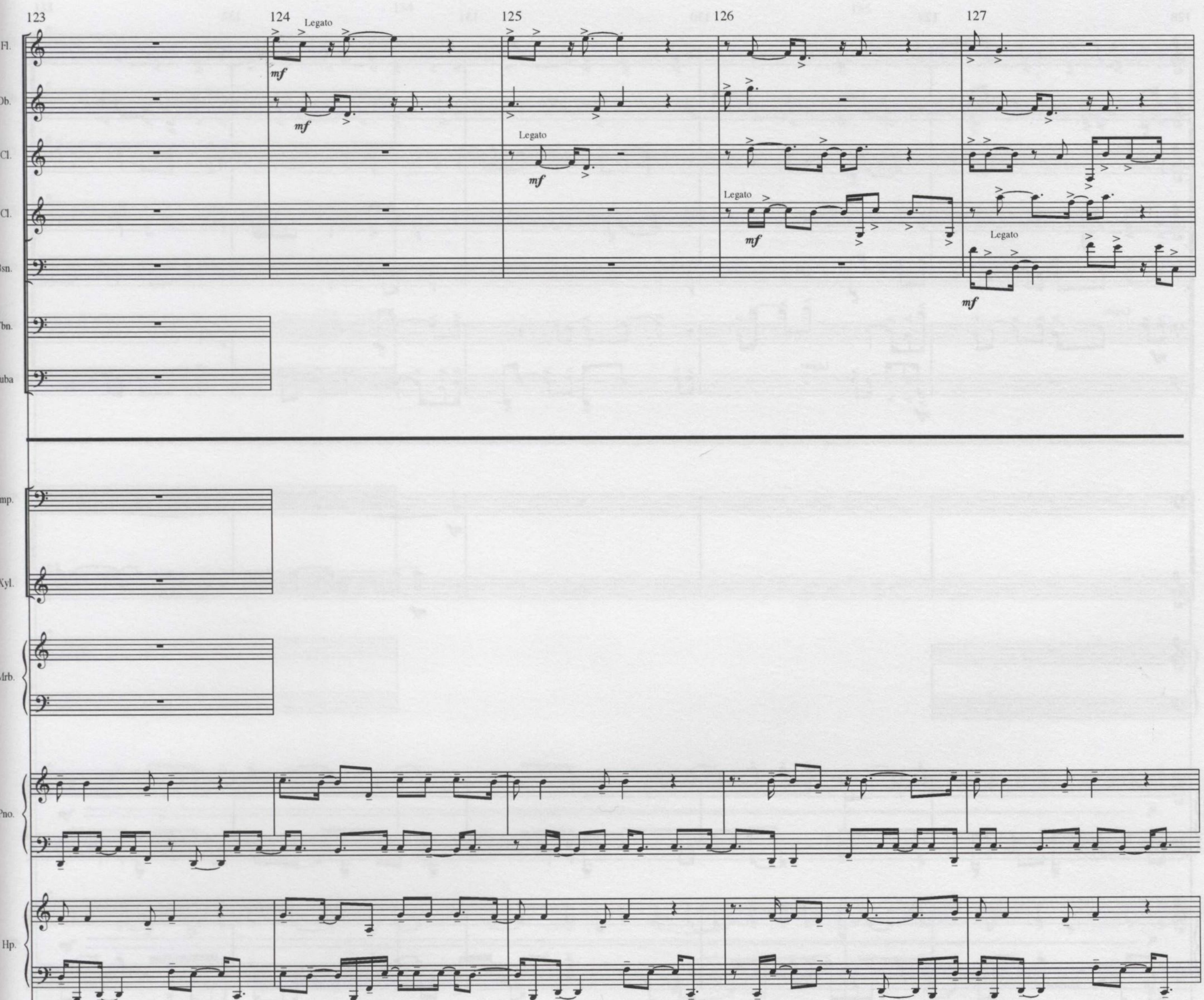

105
106
107
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
Legato
Legato
mp
mf
f

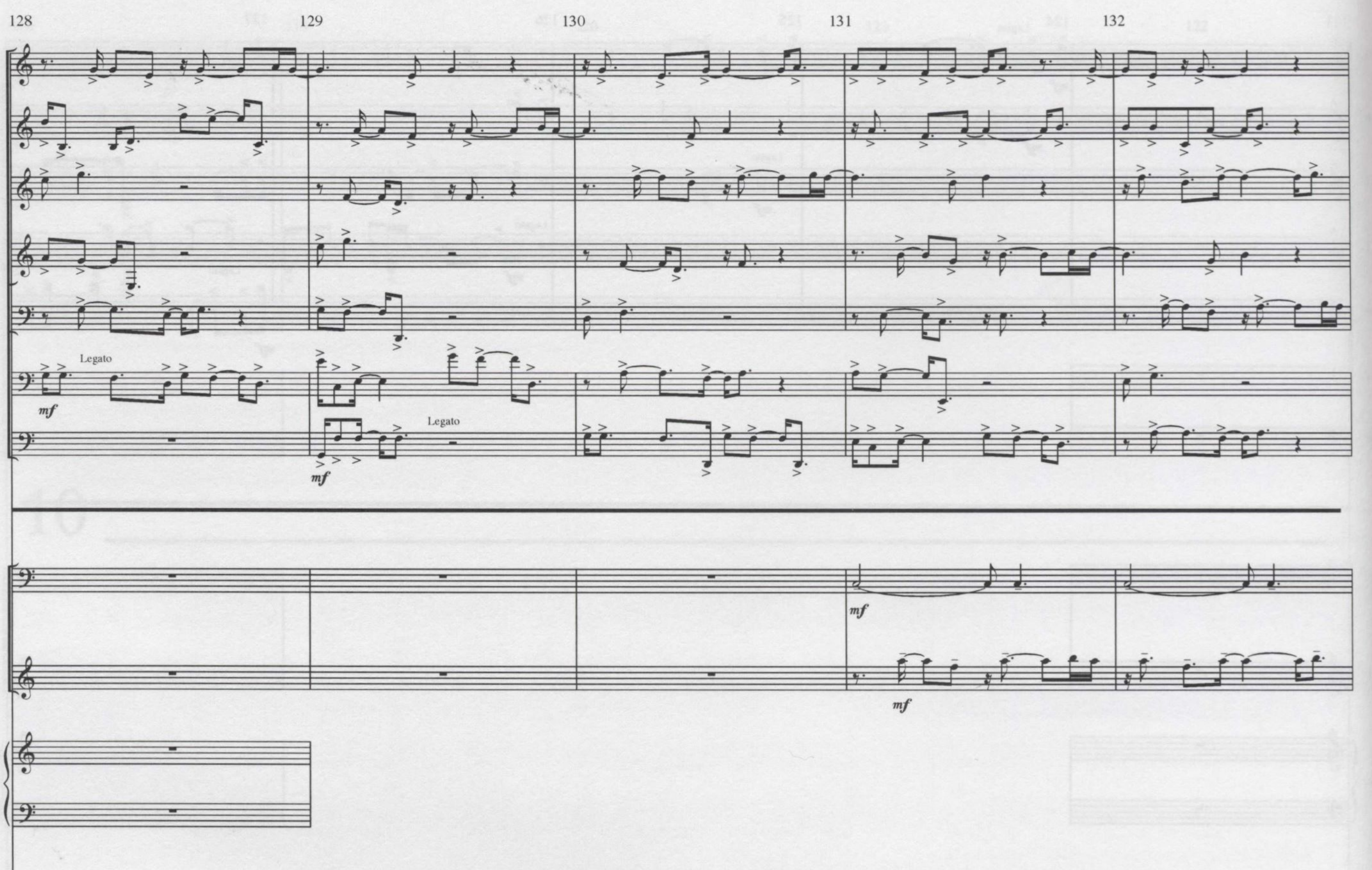

108
109
110
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mf
mp
f
3

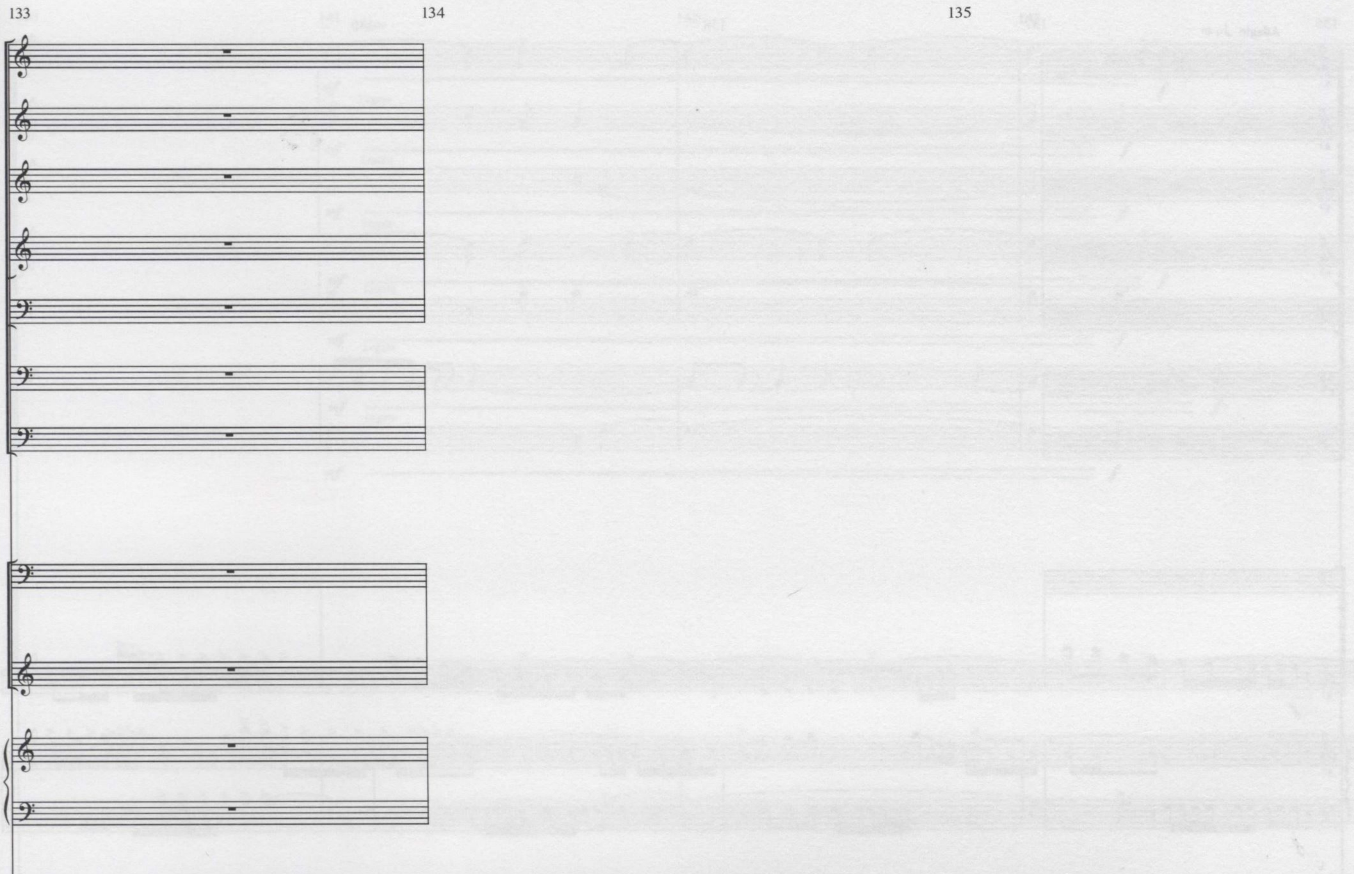

C
111
112
113
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
9


114
115
116
117
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Adagio ♩ = 40
Pno.
mp
Hp.
mp
Vln. 1
Vln. 2
Vla.
Vlc.


118
119
120
121
122
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
10
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.


123
124
125
126
127
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
Legato
mf
Legato
mf
Legato
mf
Legato
mf
mf

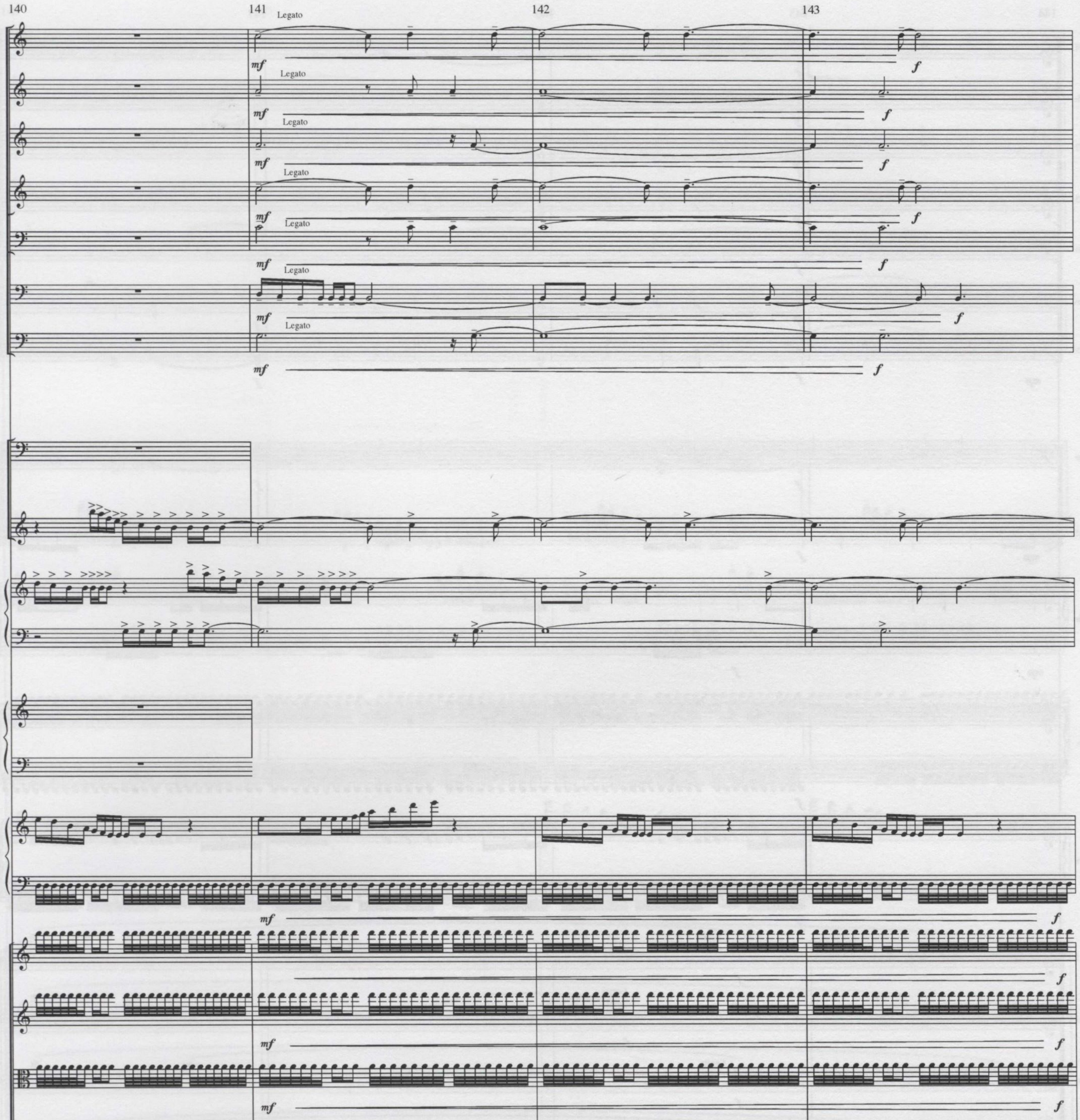

128
129
130
131
132
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Legato
mf
Tuba
Legato
mf
Timp.
mf
Xyl.
mf
Mrb.
Pno.
Hp.
Vln. 1
mf
Vln. 2
mf
Vla.
mf
Vlc.
mf

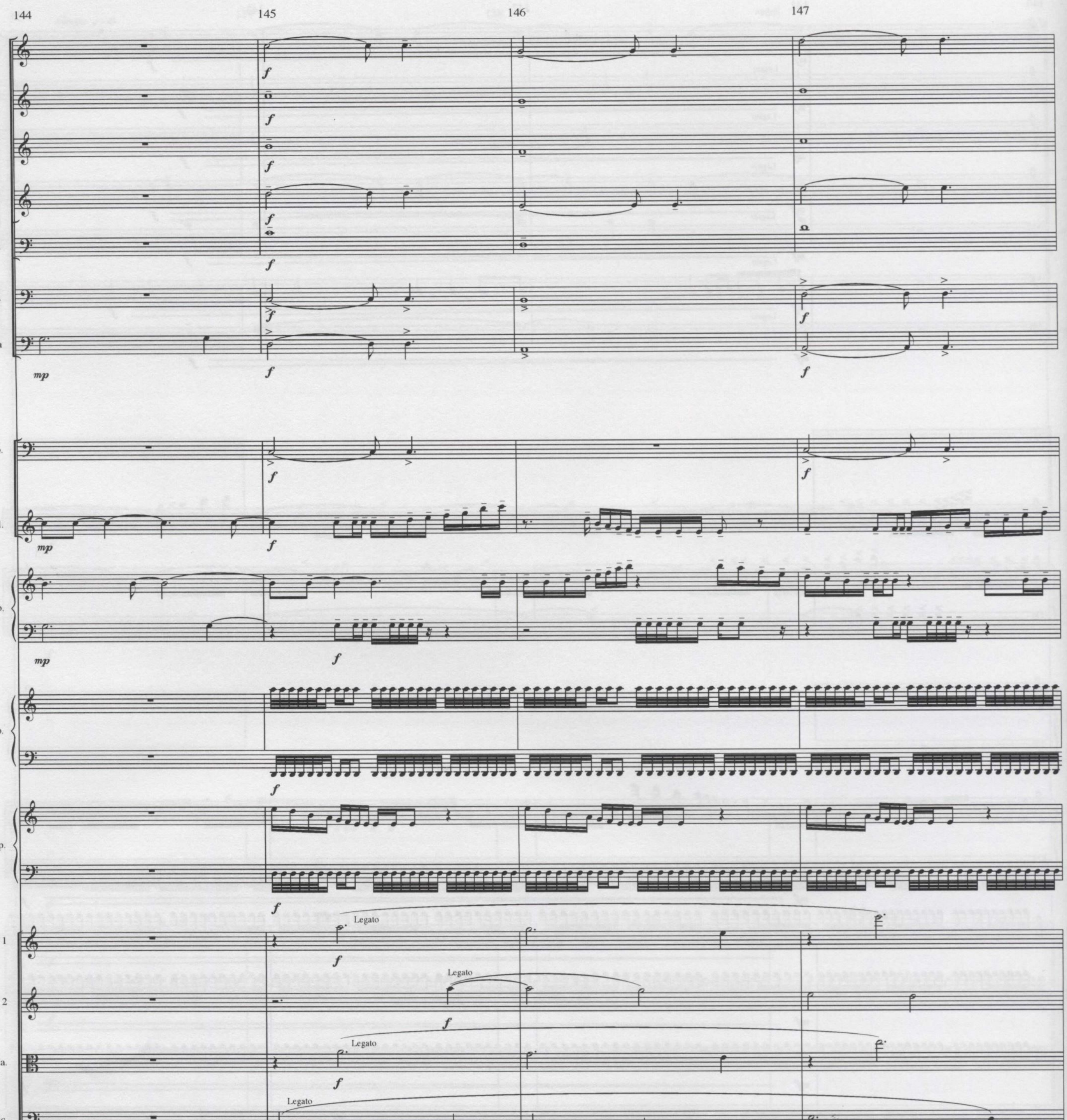

133
134
135
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
mf
p
Hp.
mf
p
Vln. 1
Vln. 2
Vla.
Vlc.

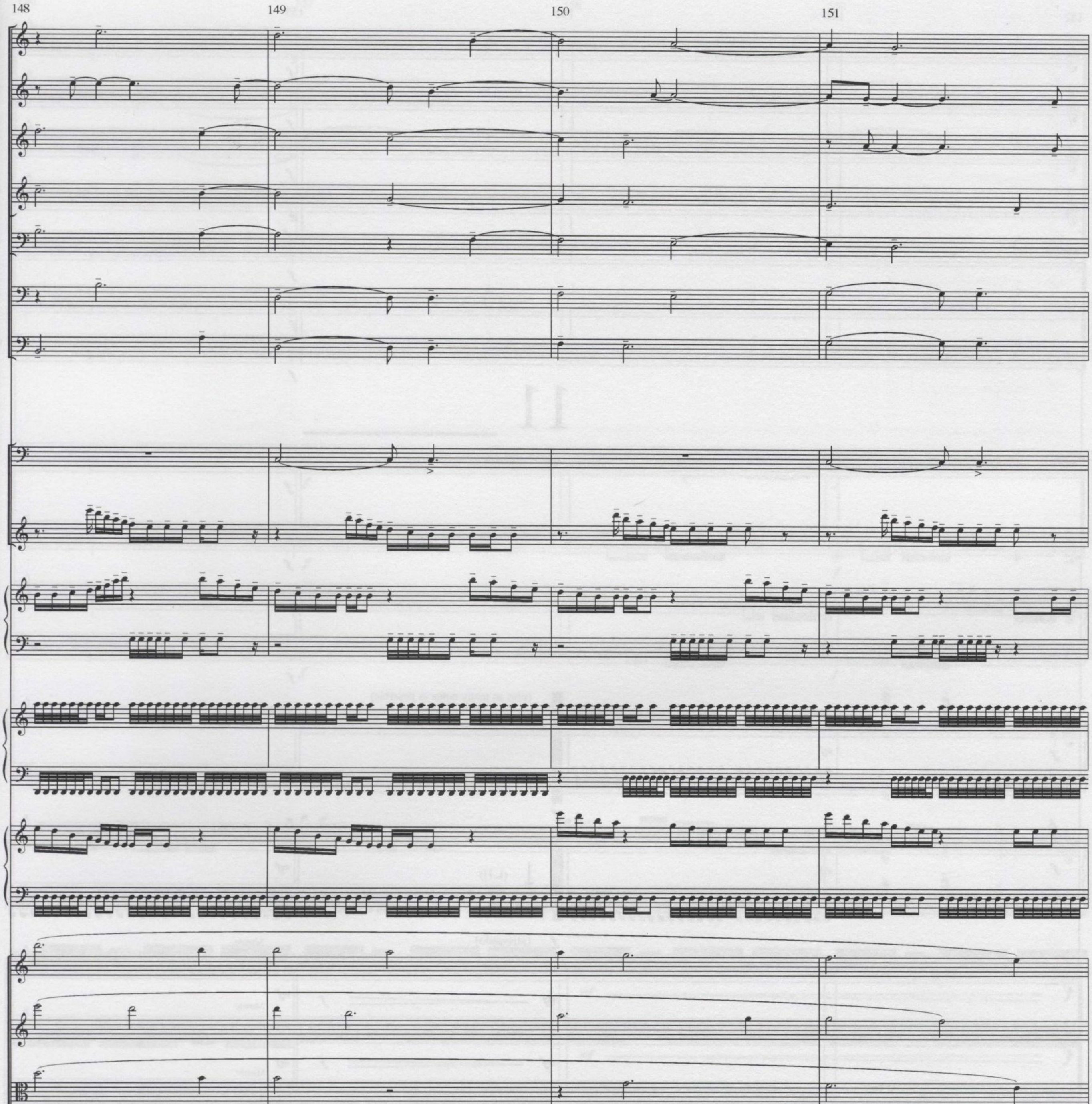
C

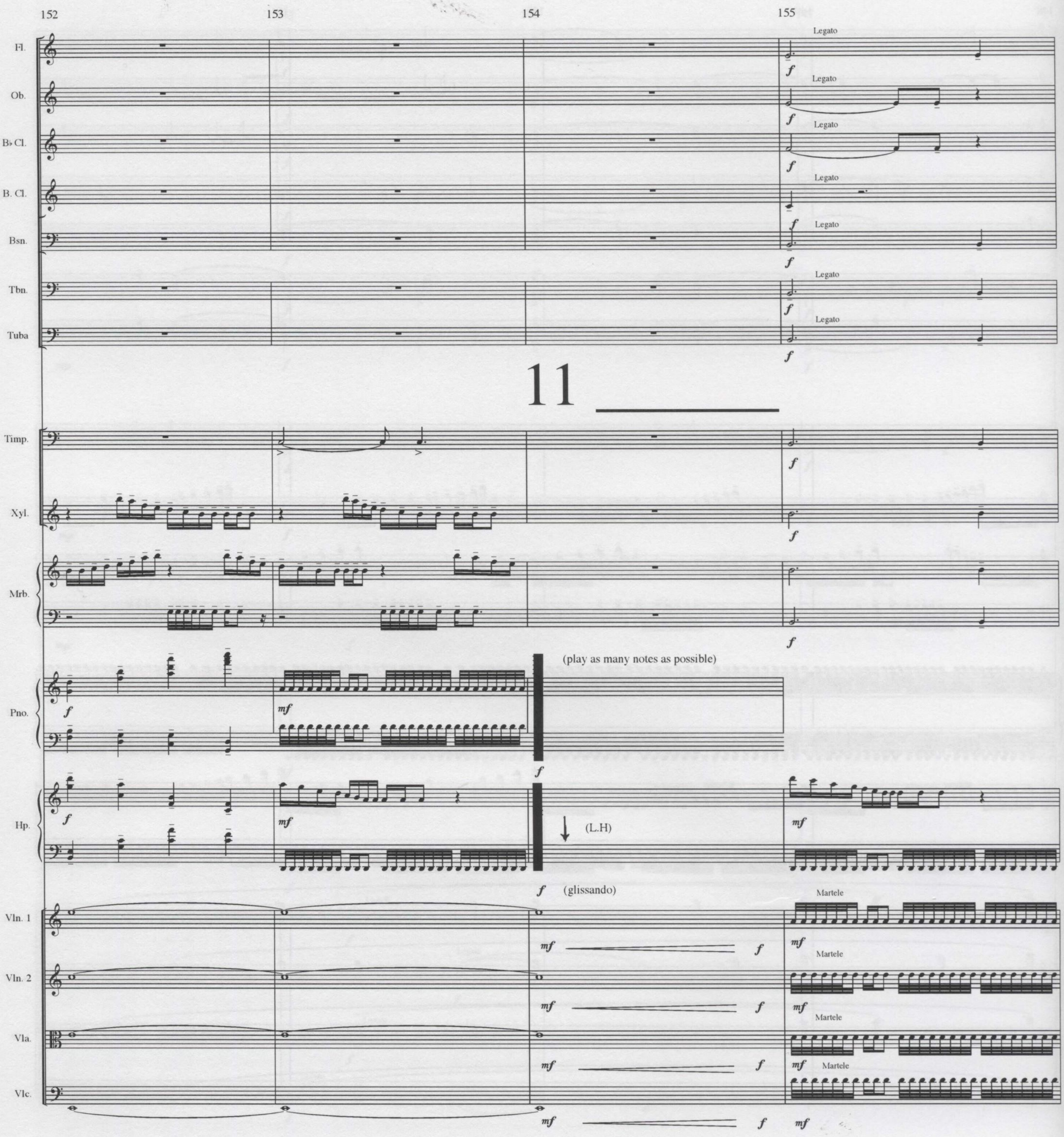
2. Passing

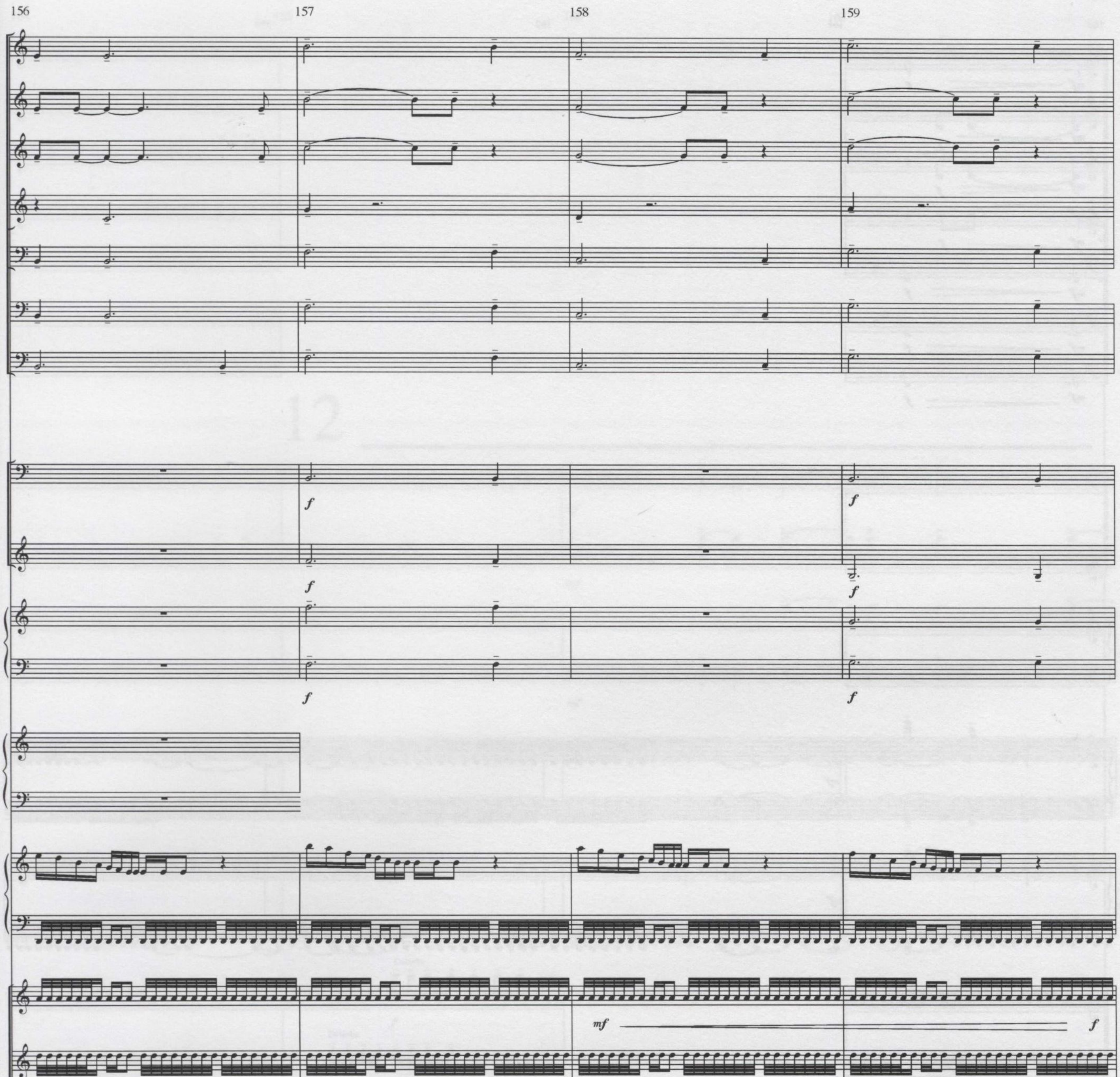

136
Adagio ♩= 40
137
138
139
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
f


140
141
142
143
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
Legato
mf
f

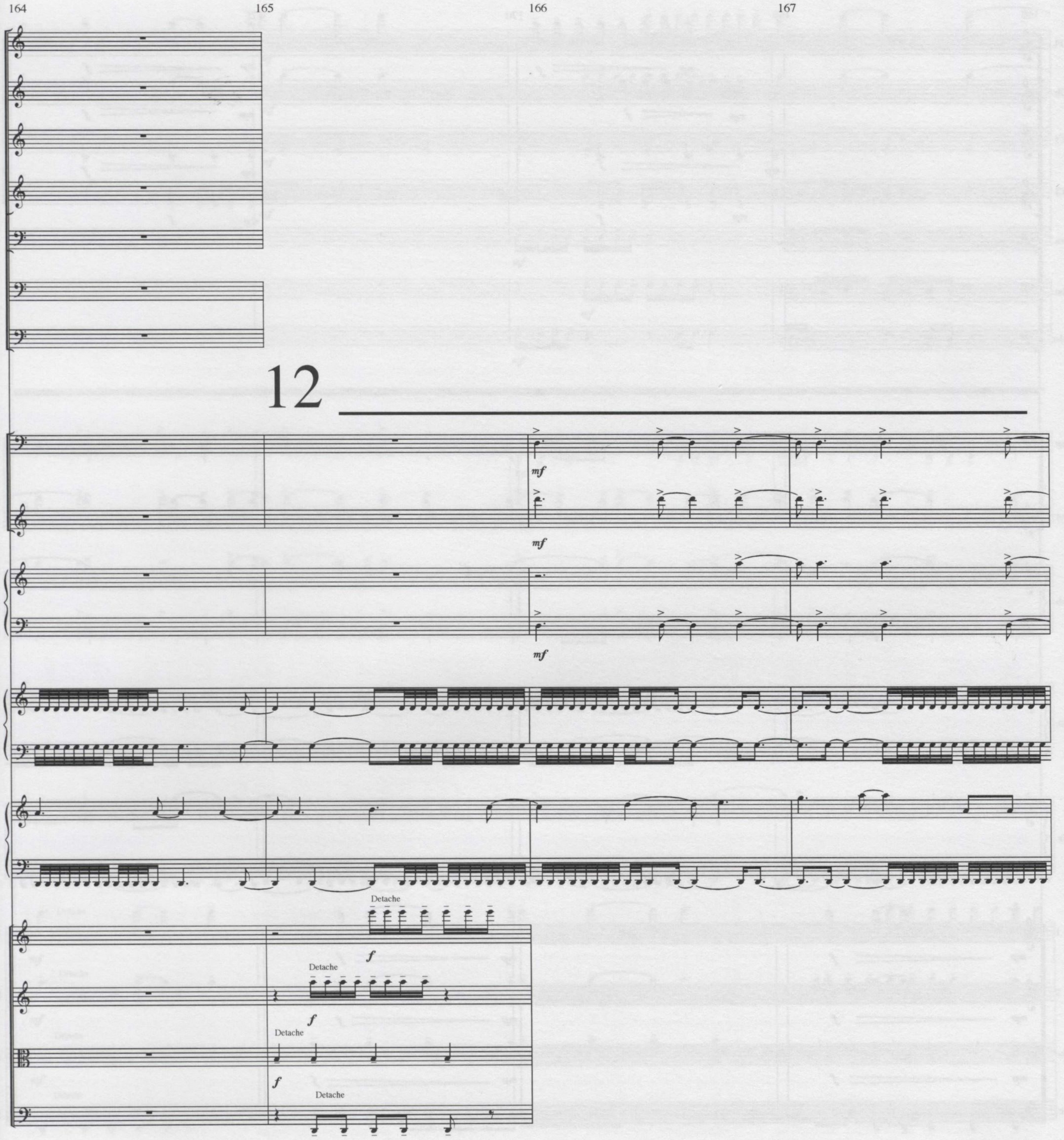

144
145
146
147
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
f
Legato

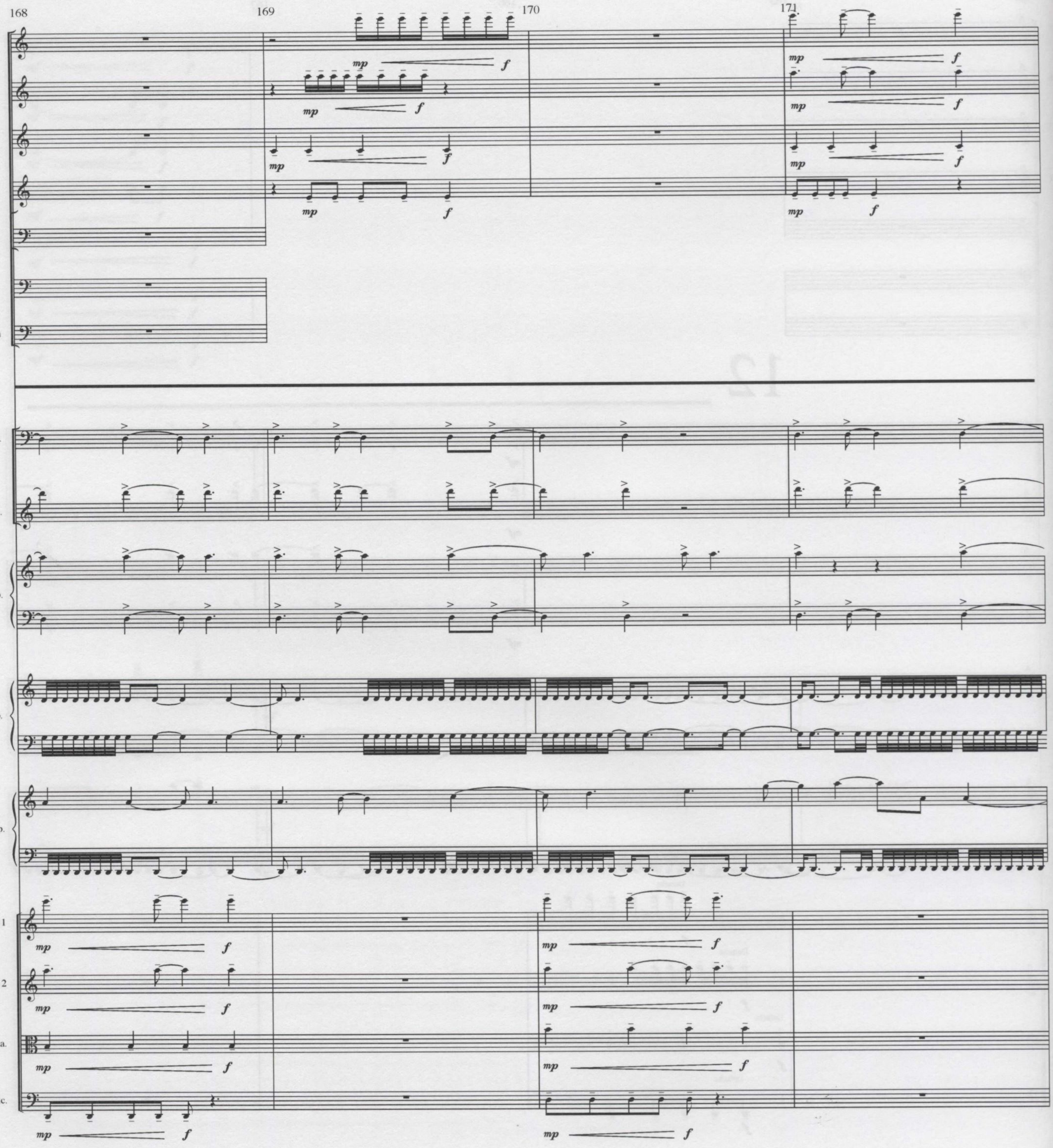

148
149
150
151
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.


152
153
154
155
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Legato
11
Timp.
Xyl.
Mrb.
Pno.
(play as many notes as possible)
Hp.
(L.H)
(glissando)
Vln. 1
Vln. 2
Vla.
Vlc.
Martele

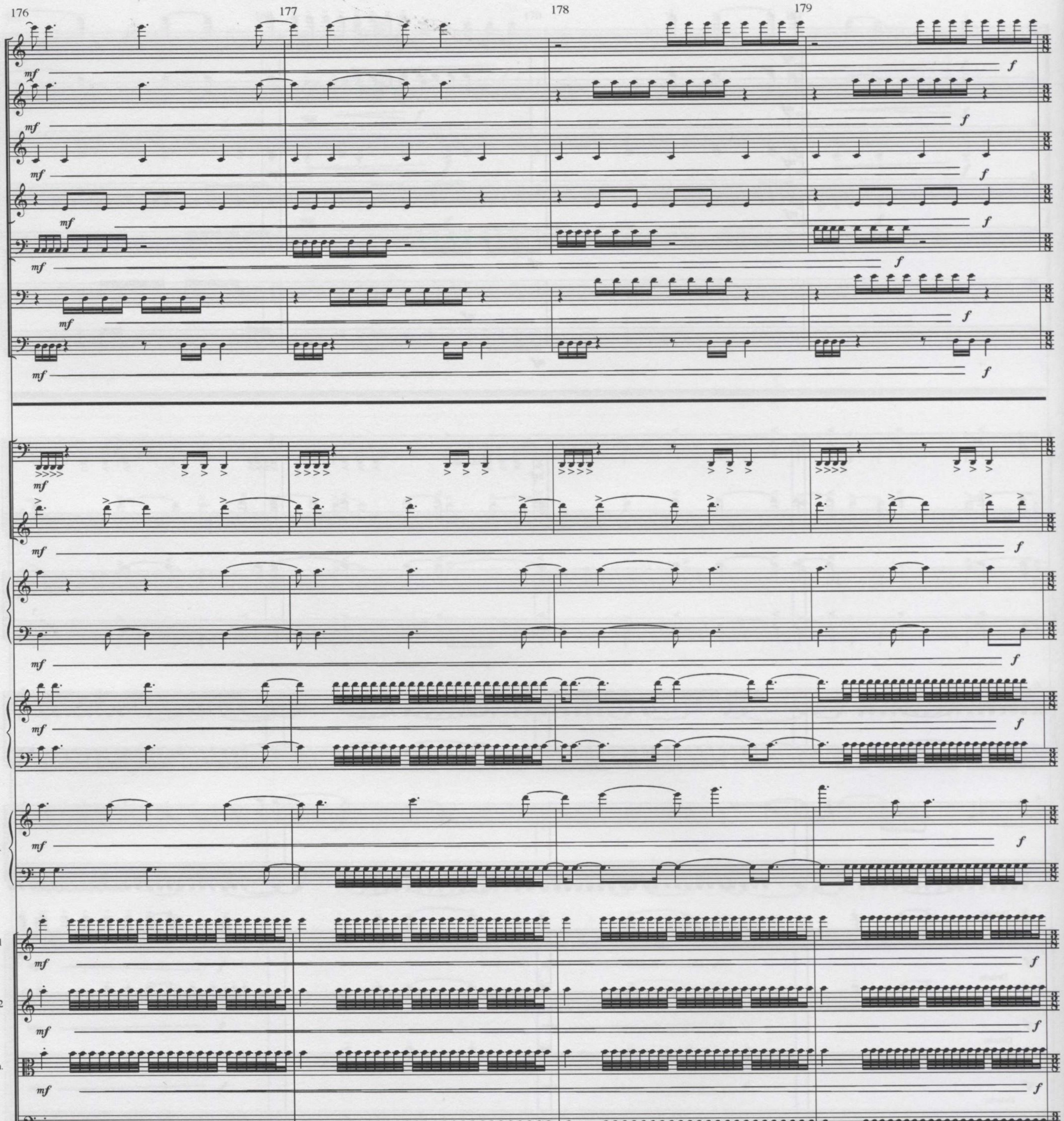

156
157
158
159
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
f
mf


160
161
162
163
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.

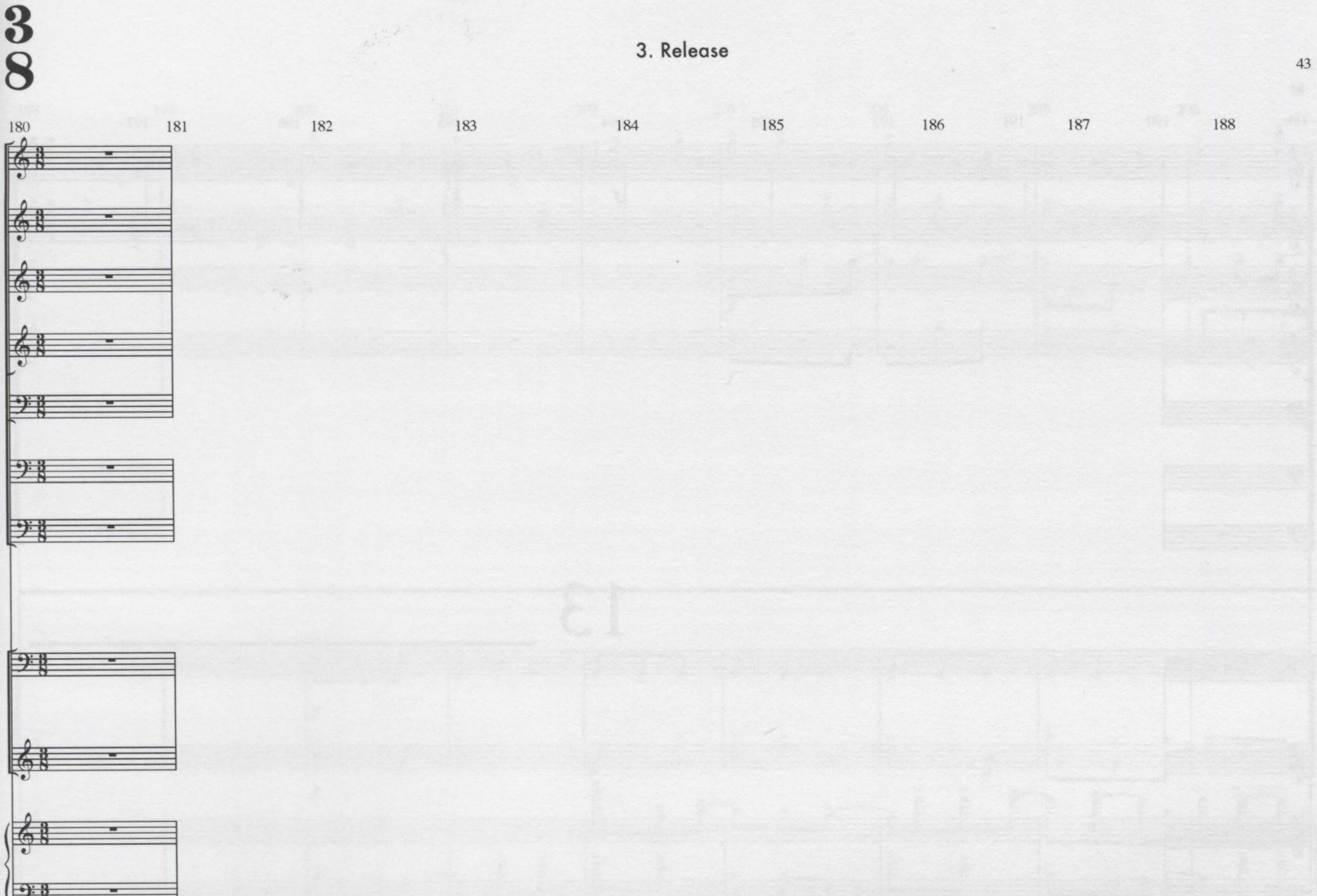

164
165
166
167
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
12
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mf
Detache
f

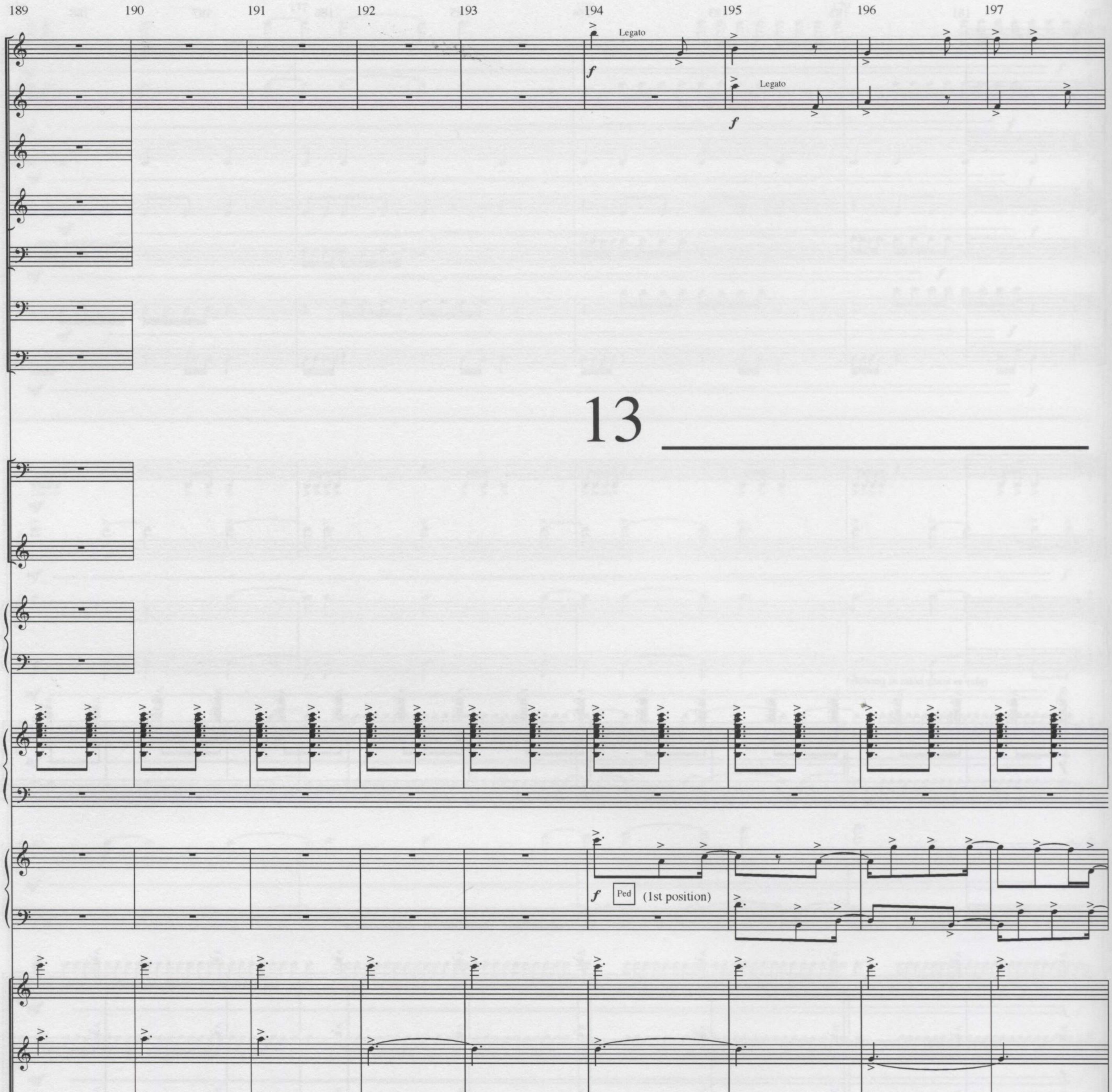

168
169
170
171
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mp
f


172
173
174
174
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mf
Detache

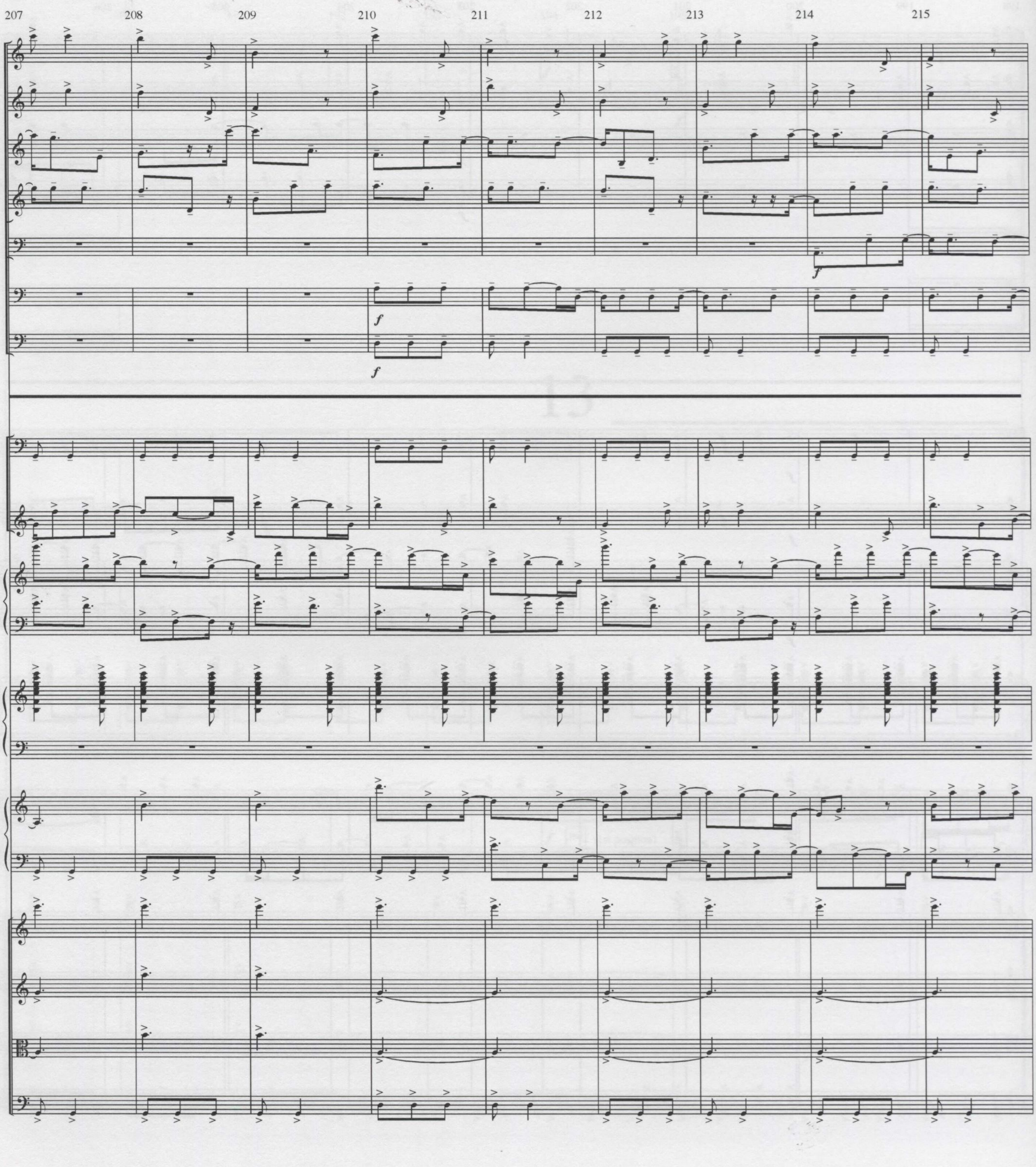

176
177
178
179
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
mf
f

3. Release


180
181
182
183
184
185
186
187
188
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
(play as many notes as possible)
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.


189
190
191
192
193
194
195
196
197
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
13
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
Legato
f
Ped
(1st position)


198
199
200
201
202
203
204
205
206
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
f


207
208
209
210
211
212
213
214
215
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
f
f
f
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.


216
217
218
219
220
221
222
223
224
225
Fl.
Ob.
B♭ Cl.
B. Cl.
Bsn.
Tbn.
Tuba
Timp.
Xyl.
Mrb.
Pno.
Hp.
Vln. 1
Vln. 2
Vla.
Vlc.
f
ff
mp
Morendo

Appendix V

Block / Static / Mass (Score)

For Large Ensemble and Electronics

Instrumentation:

Flute
Oboe
Clarinet in B Flat
Bass Clarinet
Bassoon

Horn in F
Trombone
Tuba

Trumpet in B Flat (x 3)

Bass Drum (x 2)
Vibraphone
Marimba

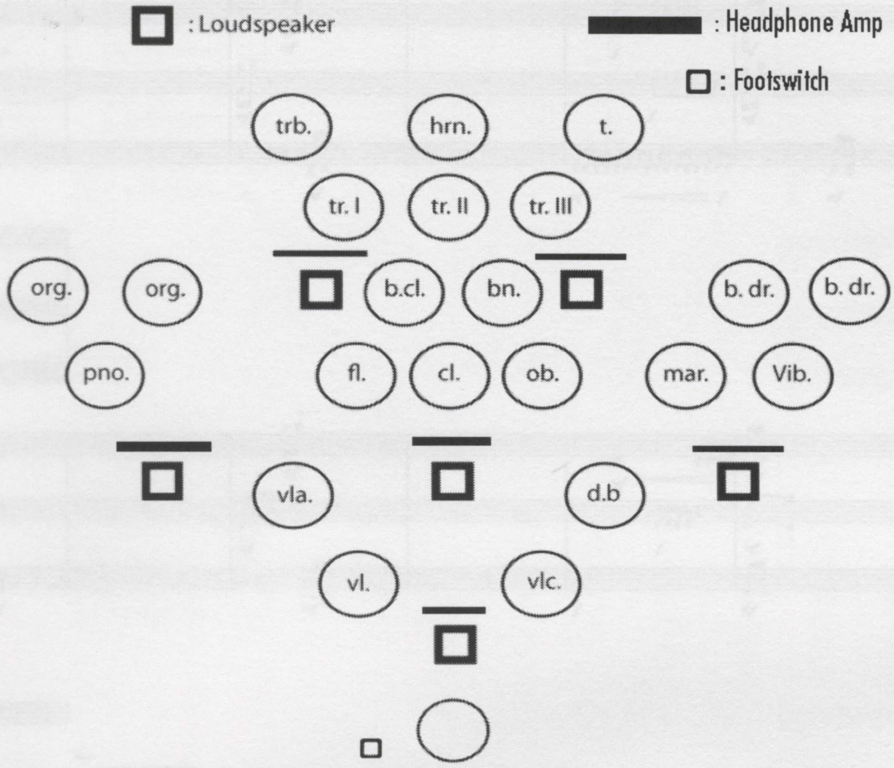
Piano
Farfisa Organ (x 2) w Volume Pedals

Violin
Viola
Cello
Double Bass

Duration: ca. 17m

Score in C

Ensemble Layout for Block / Static / Mass

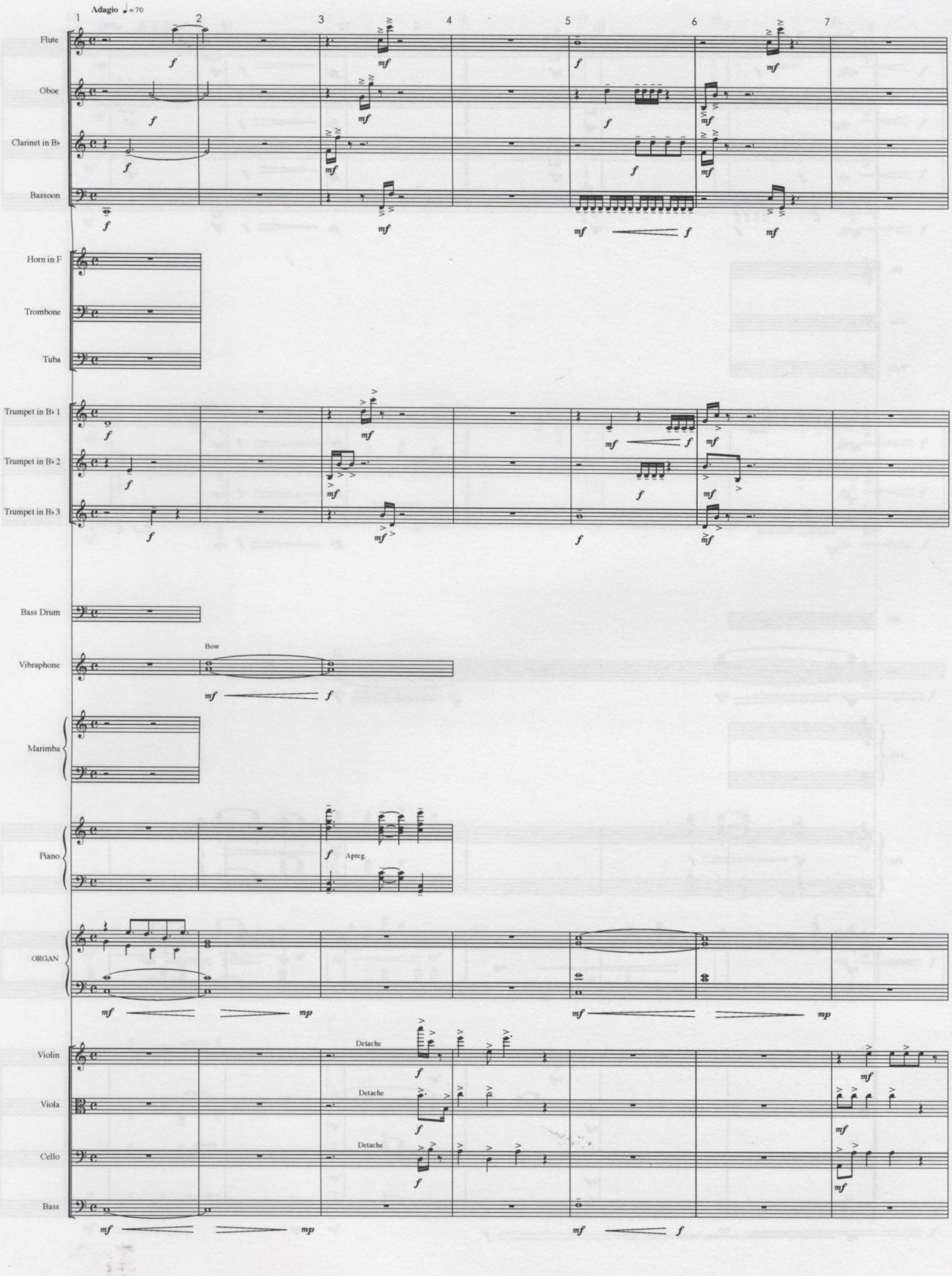


Notes on the use of electronics:

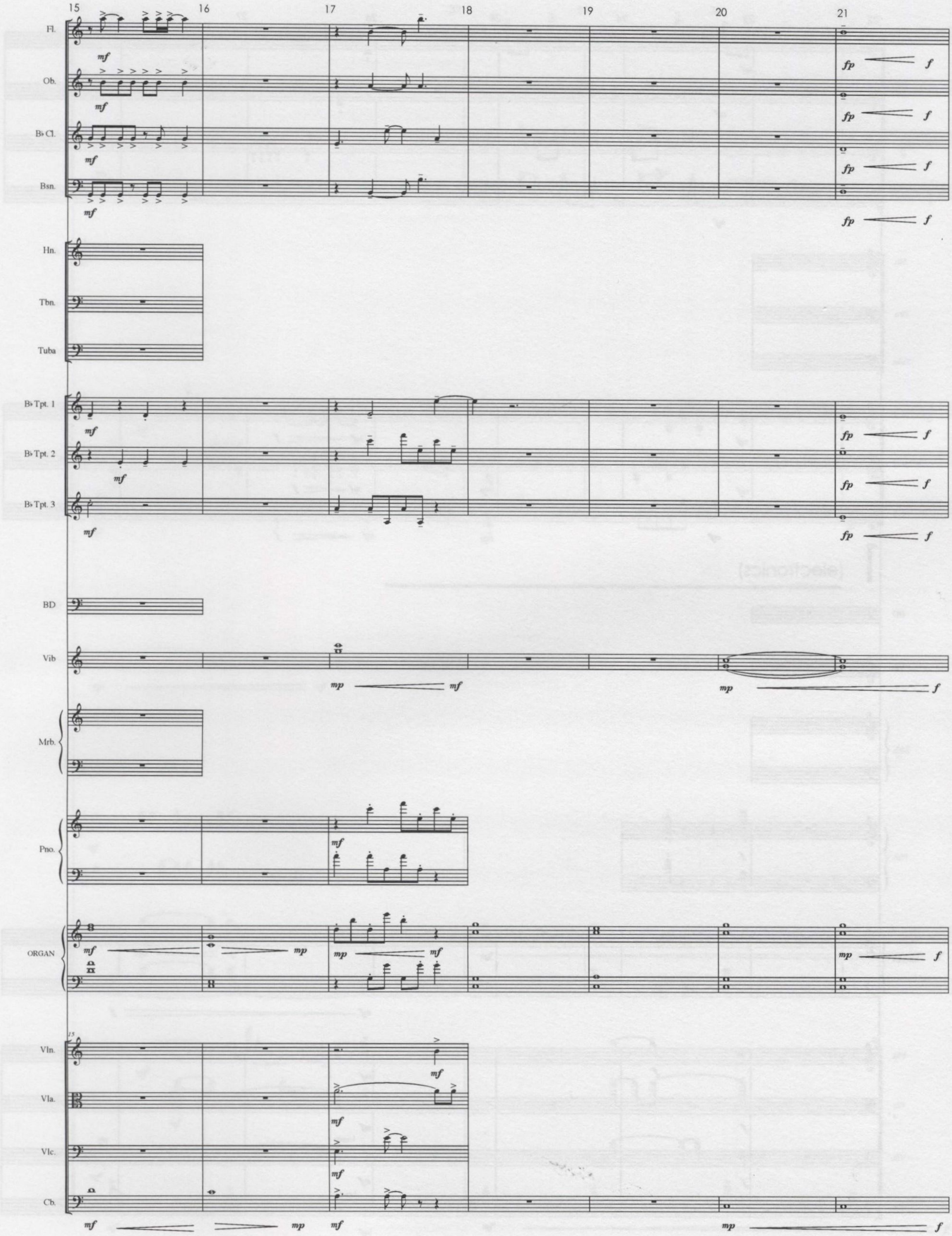
The conductor, through the use of a foot-switch, should trigger the electronic playback. The introduction points of the electronic parts are numbered in the score (where indicated). The provision of at least 6 headphone amps (see the above diagram) should be available to the performers to ensure ensembles synchronization.

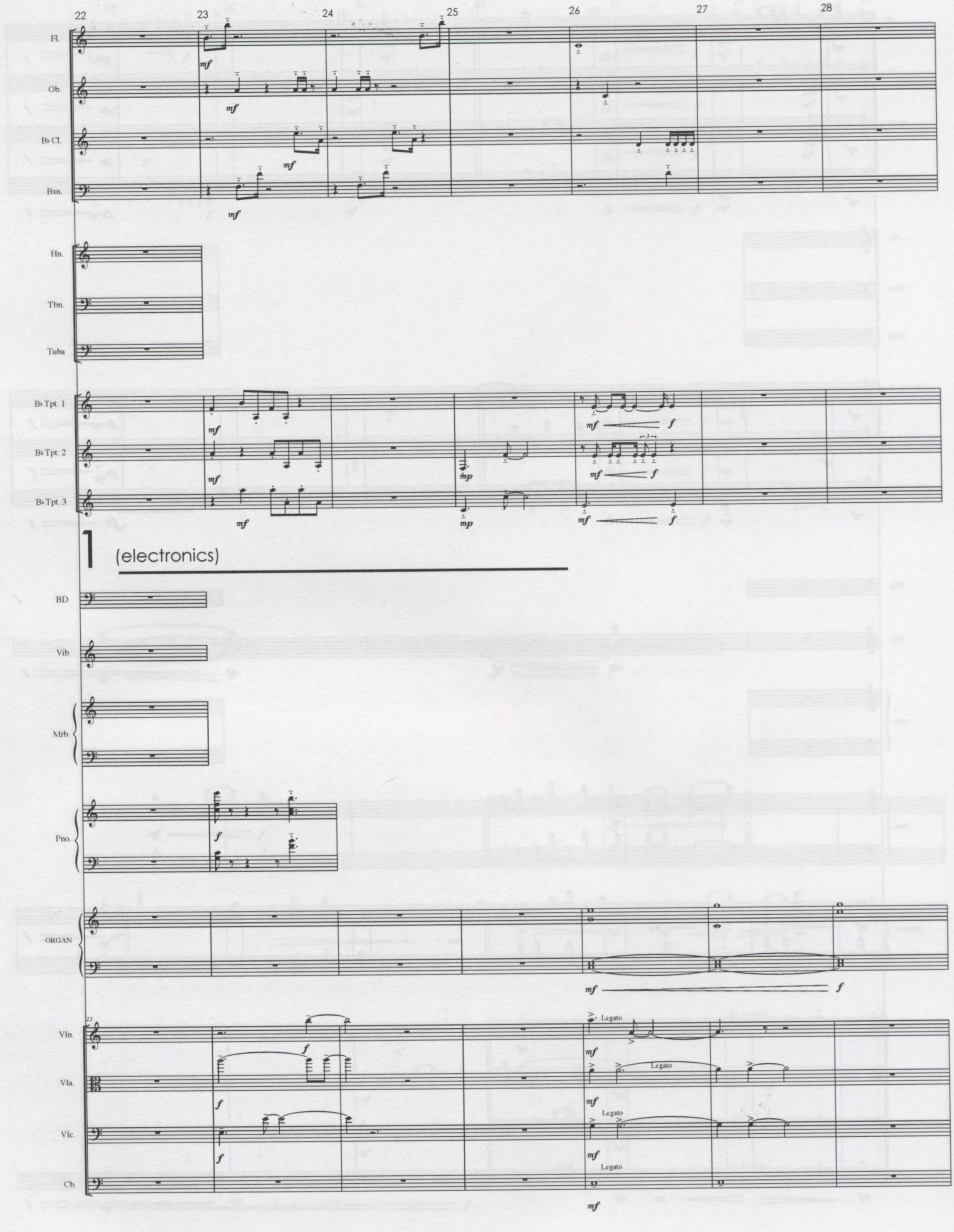
1. Block

Neil O Connor

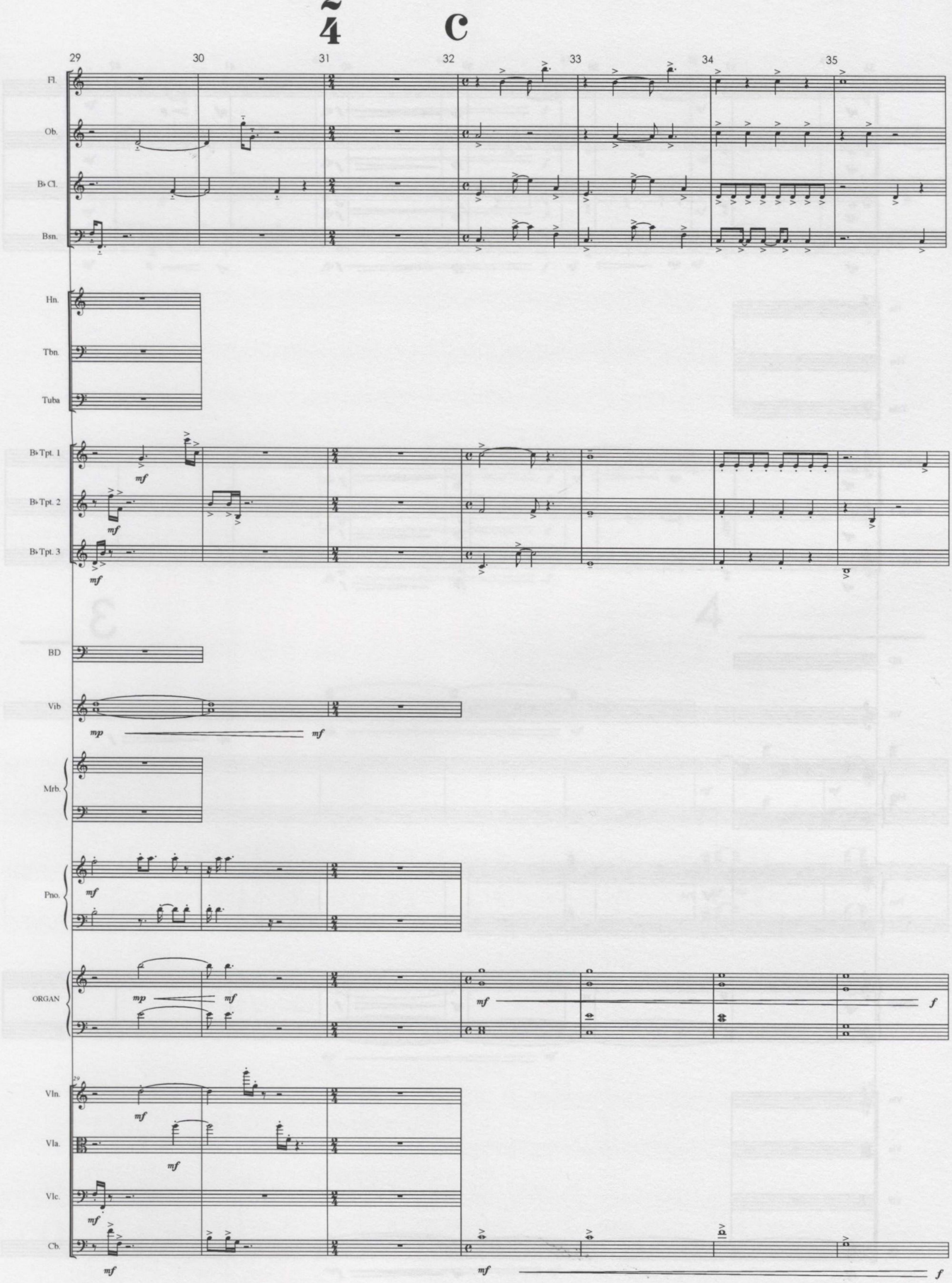



8
9
10
11
12
13
14
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
Detache
mf
f
fp
mp


15
16
17
18
19
20
21
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
mf
mp
fp
f

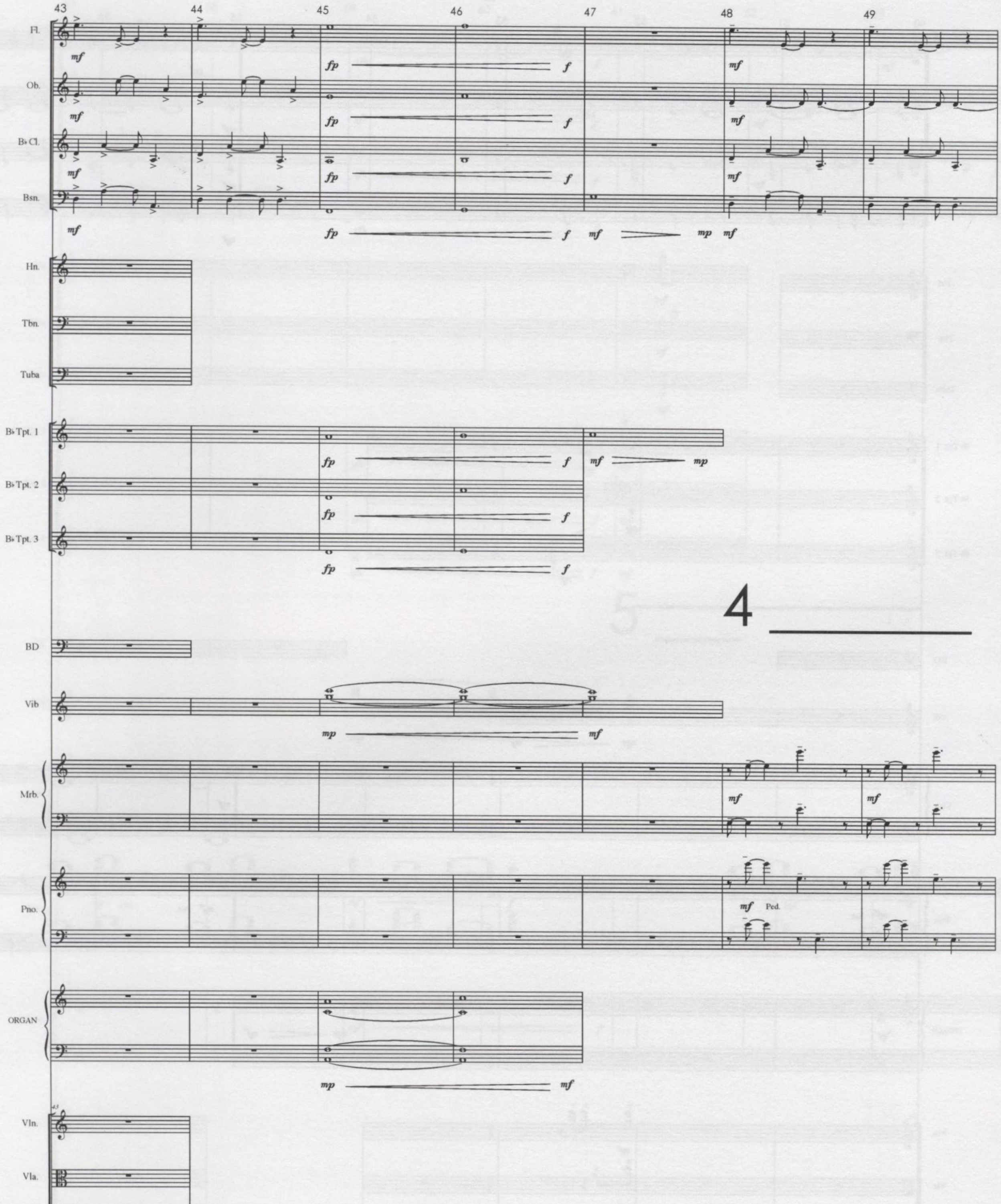


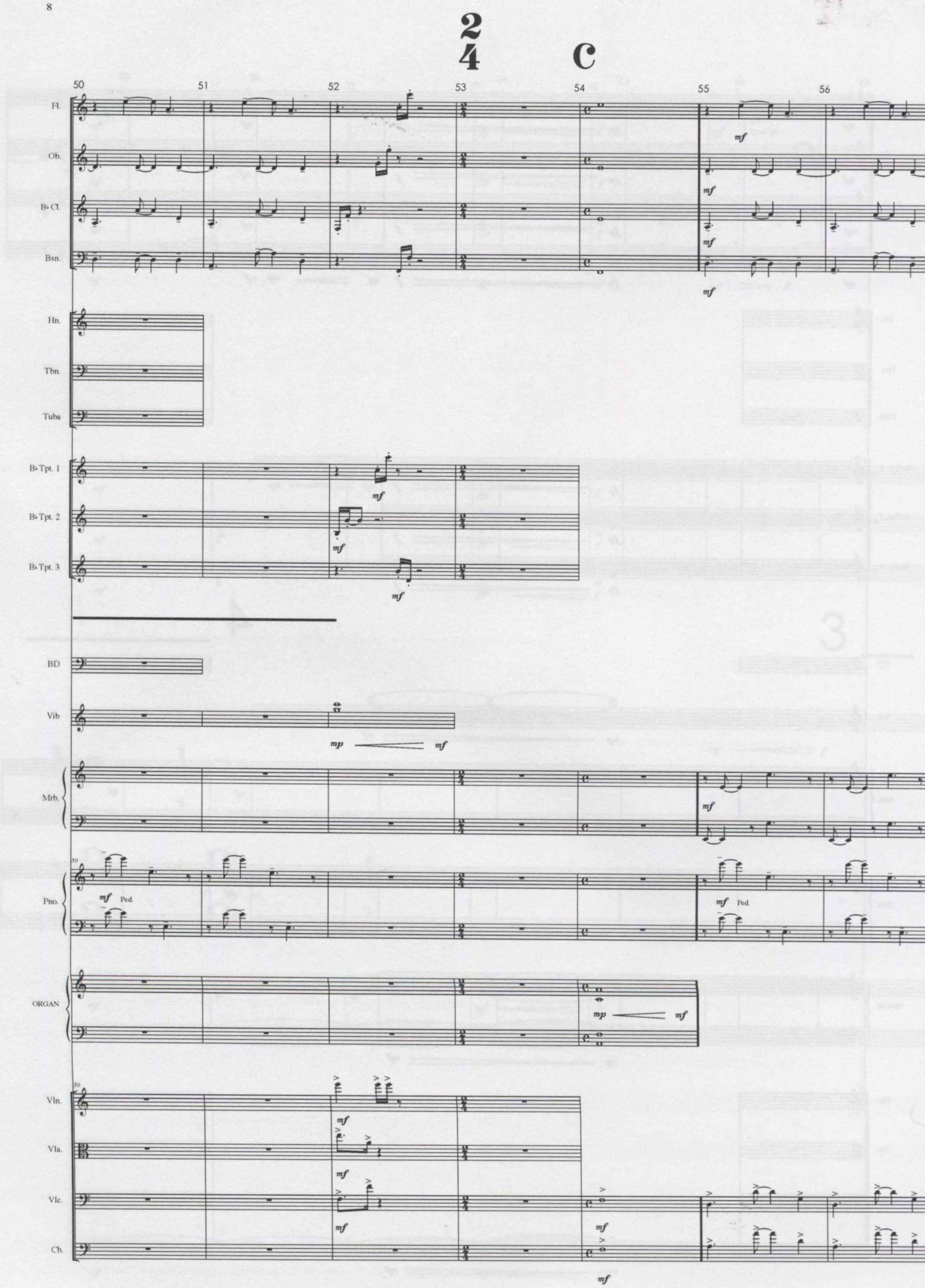
22
23
24
25
26
27
28
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
1 (electronics)
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
Legato

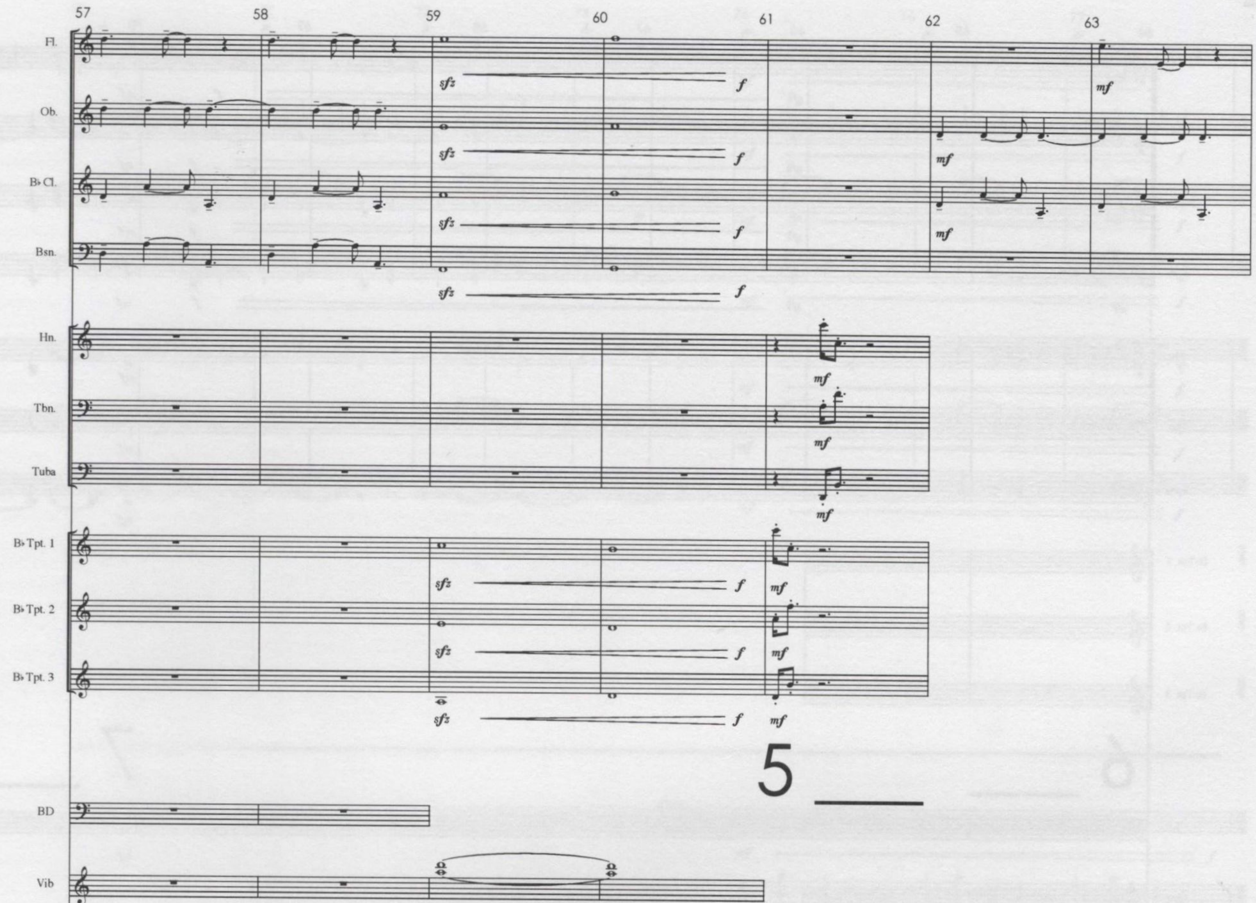

29
30
31
32
33
34
35
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
mf
mp
f

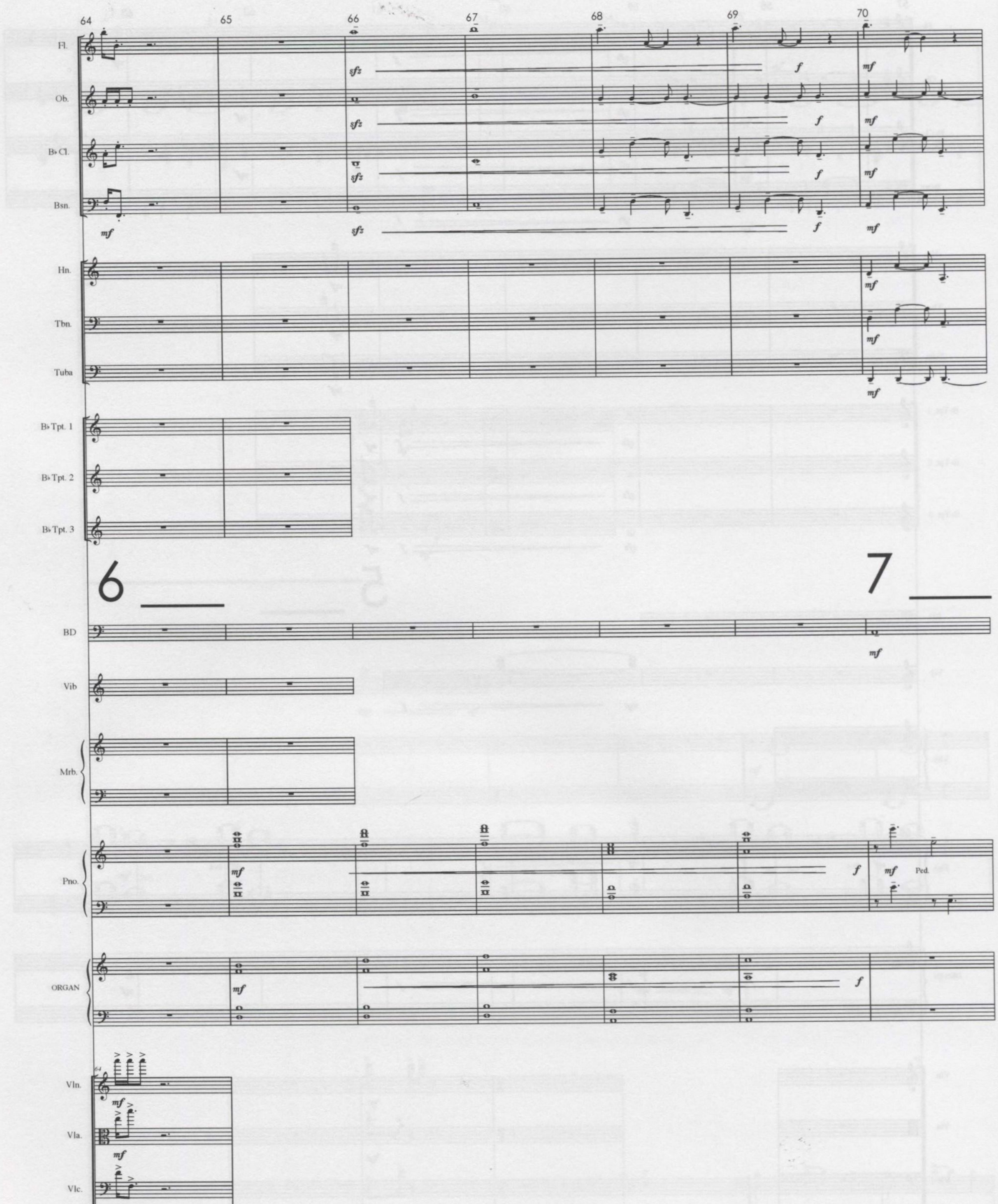
2


36
37
38
39
40
41
42
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
mf
fp
f
p
mp
Ped.

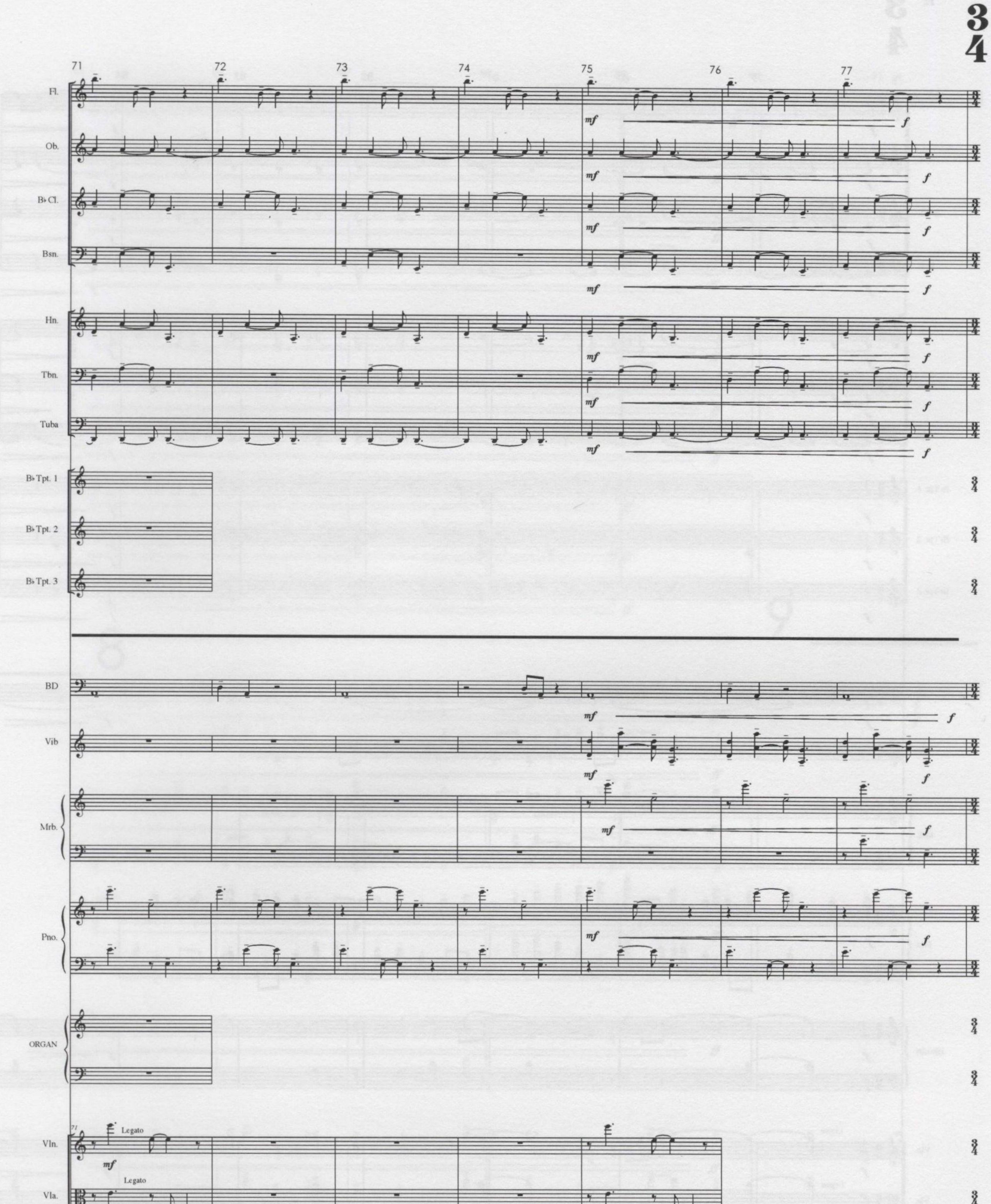

43
44
45
46
47
48
49
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
mf
fp
f
mp
Ped.
4

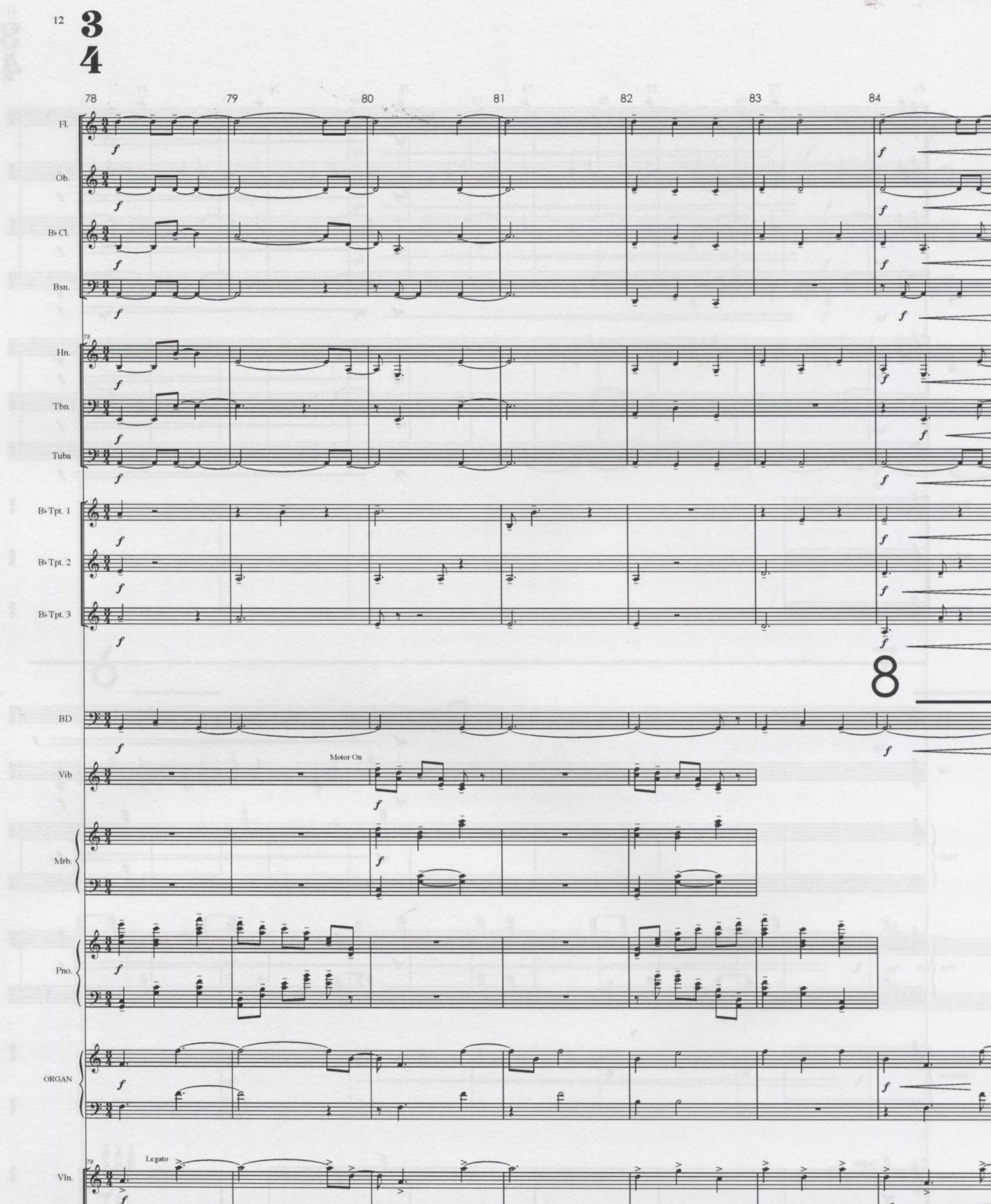

50
51
52
53
54
55
56
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
Ped.
ORGAN
Vln.
Vla.
Vlc.
Cb.
mf
mp

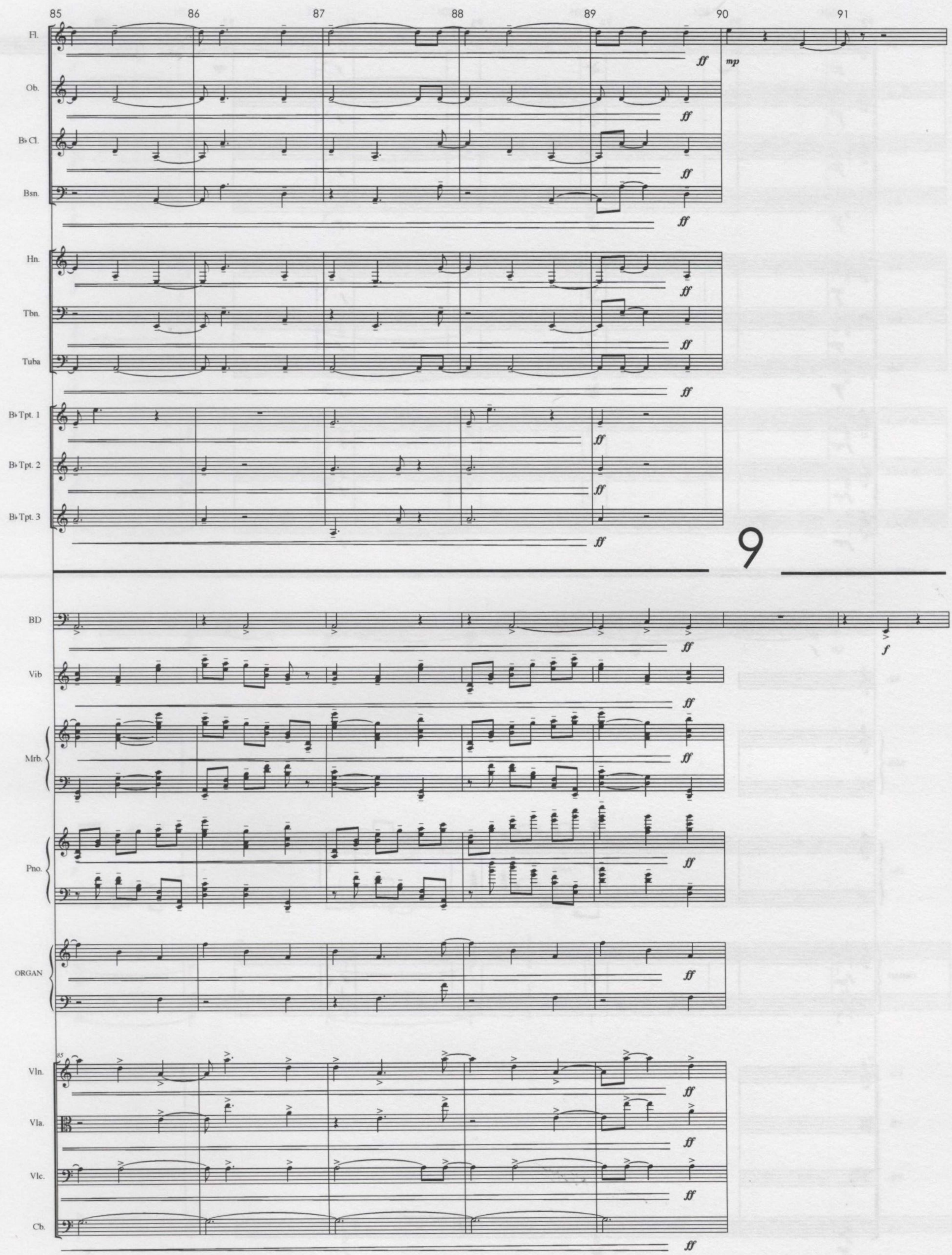

57
58
59
60
61
62
63
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
5
BD
Vib
Mrb.
Pno.
Ped.
ORGAN
Vln.
Vla.
Vlc.
Cb.

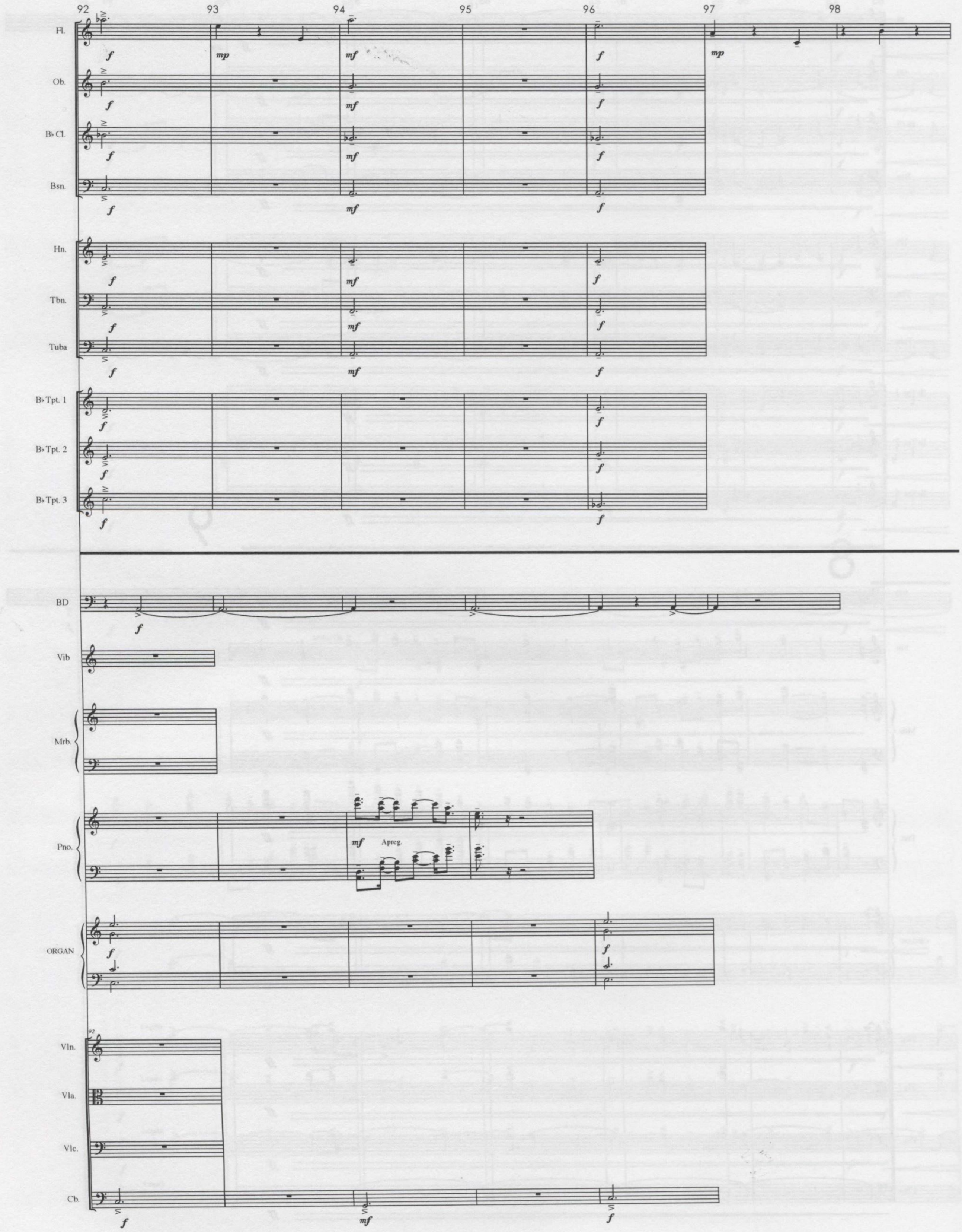


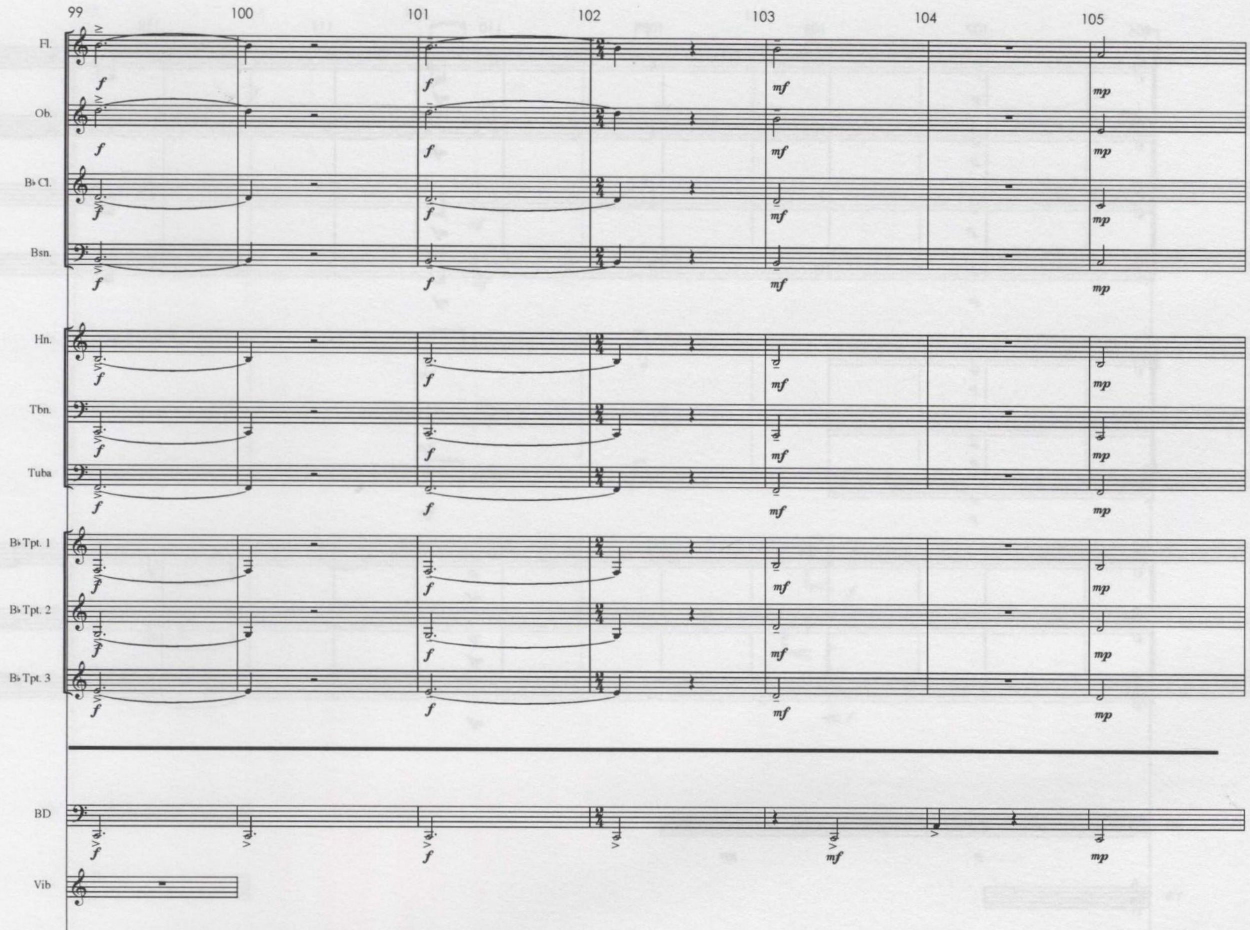
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
6
7
BD
Vib
Mrb.
Pno.
Ped.
ORGAN
Vln.
Vla.
Vlc.
Cb.
Legato


3
4
71
72
73
74
75
76
77
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
Legato
mf
f


3
4
78
79
80
81
82
83
84
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
8
BD
Vib
Motor On
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
Legato

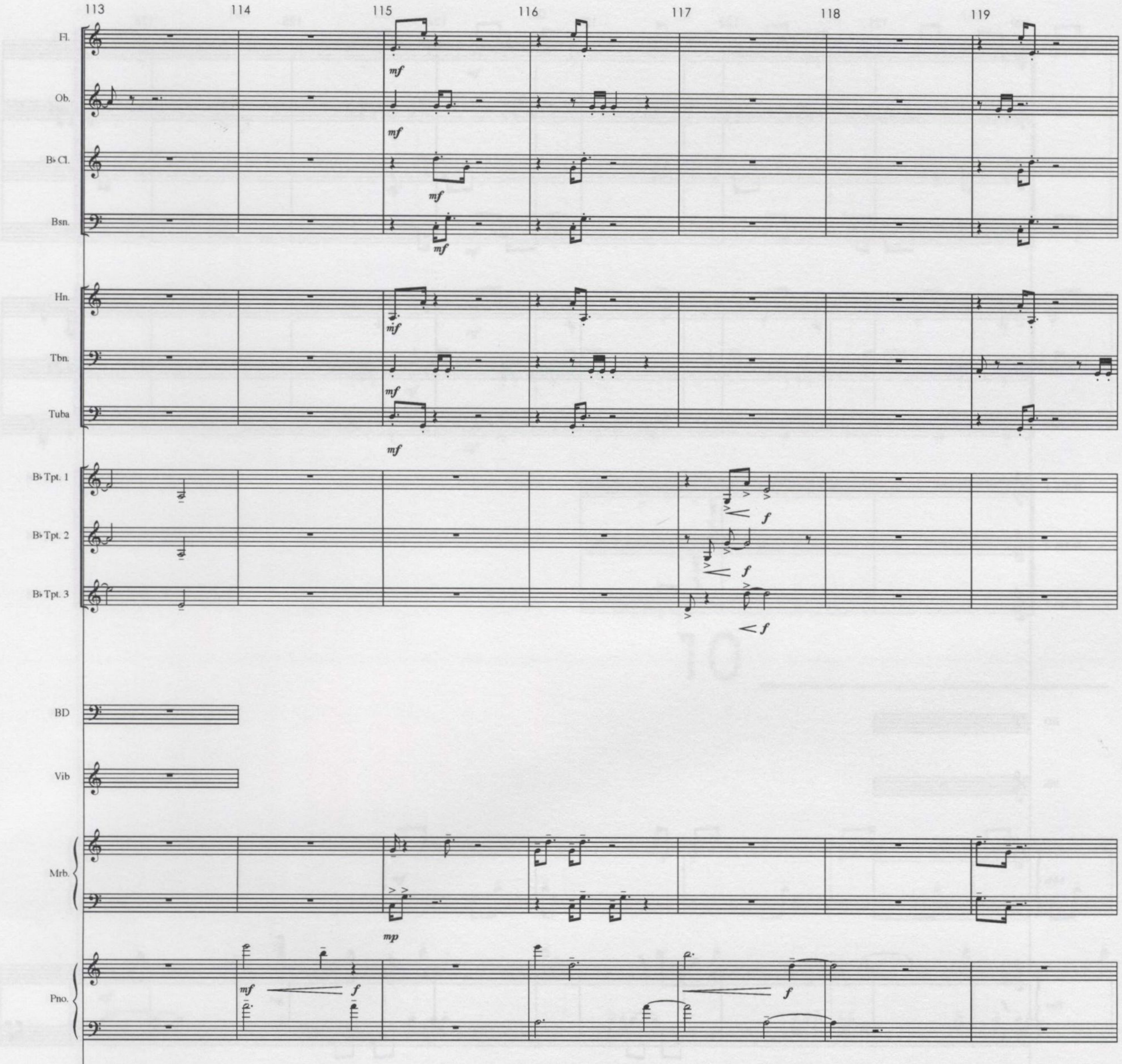

85
86
87
88
89
90
91
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
9
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
ff
mp
f


92
93
94
95
96
97
98
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
Apreg.
ORGAN
Vln.
Vla.
Vlc.
Cb.


99
100
101
102
103
104
105
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
f
mf
mp

2. Static


Allegro (M.M. ♩= c. 120)
106
107
108
109
110
111
112
Fl.
Ob.
B♭ Cl.
Bsn.
Hn.
Tbn.
Tuba
B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
Vib
Mrb.
Pno.
ORGAN
Vln.
Vla.
Vlc.
Cb.
p
mf
pp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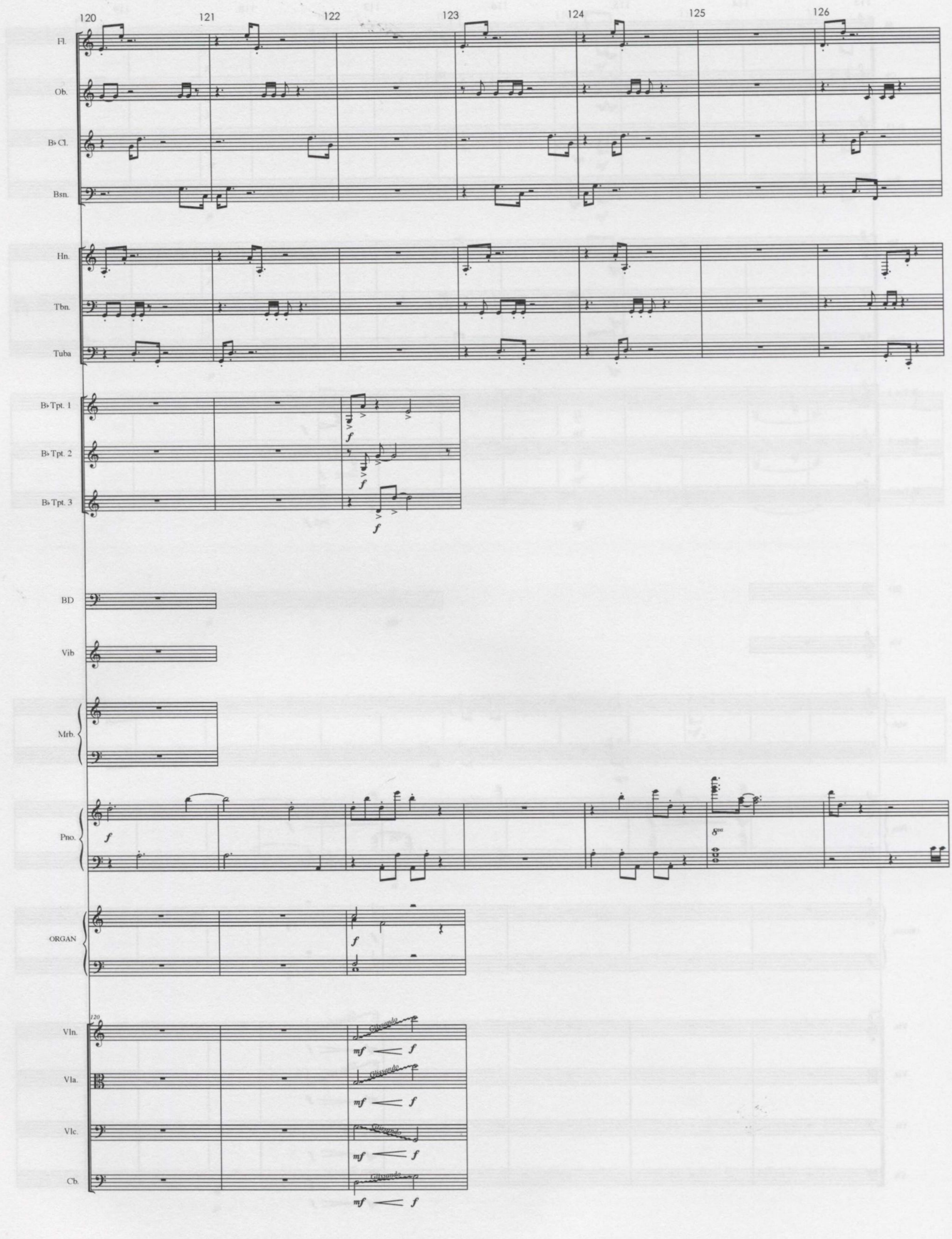
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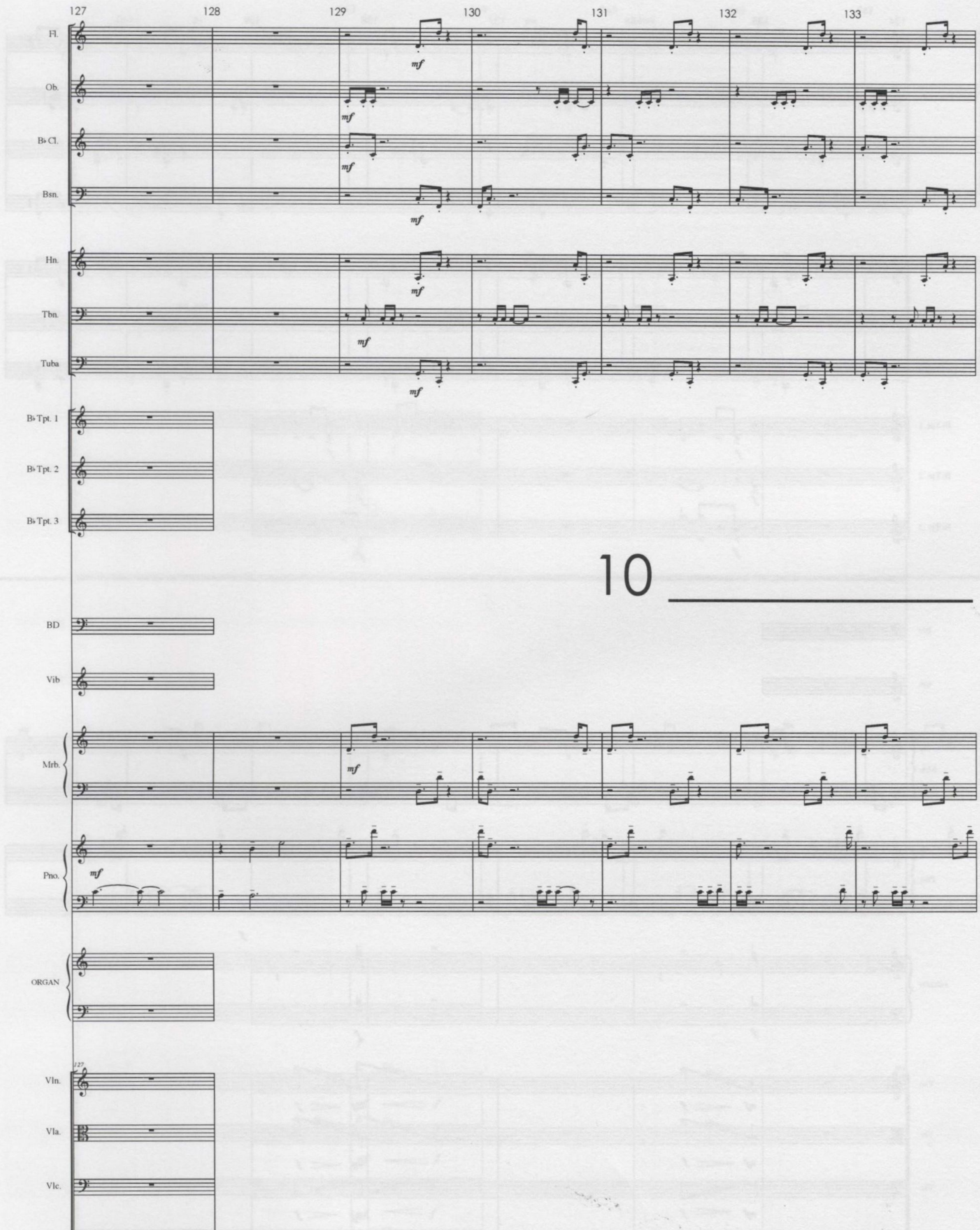
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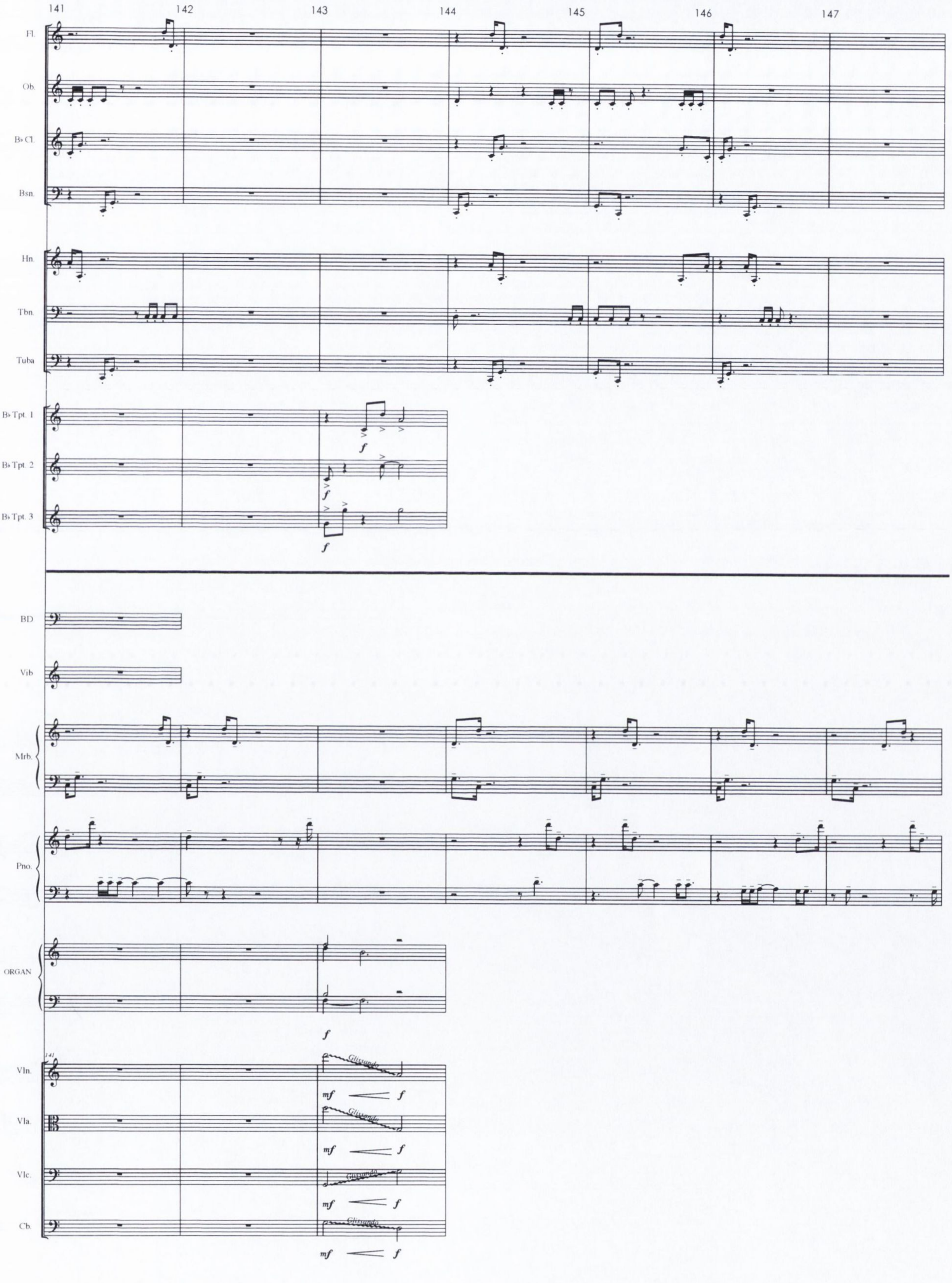
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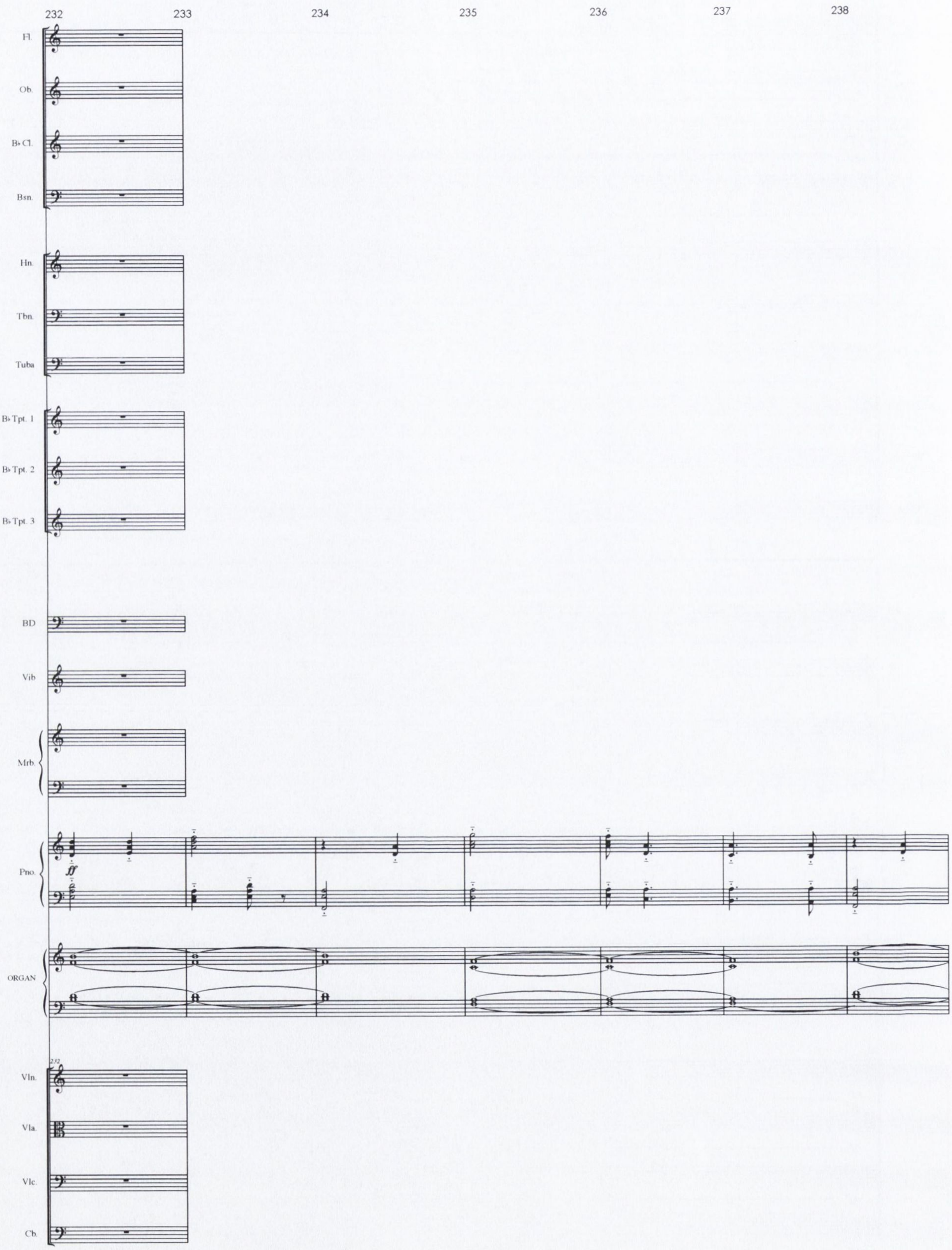
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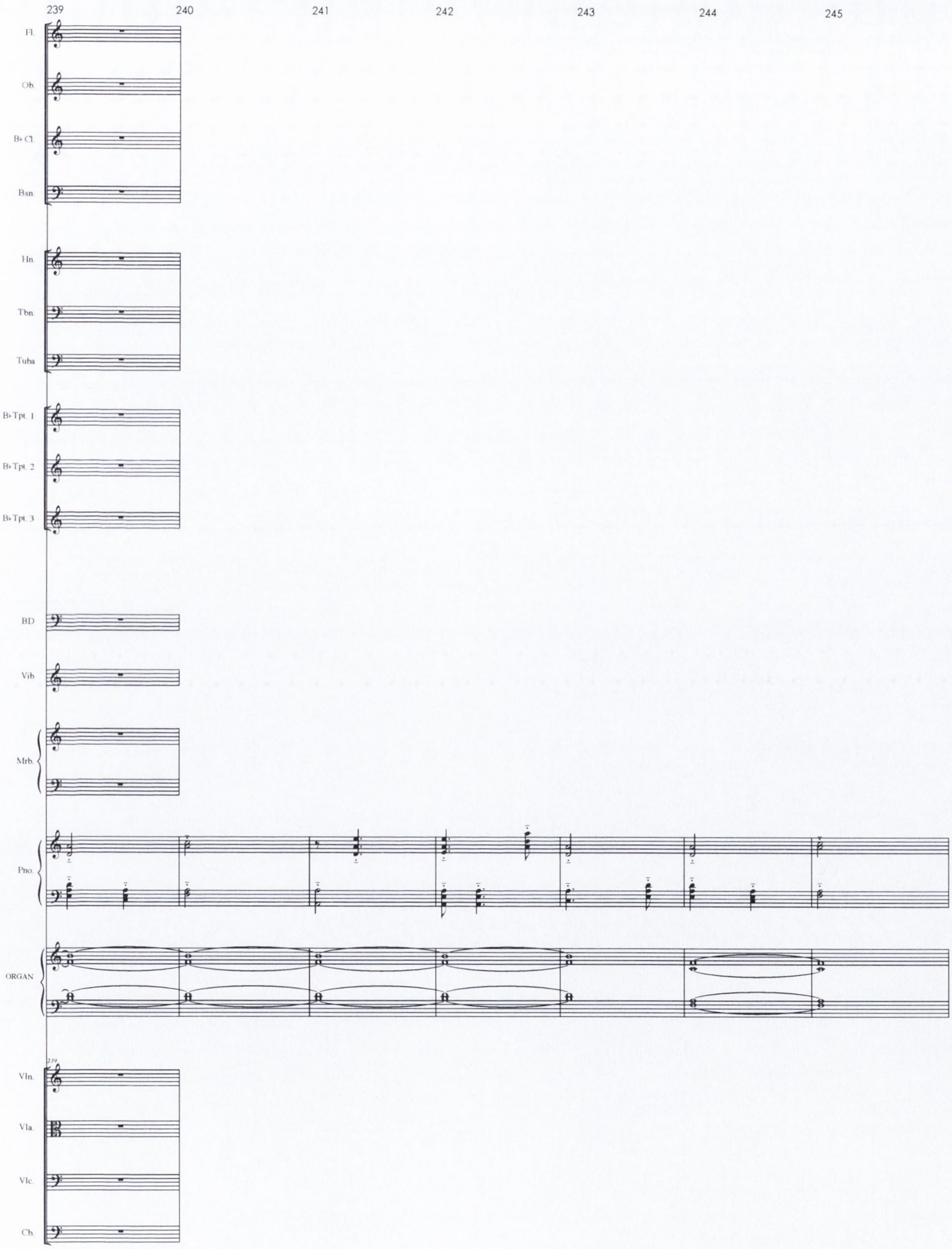
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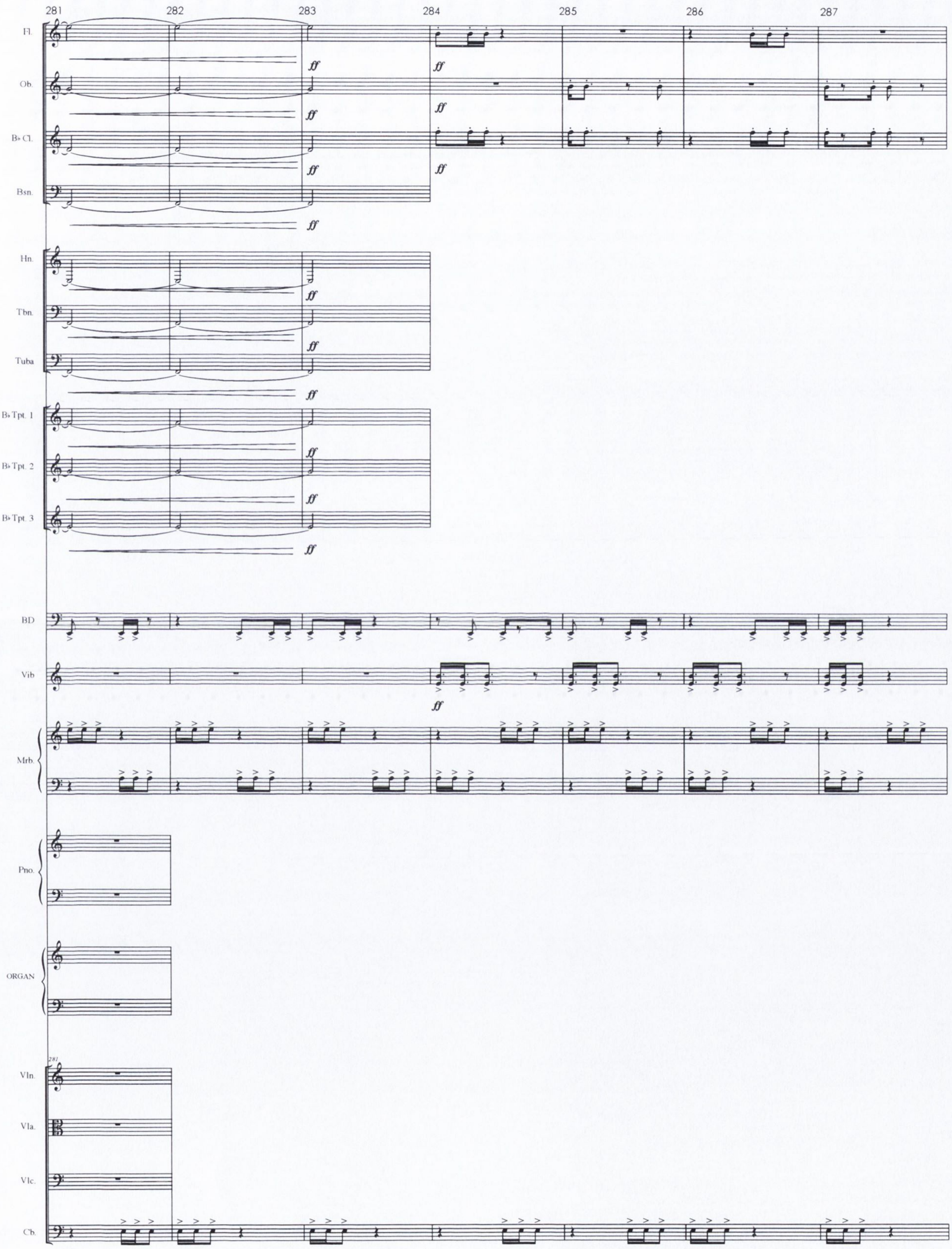
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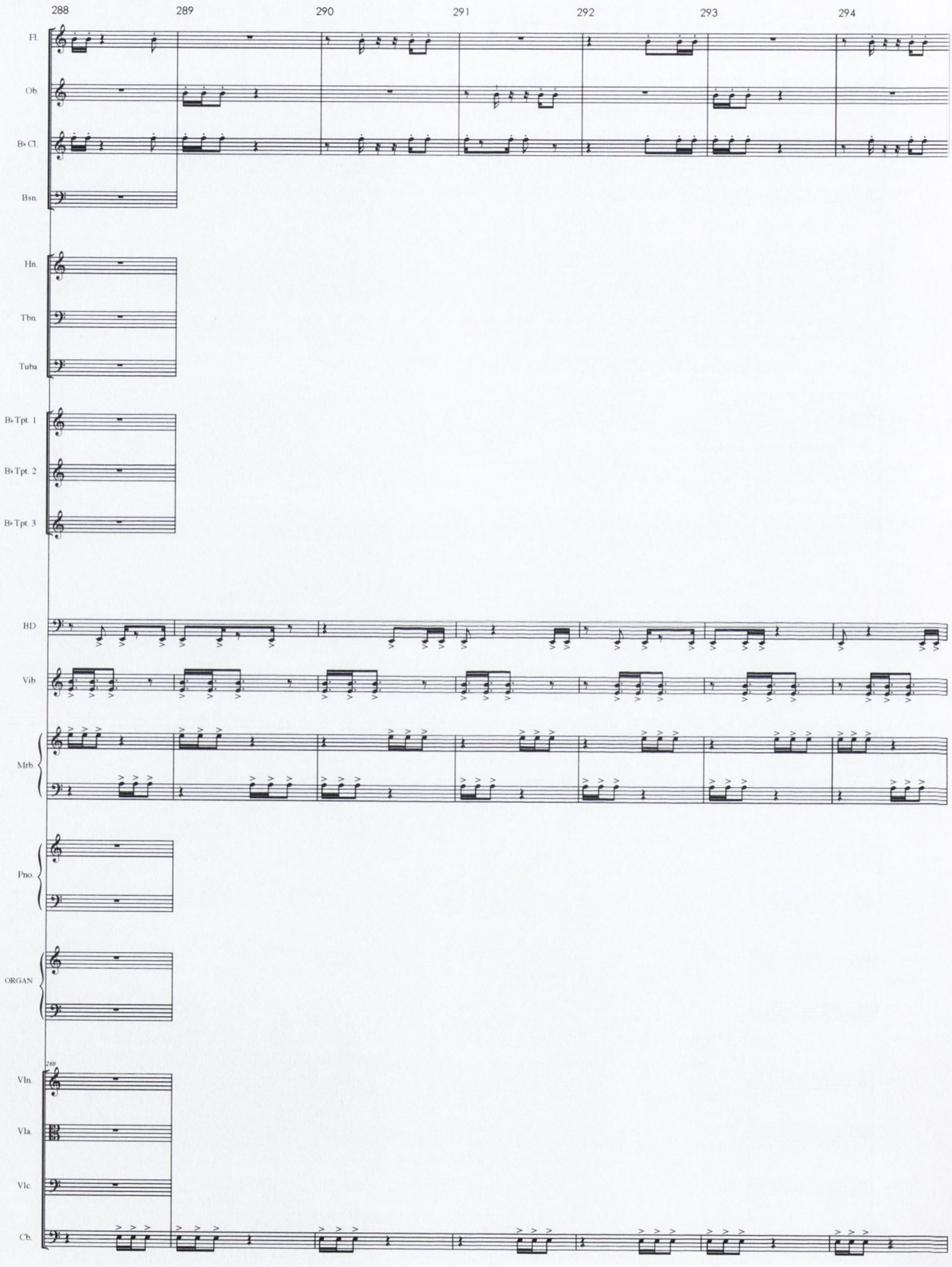
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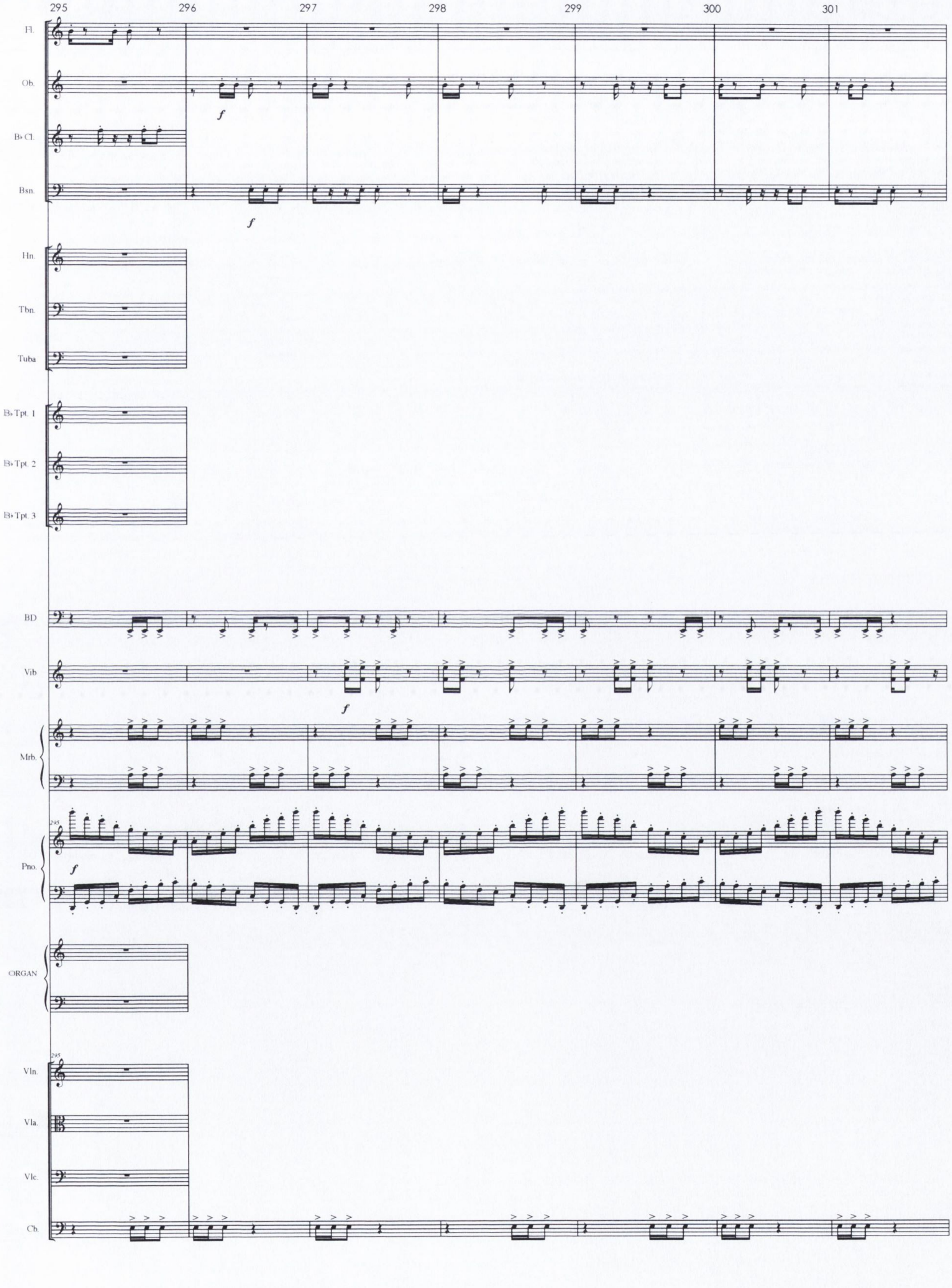
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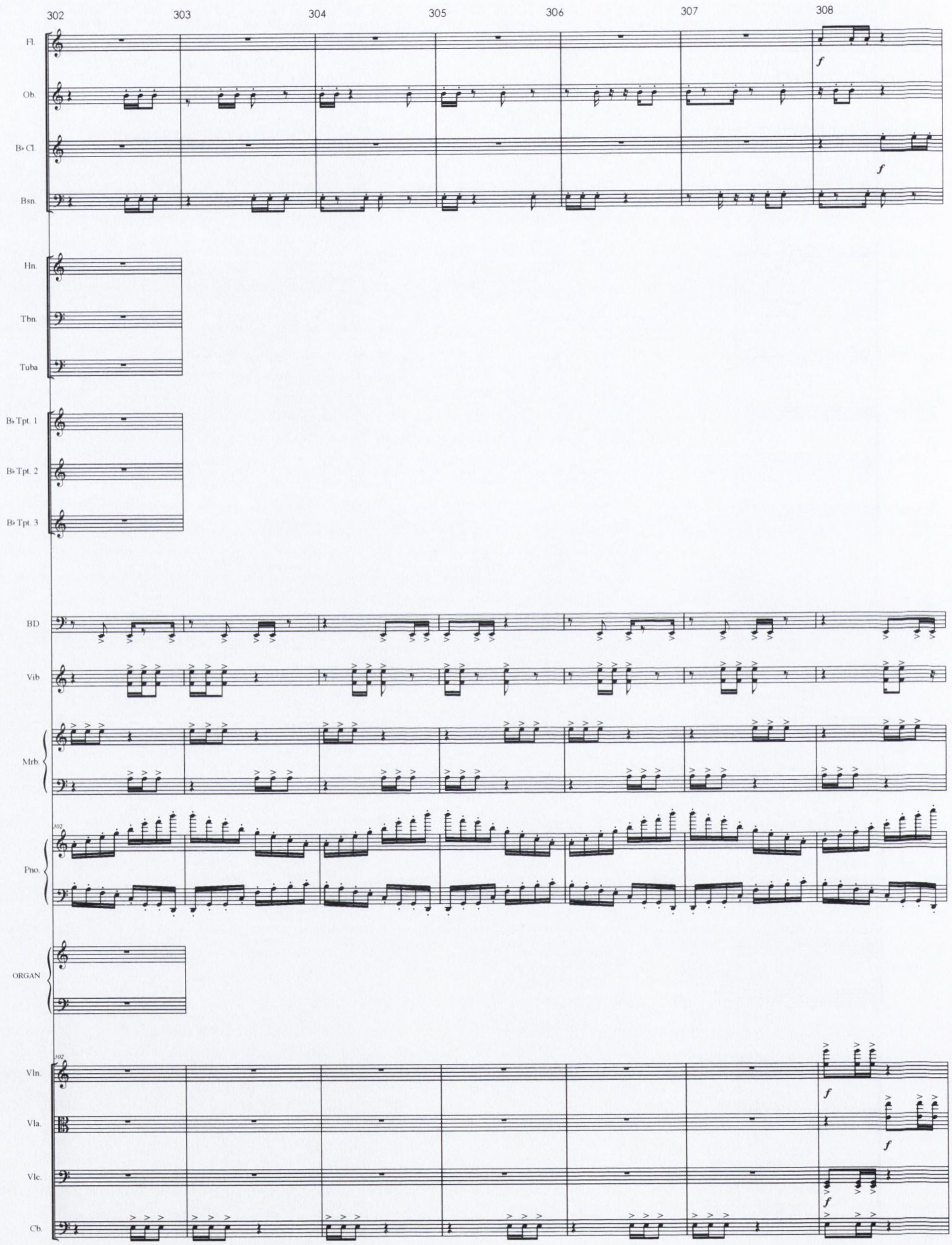
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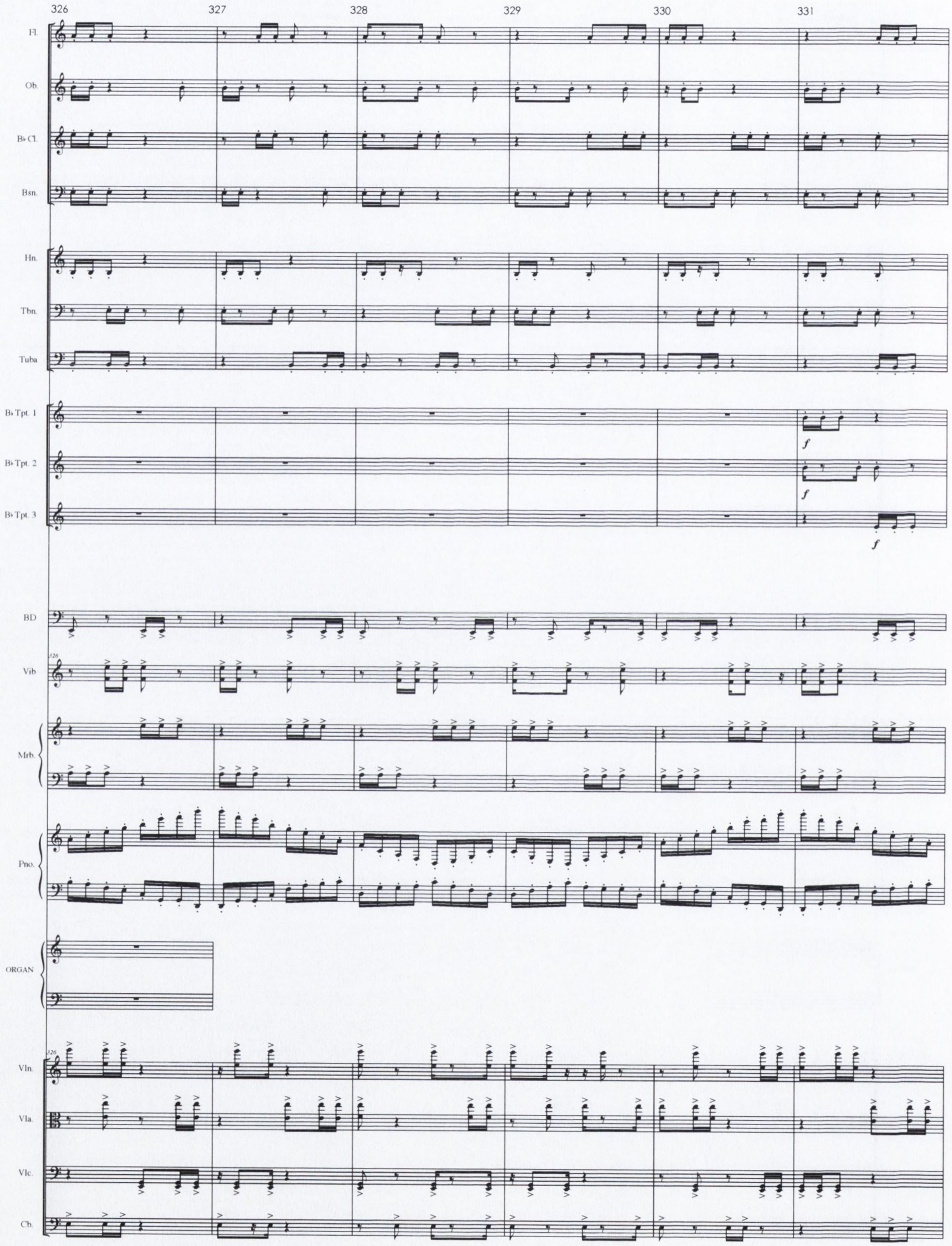
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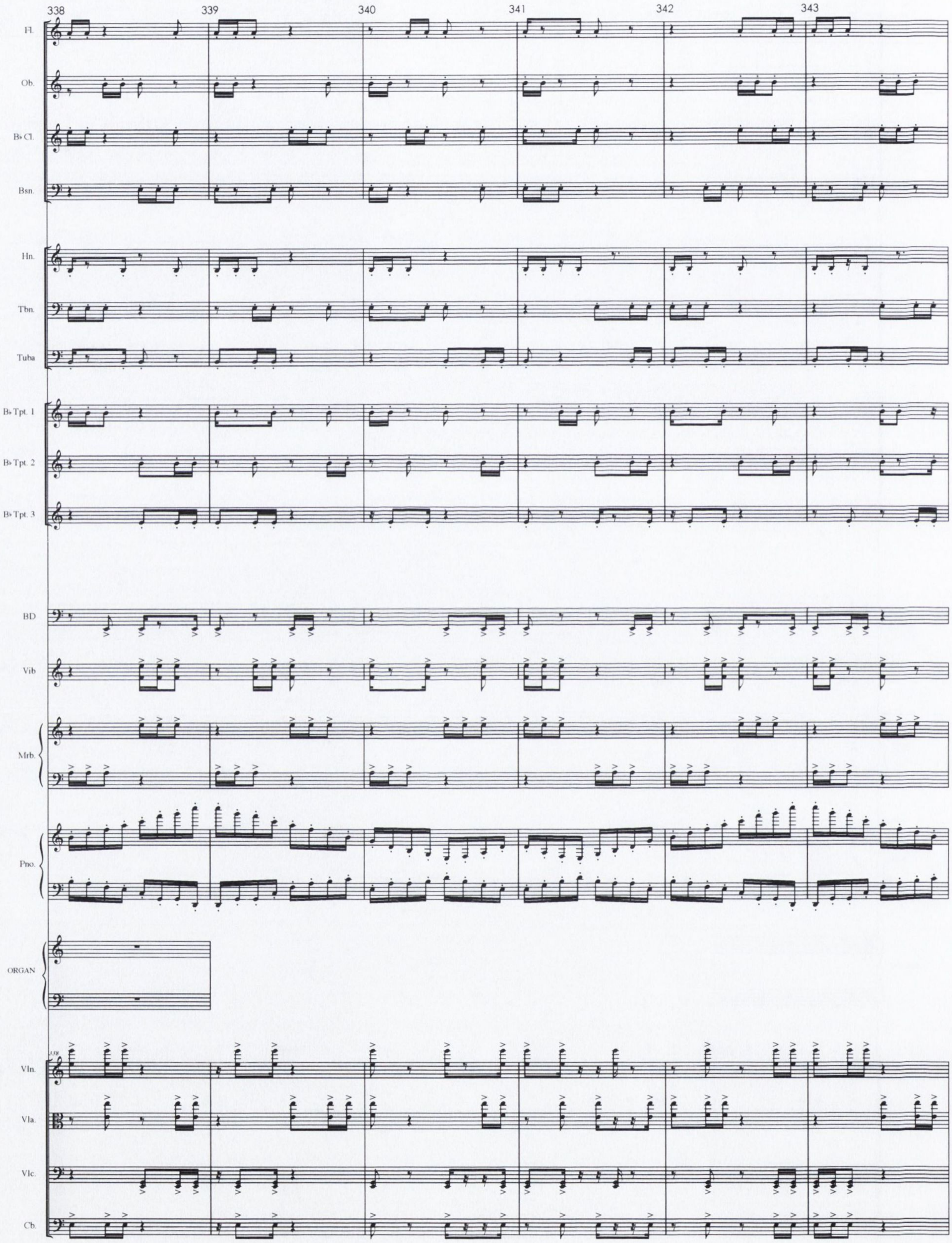
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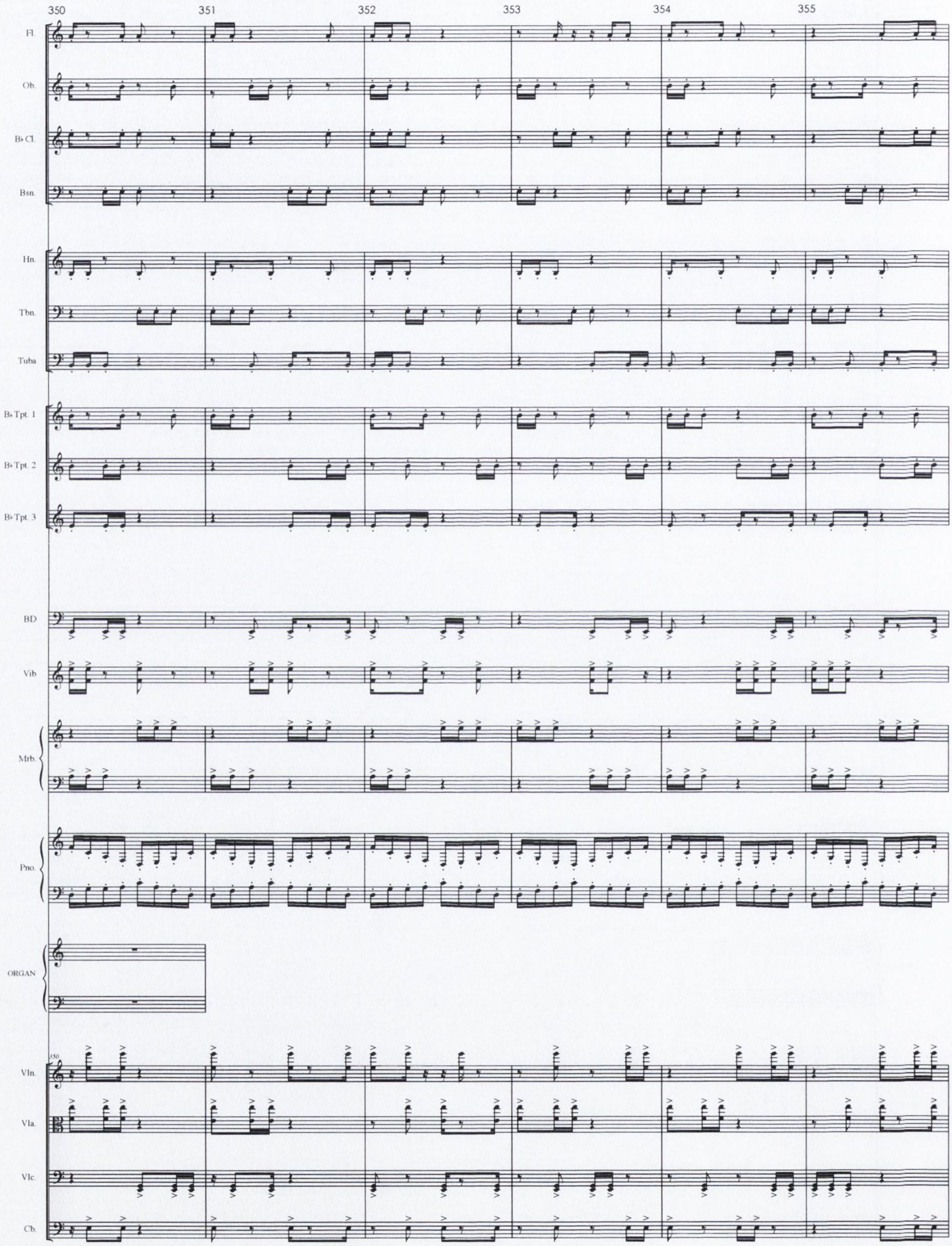
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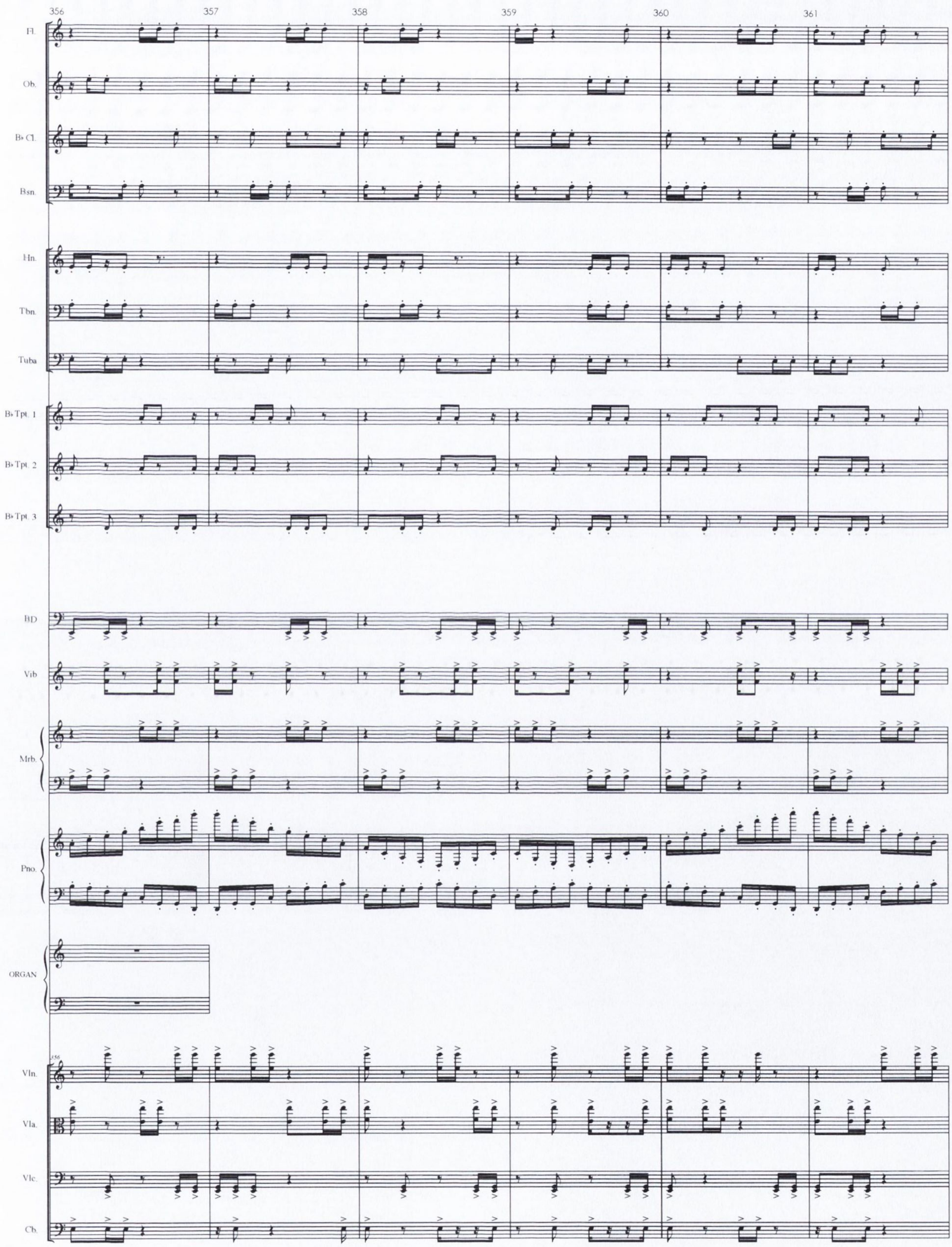
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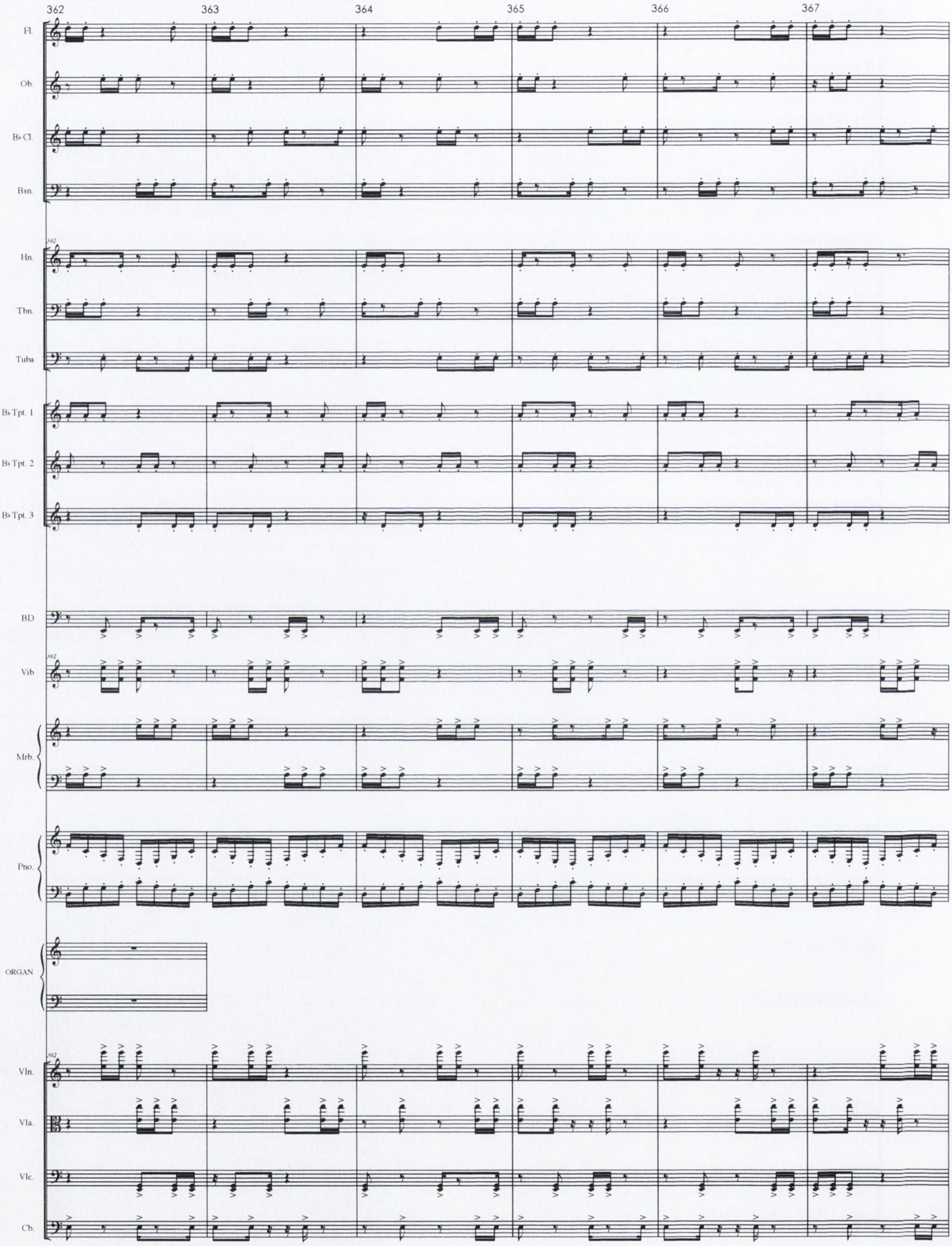
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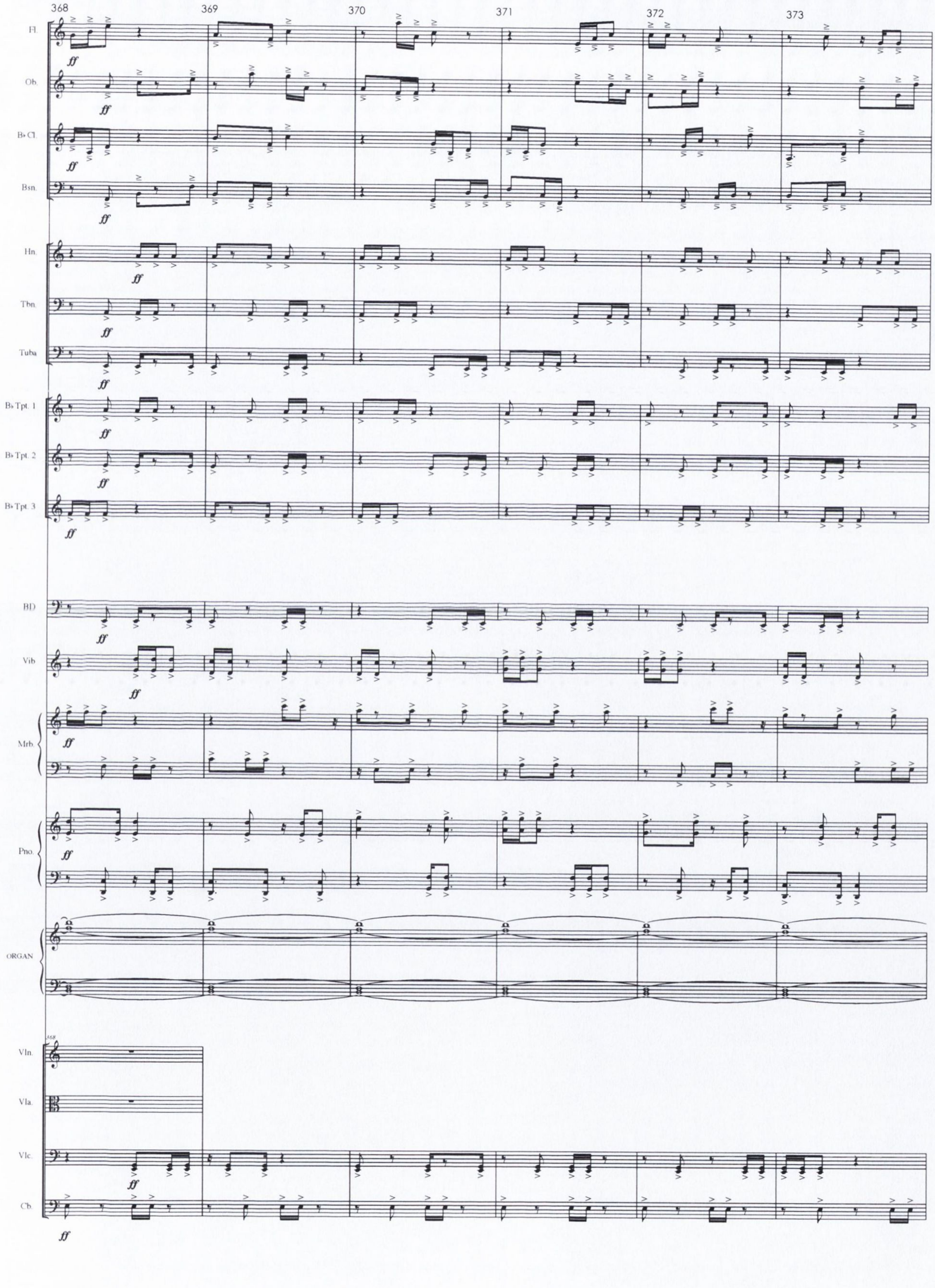
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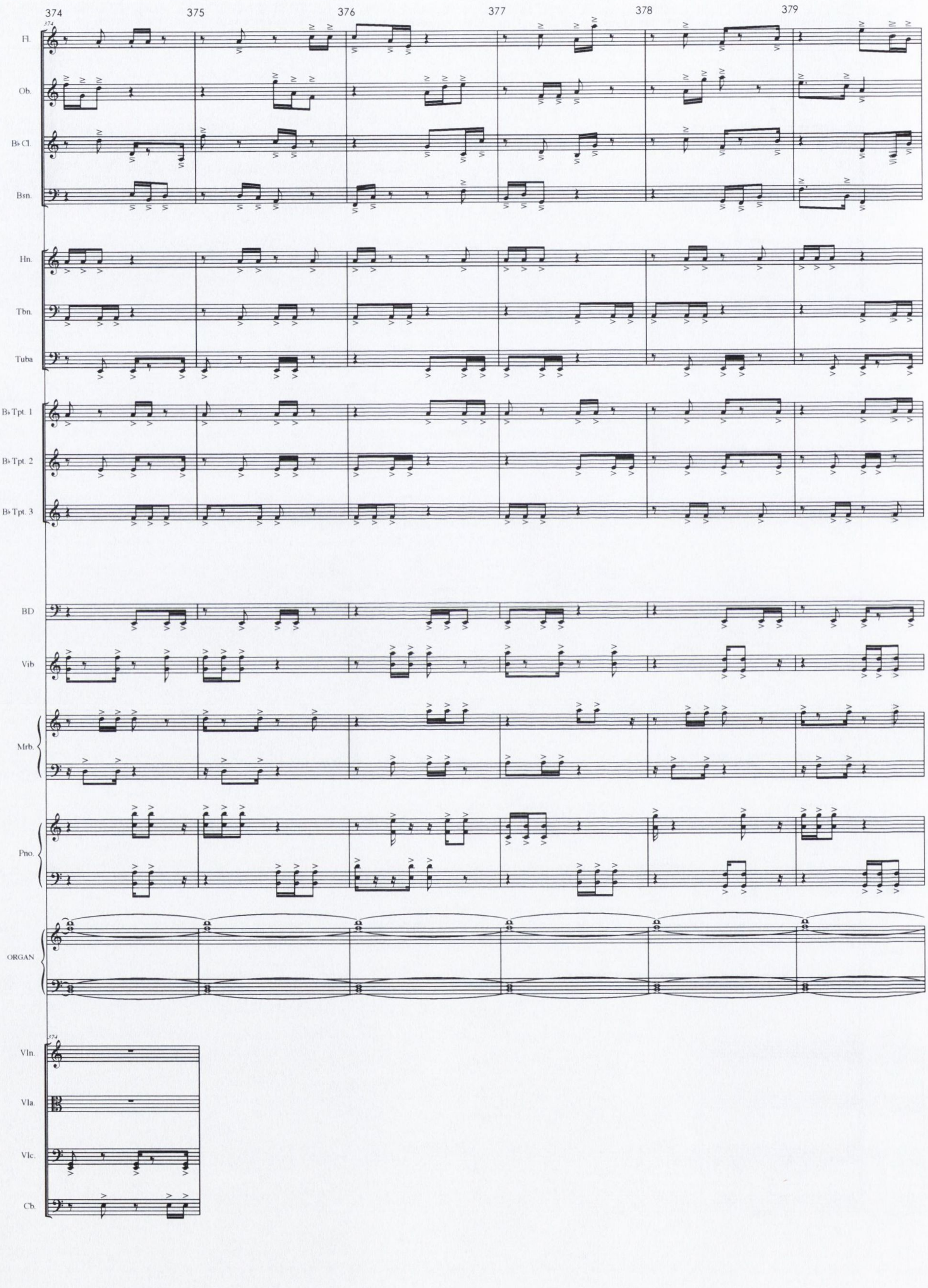
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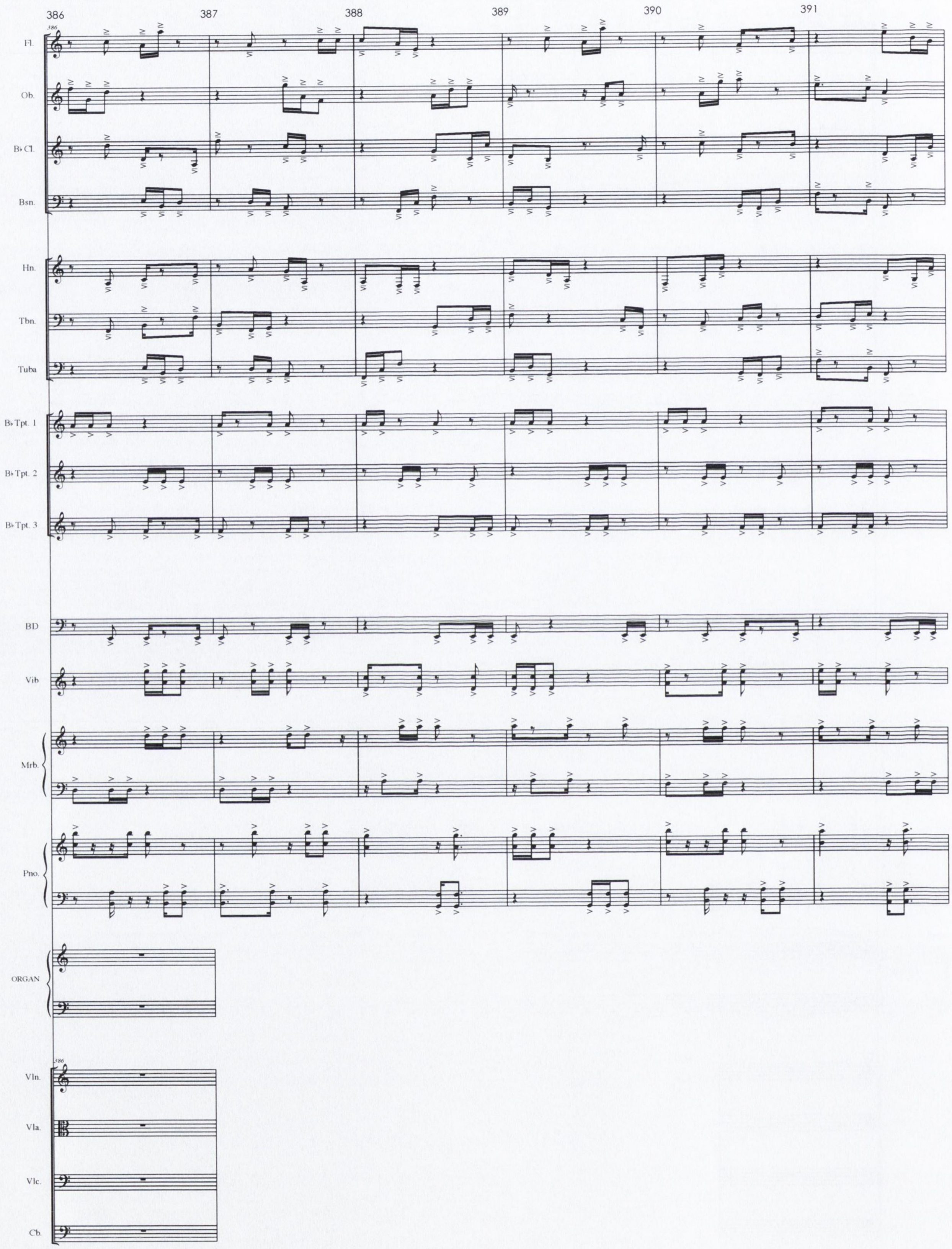
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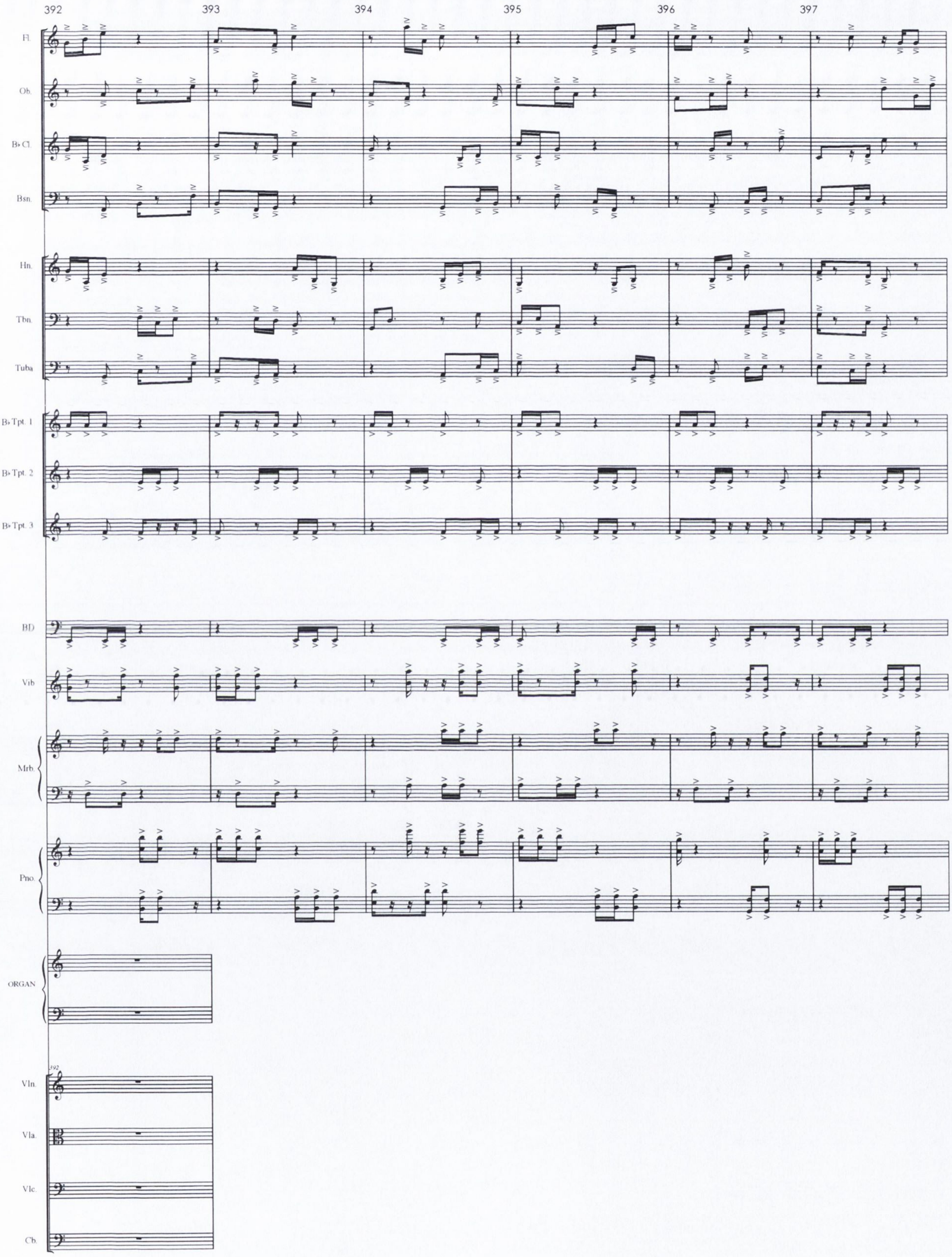
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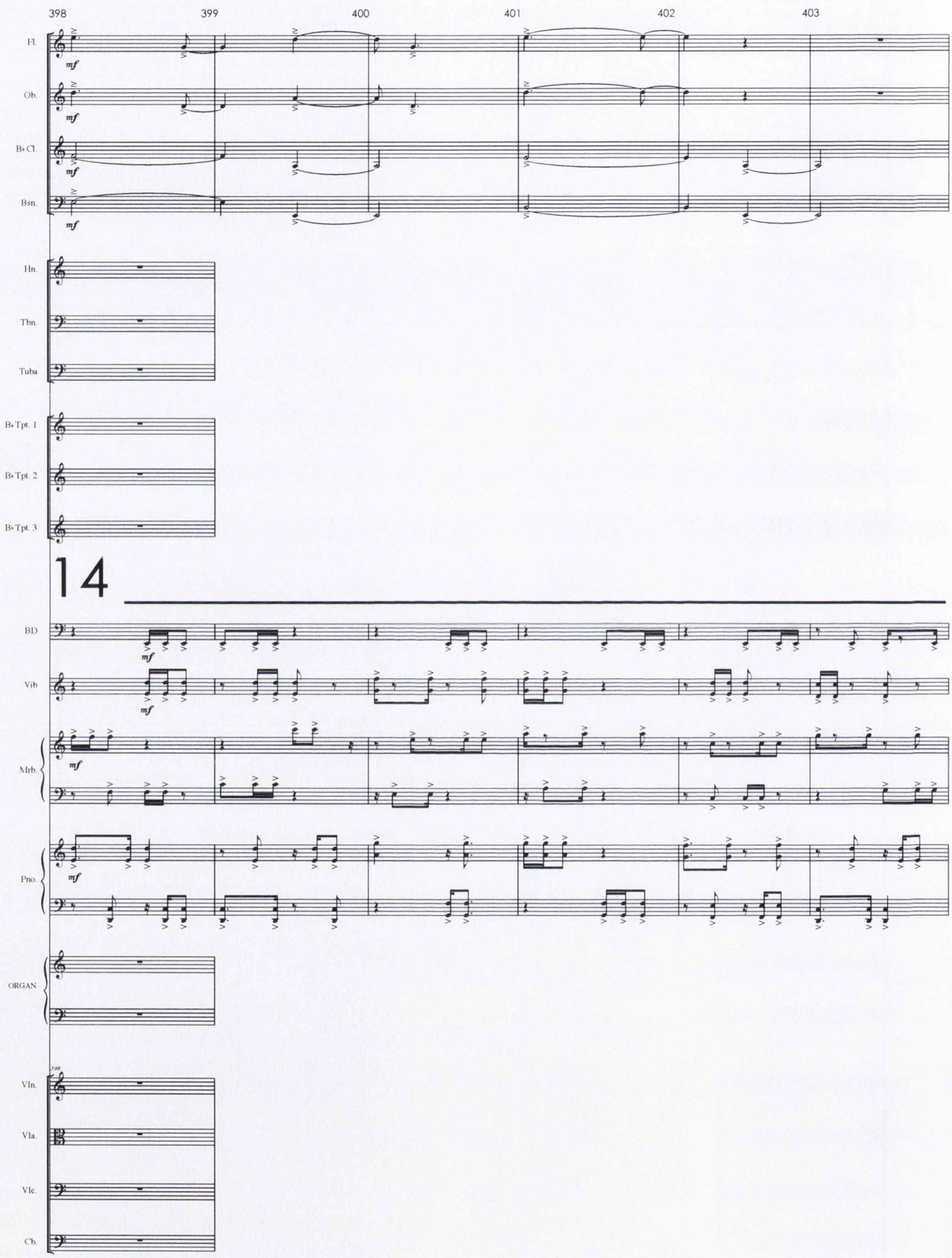
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B♭ Tpt. 1
B♭ Tpt. 2
B♭ Tpt. 3
BD
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Mrb.
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ORGAN
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Tuba
B♭ Tpt. 1
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BD
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