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The Application of Electronic Collage Techniques to the Composition of Acoustic Instrumental Music

by

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ABSTRACT

FACULTY OF MUSIC

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THE APPLICATION OF ELECTRONIC COLLAGE TECHNIQUES TO THE COMPOSITION OF ACOUSTIC INSTRUMENTAL MUSIC

By Leo Grant

During my Master's degree I created a series of electronic collage compositions by superimposing pre-existing recordings of 'found' musical material. The aim of my PhD has been to expand upon this work by applying a modified version of the same electronic techniques to the composition of acoustic instrumental music, employing transcription as a means of converting audio recordings into MIDI information, which was edited using a computer sequencer to create new works.

In **Section One 'PhD Background and Development'**, I present a summary of the earlier work to illustrate the technical and conceptual concerns that were the point of departure for my thesis. An overview of the PhD work follows, focusing on central issues such as: the relationship between material, process and structure; definitions of musical information; the philosophical implications of using collage techniques, embodied in the phrase 'the refusal of totality'; and the practicalities that result from working with notation and acoustic instruments as opposed to electronic media. In addition, I contextualise my work and practice in relation to those musicians who have directly affected my compositional aesthetic, thereby demonstrating how I have attempted to build upon pre-existing lines of development to create original music. In **Section Two 'Analysis',** I outline my compositional technique in greater detail, and provide individual analyses for each of the works in the portfolio.

TABLE OF CONTENTS

SECTION ONE: PHD BACKGROUND AND DEVELOPMENT

Introduction....21

Various Forms of Ambiguity....24
I: Harmonic Ambiguity (Tonality vs. Atonality)....24
II: Gestural Ambiguity....25
III: Contextual Ambiguity....26
IV: The General and The Specific....27

Limitations....28

PhD Aims....31

Material and Process....31
I: Atomisation....32
II: Harmonic Ambiguity Revisited....33
III: 'Intactness' Revisited....35
IV: Continuity vs. Discontinuity....35

Practical Issues....36
Instrumentation: Real vs. Virtual Instruments....36
Notation and Transcription....38

Structure....39
Possible Solutions....40

Collage and Found Material....45
Choosing Source Material (or Information Content Revisited)....47

1. 'Purely Musical' Information....47
Instrumentation....49
Dynamics....50

Counterpoint 50
The Limitations of Timbre.....51
Malleability.....53

2. Extramusical Information.....54
Conceptual Background 55
Politics.....56

Influences.....58
Charles Ives.....59
John Cage.....61
Michael Finnissy 63
Jungle.....66

Conclusion.....67

SECTION TWO: ANALYSIS

Overview 69

1st Year: Experimentation.....69

2nd Year: Consolidation 70

3rd Year: Exploring New Territory.....74
Internet MIDI File Experiments.....74
Sources of MIDI.....75
Implications.....75
New Approaches to Rhythm and Tempo.....76

Analysis 1: *Canpiom* 79
Source Material.....79
Conceptual Background: Quantum Foam 80
Structure.....82
Editing 83

Analysis 2: *Quartut* 89
Conceptual Background: *Quarantine* and Quantum Mechanics 89
Editing 89
Structure 90

Analysis 3: *Untitled 1, Untitled A* 95
Source Material 95
Conceptual Background: Emergence 95
Processing 97
Structure 100

Analysis 4: *This Moving with Respect to That* 103
Source Material 103
Conceptual Background: Relativity Theory and Cultural-Historical Context 104
Process: 'Warping' 105
Structure 107

Analysis 5: *Toward a more American style* 111
Aims 111
Source Material 111
Conceptual Background: Music as Cultural-Historical Artefact 112
Structure and Process 115
Structural Repetition: Implications 118

SECTION THREE: PORTFOLIO

Portfolio CD Tracklisting 123

Canpiom 125

Quartut 141

Untitled 1, Untitled A 157

This Moving with Respect to That 169

APPENDICES

Appendix 1: Examples 181
CD Tracklisting 181

Appendix 2: Experiments 183
CD Tracklisting 183
Score: *Classical Charade* 185

Appendix 3: The Invaderz 195
Biography 195
CD tracklisting 195

Bibliography 197

List of figures

Section One: Background and Development

Figure 1: *Caravaggio...The Final Years,* Idris Khan (2006) 21

Figure 2: An example of a six-dimensional Calabi-Yau space 22

Section Two: Analysis

Quartut

Figure 3: The first 22 bars of Beethoven's Op.127, 2nd Movement as transcribed in *Sibelius*.....72

Figure 4: Material above transferred into *Logic* as a MIDI file, represented visually in the standard 'piano roll' format.....73

Canpiom

Figure 5: Quantum Foam, from Brian Greene's *The Elegant Universe*.....81

Figure 6: Guitar layer before editing, Bars 1 – 37 (Track 3: Analysis Examples CD) 84

Figure 7: Guitar layer bars 1 – 37 post-editing (Track 4: Analysis Examples CD).....85

Quartut

Figure 8: The upper two staves show the transcribed first violins from op.127 and op.131, the bottom stave shows the result of the interruption process, with vertical arrows representing interruptions. 90

Untitled 1, Untitled A

Figure 9: Stage 1, Excerpt from original transcription of Sonata Op.12, No.3 97

Figure 10: Stage 2, all single line melodic material removed (in this example, this is all the right hand material).....98

Figure 11: Stage 3, all lower notes removed from remaining chords, to leave a selection of melodic fragments. 98

Figure 12: Stage 1, violin parts from the three transcriptions superimposed 99

Figure 13: Stage 2, two of three bars are erased from each transcription 99

Figure 14: Stage 3, material above condensed into a single line 100

This Moving with Respect to That

Figure 15: An illustration of the Universe as described by Relativity Theory (BBC Horizon: *What on Earth is Wrong With Gravity?* (2008)) 105

Figure 16: Source material, J.S.Bach *Fugue No.8 in D sharp minor* 105

Figure 17: Example: Piano One's tempo curve, represented by orange line (Track 8, Analysis Examples CD) 106

Figure 18: Opening bars of Piano One fugue post-warping and matching (Track 9, Analysis Examples CD) 106

Toward a more American Style

Figure 19: *Long Distance* cover art used for CD packaging and download 113

Figure 20: *Dusty Rag* sheet music cover art 114

List of accompanying materials

Audio CDs:

- Portfolio recordings
- Appendix 1: Examples
- Appendix 2: Experiments
- Appendix 3: The Invaderz

Portfolio Scores:

- *Canpiom*
- *Quartut*
- *Untitled 1, Untitled A*
- *This Moving with Respect to That*

Additional Scores:

- *Classical Charade*

DECLARATION OF AUTHORSHIP

I, Leo Grant

declare that the thesis entitled

"The Application of Electronic Collage Techniques to the Composition of Acoustic Instrumental Music"

and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
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- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- none of this work has been published before submission, or [delete as appropriate] parts of this work have been published as: [please list references]

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Date:…….

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SECTION ONE: PHD BACKGROUND AND DEVELOPMENT

Introduction

For my Master's Degree in 2006-2007, I created a series of electronic compositions by superimposing multiple audio recordings and editing the results using a computer sequencer, and the aim of my PhD was to develop and expand upon this work by applying similar electronic collage techniques to the composition of instrumental acoustic music. Therefore, it seems logical to begin my commentary as I did my PhD, by reviewing the earlier work and attempting to summarise my insights about it, thereby preparing the ground for further exploration.

Figure 1: *Caravaggio...The Final Years,* Idris Khan (2006)

An initial source of inspiration for these electronic collages was the work of artist Idris Khan, which is made by superimposing multiple photographs of pre-existing art. What interests me about his work is the fact that it exhibits aspects of both

representational and abstract art, and seems to operate somewhere in between these two modes of expression. In the example above, recognisable fragments of faces and bodies remain intact but are recontextualised through their absorption into a cloud of colours and shapes. The specific details of the individual source materials blur and melt into one another, but general stylistic characteristics are readily perceived, and the picture thereby presents a kind of fuzzy archetype.

Each constituent layer embodies a different viewpoint and sense of scale. When these are combined into a single two-dimensional plane it creates an illusory effect of multi-dimensional space reminiscent of early Cubist experiments by Picasso and Braque, or the six-dimensional Calabi-Yau spaces utilised in the physics of String theory (see below), almost but not quite resolving into a coherent shape. In addition, the work is temporally multi-layered, as different moments in time are presented simultaneously: the virtual moments represented in the painted scenes, and the real time taken to paint the original pictures (and later to superimpose them as photographs).
The resulting complex of overlapping, conflicting visual information is hard to perceptually disentangle, and the work thus contains within itself the potential for simultaneous opposing ‘readings’, creating a sense of irresolvable ambiguity.

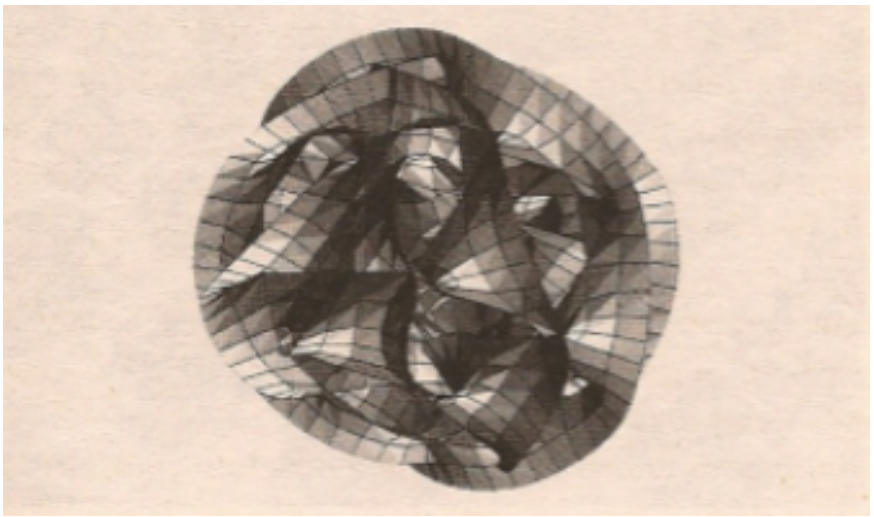

Figure 2: An example of a six-dimensional Calabi-Yau space; Brian Greene, *The Elegant Universe* (Vintage, 2005), p.207

Using Khan's work as a point of departure and visual reference point, I explored similar ideas by superimposing pre-existing 'found' material from the canon of Western Classical music to create my collages. I chose a composer or recording artist and overlaid multiple recordings of their work, for example, a selection of recitatives from various cantatas by J.S.Bach, or the tracks from a compilation CD by the countertenor Andreas Scholl. I found that the most successful collages used musical material with low information content in one or more parameters. For example:

- Low rhythmic density: a minimal number of 'events per second'.

- Sparse instrumentation: 1 or 2 instruments is most effective; if more, they should audibly resolve into (a) two groups of instruments (e.g. piano quartet = strings and piano) or (b) two streams of information (e.g. melody and accompaniment).

- Simple gestural language: clearly defined, preferably discrete, rhythmic units and melodic phrases rather than, for example, an unbroken continuum of densely woven polyphony.

- Harmonic stability: slow harmonic movement, with a clear tonal centre.

Generally speaking, if the original material were too dense, the resulting superimposed texture would be relatively undifferentiated, with limited scope for compositional manipulation. There is a critical density, at which original details remain audible after superimposition, and simultaneously re-combine to create new gestures and unexpected harmonies. This effect is more likely to be achieved using sparser material.

Various Forms of Ambiguity

I: Harmonic Ambiguity (Tonality vs. Atonality)

By superimposing representational art, Idris Khan creates work that appears to operate in between representative and abstract modes of expression. Similarly, my collages exhibit a similar kind of ambiguity: superimposing tonal music creates work that appears to operate in between tonality and atonality. The original tonal pitch material is recontextualised through superimposition, and thus appears to perform both tonal and atonal functions simultaneously.

- Tonal: The pitch material functions according to the rules and conventions of the common practice tonal system. Chord progressions and melodic lines are organised around a localised tonic and are defined in relation to this implied centre of gravity.

- Atonal: The pitch material functions statistically, in the context of the total pitch-field that it describes. In atonal music the sense of a hierarchical harmonic system is suspended, and goal-directed movement through time is replaced by harmonic stasis, due to chromatic saturation.

Tonal and atonal music require different modes of listening. To apprehend tonal pitch relationships information must be held in memory, as a limited number of potential possibilities are implied at any one time, until a resolution retroactively collapses them all into a single path. Atonal music's temporal perspective is rather attenuated by comparison. Unlike goal-directed tonal harmony, which requires us to remember previous pitch information and use it to infer possible futures, atonality's absence of goal directed harmony focuses our attention on the present, the moment-by-moment succession of events. To fully comprehend music that exhibits aspects of both tonality and atonality therefore requires a kind of separation of the focus of attention, between these two modes.

This creates a 'tangled', ambiguous harmonic situation, with a high potential for 'misreading', which is specifically dependent on the superimposition of *tonal* music.

By contrast, superimposing atonal material with itself simply creates further atonality (0 + 0 = 0). Combining atonal and tonal material is similarly ineffective because the two layers tend to be so starkly differentiated that one or the other is audibly dominant at all times.[1] This means that they don't merge or bleed into one another, which reduces the possibilities for interesting misreadings.

II: Gestural Ambiguity

This harmonic ambiguity is reflected in the dualistic character of the rhythmic and melodic gestures. Just as audible fragments of tonal pitch material function not only as part of a tonal chord progression but also subsumed into an atonal pitchfield, similarly, gestural profiles simultaneously exhibit characteristics of both:

- Tonal: The gestures are integrated with the pitch material, in an interdependent relationship.

- Atonal: The gestures are autonomous; disconnected or 'decoupled' from the pitch material, operating on separate planes.

In addition to this, because of my decision to use a single composer or performer as material for each collage (as opposed to a more varied collection of materials), there arose other types of unexpected gestural ambiguity. The more similar two layers of musical information are, stylistically and texturally, the more difficult it is to perceive individual layers when they are combined. Fragments that emerge from the totality are thus more likely to conglomerate into new gestures that are simultaneously very unconventional (in the context of the original material), and very natural sounding (in the context of the totality, which is essentially a pool of material constructed according to similar principles).

[1] Admittedly this differentation is also a function of the gestural-textural language associated with each, but that wasn't something I could alter when working with audio recordings, a limitation I will return to later

Finally, the superimposition process had the effect of not only recontextualising the familiar gestures of the original tonal material, but also many of the (by now) conventional gestures used in atonal music. For example, a ubiquitous device is the simple repetition of a single note[2], which stands out in the context of a chromatically saturated pitchfield by virtue of its repetition and serves the function either of a kind of pseudo-tonic (performing a stabilising function), or simply to temporarily attenuate the scope of the pitchfield and thereby create contrast (between 'all pitches' and 'one pitch'). These repeated notes also arise when tonal music is superimposed, but they are notable in this context precisely because of their very *lack* of function; an accidental side effect rather than a rhetorical contrivance, exhibiting a pleasingly coincidental quality and harmonic redundancy.

III: Contextual Ambiguity

Contextual ambiguity arises when the source material remains audibly intact in a collage, because it can be 'heard' (decoded or understood) in two distinct ways:

1. As itself: Audibly recognisable as the original material, a self-contained fragment embodying a set of musical rules and conventions, a particular musical 'language' attached to a particular cultural-historical setting.

2. As part of the new piece: Recontextualised in a new setting, performing a quite different function within a new set of musical rules, with different cultural-historical implications.

As with the harmonic and gestural ambiguities discussed above, recontextualised material has the potential to be 'heard' both ways simultaneously. The context-confusion situates the listener somewhere in between the original material and the new composition it has been used to create.

[2] There are countless examples of this gesture, such as Pierre Boulez's *Sur Incises* (1996/1998), in which repeated notes become a point of contact between the multiple pianos, harps and percussion, a rather stale rhetorical device.

IV: The General and The Specific

The artist and composer Chris Newman writes that 'it is the general and the specific combined which makes music'.[3] I feel that my music is defined by the particular relationship it sets up between the two, and as a consequence the work performs a kind of analysis of the materials used in its construction. A traditional method of musical analysis infers the general characteristics of a composer's output or a musical form from the detailed study and comparison of multiple specific instances of the same. In a sense sonata form, for example, is an archetype that represents all existing sonatas, and defines the blueprint for all possible sonatas. It is thus a platonic idealisation. However, it is hard to find 'textbook' examples of a musical form in the work of real composers, and there are a number of reasons for this:

- Composers establish a form in the act of composing, exploring possibilities by trial and error until finding something that 'works', and becomes part of their practice.

- Even as they are creating a new form, composers tend to be elliptical in their treatment of it.

- A musical form or style defines a set of possibilities, branching out in multiple, potentially mutually exclusive directions, not all of which can be contained within a single instance or manifestation.

In analysis, musical characteristics are categorised and differences removed or ignored to reveal (or possibly create?) an abstract framework. My superimposition process performs a similar function by collating information in a way that invites comparison. Related features of the material appear to automatically conglomerate, and are thus foregrounded through statistical predominance. The superimposed material 'tends towards' an abstract generalisation of its own properties, but despite

[3] Chris Newman, *Format* programme note

the conglomeration of similarities, deviations from the archetype (i.e. the specifics) remain 'intact' (viz. Newman). The result is not a perfect platonic object, but rather a messy, hazy cloud that implies its own abstraction.

Limitations

As I have outlined above, the electronic collage work laid the groundwork for the conceptual background of my PhD[4]. The success of these experiments notwithstanding however, problems with this method of working soon became apparent. Essentially, I was working with relatively unmalleable 'blocks' of pre-recorded sound, and therefore was restricted to using two main compositional processes: juxtaposition and superimposition. Contemporary electronic sound processing techniques tend to focus on timbral manipulation, and are severely limited when it comes to altering the pitch and duration of recorded material (without degrading sound quality in the process), and vitally I could not edit (add, delete or transpose) the individual notes of a recording.[5]

This had implications for musical structure. Unless I could edit my materials more aggressively, I would be unable to create noticeable *change*: different types of material that could be used to delineate sections. As a result the compositions tended to be structurally rather monolithic, because they exhibited the same type of musical material and process throughout. It seems to be the case that however complex a compositional system, the listener will eventually become accustomed to its results,

[4] It is worth pointing out that the realisations about my Masters portfolio outlined above only came into focus during the course of my PhD work, which not only continued but also consolidated ideas inherent in the earlier portfolio, and this is why I considered it worth recapping.

[5] It is possible to alter the *total* pitch content of an audio file, albeit in a limited way; it can be pitchshifted or transposed. But this is effectively limited to about a minor 3rd either direction, because again the sound quality quickly becomes degraded. More recently, software has been developed (such as *Melodyne Editor*) that allows one to edit individual notes within a polyphonic sound recording, but is still rather limited.

especially if they are readily perceived as part of an unchanging system, and this is likely to quickly become uninteresting.

This 'flat', unchanging quality is found in certain pieces of serial music, certainly in the Total Serialism of the 1950's, in works such as Pierre Boulez's *Structures I* (1952). It is, I believe, one of the fundamental problems of serial atonal music: if the field of possibilities (the limits of the musical system used to compose the piece) is defined from the outset and presented in its entirety throughout the composition, then the composition as a totality will be unchanging. Theodor Adorno recognised this problem arising in the music of late Schoenberg: 'it bears a certain similarity to a highly complicated machine, which remains firmly fixed in one place in spite of the dizzying movement of all its parts'.[6]

Despite the aforementioned complexity of ambiguous musical relationships afforded by my collage technique, the restrictions of my compositional process were undermining its potential, by limiting options and creating unchanging systems. I needed to develop a new method that would allow me to overcome these problems.

[6] Theodor Adorno, *The Philosophy of New Music* (Continuum, 2007), p.65

PhD Aims

The aim of my PhD work then was to expand upon the earlier electronic collage work, maintaining and developing the aspects that I had found to be successful and attempting to move past its limitations. I decided to do this by moving from the purely electronic domain into more 'traditional' score-based acoustic instrumental music, to explore the possibilities of notation and transcription. My hope was that this would open up new methods for processing musical material, in turn allowing me to create more varied structures.

Material and Process

During the first year of the PhD I developed a modified version of my earlier collage technique that I used to write a series of instrumental scores. I will describe this in greater detail in the Analysis section of the commentary, but for now I will give a brief overview of the steps taken:

1. Choosing Source Material

   As with the electronic collages, I used recordings of tonal classical music chosen on the basis of rhythmic density, instrumentation, simple gestural language, and harmonic stability.

2. Superimposition

   I then superimposed these recordings in the computer sequencer *Logic* to find combinations that created interesting results. Trial and error showed that the most effective combinations used no more than two superimposed recordings.[7]

[7] More than two and the result quickly became an undifferentiated, generalised wash of sound obscuring the ambiguities described earlier.

3. Transcription

Having chosen one or more pairs of recordings, I transcribed them (using *Sibelius* notation software) to a common tempo thus maintaining their original rubato and the rhythmic relationship between them.

4. Editing

The transcriptions were then 'exported' from *Sibelius* as MIDI files,[8] and loaded into *Logic* for editing, which consisted of adding, erasing and transposing notes, as well as changing durations and tempo.

5. Notation

When the composition was completed, I would transfer the edits to the *Sibelius* transcription, adding dynamics, phrasing and other performance instructions to create the final score.

The third stage (Transcription), in which I manually converted an audio recording into a MIDI file, was the most important addition to my compositional process because it meant that I was no longer limited to juxtaposition and superimposition of 'blocks', but could edit the individual notes independently within. This opened up many new possibilities for manipulating materials:

I: Atomisation

By working with transcriptions as MIDI, now I could not only add information through superimposition, but also subtract information by erasing notes, progressively moving towards atomisation of the original material.

[8] A MIDI file encodes music as a list of pitch and duration information. MIDI technology is an industry standard protocol, so MIDI files can be transferred between any music software with MIDI capability.

Superimposition (adding information)

↑

Original Found Material

↓

Atomisation (removing/ subtracting information)

The *combination* of superimposition and atomisation made it possible to process material in new ways that had not been possible working with audio files. For example, I could separate constituent elements and re-combine them, such as a melody from one piece of music and the accompaniment from another.

II: Harmonic Ambiguity Revisited

In addition, by editing individual notes I could subvert the harmonic implications of my source material, and thus further exploit the ambiguities that exist in between tonality and atonality. My aim was to create a soundworld reminiscent of an atonal pitch-field, but without the harmonic stasis that often accompanies such chromatic saturation, due largely to the systematic avoidance of consonance. A pitch-field with an unpredictably shifting balance between consonance and dissonance has a greater degree of harmonic potential than one that is constantly saturated. Therefore, by creating multiple floating, contingent pitch centres within this field (or by allowing them to occur naturally) the harmony can move fluidly between tonality and atonality.

Common practice tonality is defined by a specific kind of harmonic stability, governed by a hierarchical system of pitches in which the tonic acts as a centre of gravity. The harmony moves away from and back towards this central point of attraction. By comparison, atonal material is not really stable, but static, because total chromatic saturation denies the possibility for harmonic movement. Undermining the harmonic stability of tonal material is thus an obvious strategy for making it sound less tonal and more atonal. I did this in various ways, such as erasing, transposing or adding notes to a melodic line or chord progression, or disrupting the sense of goal directed movement towards the tonic. For example, by erasing the final chord in a perfect cadence, I could deny the usual sense of ‘closure’ and create a more open-

ended, free-floating succession of seemingly non-directed chords. I could also blur chord progressions by adding notes to create a harmonically ambiguous cluster effect.

To choose *what* to edit I listened to the computer playback of a pair of superimposed transcriptions, and altered or removed anything that 'stuck out' inappropriately from the texture, such as audible perfect cadences (that needed to be erased), or melodic lines that were too unambiguously goal directed (and needed to be truncated or otherwise distorted). Anything too suggestive of resolution or closure would anchor the harmony- rather than allow it to remain free floating- and would thus be altered.

Incidentally, during this process I would constantly be switching between listening to superimposed transcriptions and a single transcription, an experience that proved to be very instructive, a useful illustration of recontextualisation. Listening to tonal material after hearing it combined in a more harmonically ambiguous context, it would become perceptually transformed: my brain seeming to have been trained to listen statistically rather than functionally. I now heard tonal material as if through an atonal filter. In this context a repeated tonic, for example, that I previously heard (functionally) as the central point of a hierarchical system, would now be heard (statistically) simply as a pitch with a high frequency of recurrence, 'corrupting' an otherwise non-hierarchical pitchfield. An attempt to incorporate this disorientating effect into my work can be heard in *This Moving with Respect to That*, the final notes of which outline a C major triad (in first inversion), and the last two notes of which are technically a perfect V-I cadence, but do not perform the same function in this context and are thus rendered unfamiliar.

III: 'Intactness' Revisited

I soon found that note-to-note processing could rapidly make a piece of found material completely unrecognisable. Progressively erasing or changing notes would totally obscure its original melodic, harmonic and rhythmic identity. In the limit, material would become almost totally atomised, a disordered collection of pitches and rhythmic cells which sounded as if they had been created using some kind of generative compositional process. In this case, the logic of using found material was totally undermined, why not just use a generative process if the result was the same? I decided that it was therefore necessary to preserve the original material's identity, if only vestigially, or even subliminally.

I think of a piece of found material as a self-contained musical object, with its own internal logic, a web of interconnections, some of which can be broken or weakened without destroying the whole. I was interested to see how far it could be transformed before it turned into a different *type* of material. I wanted to distort it in such a way that it didn't simply 'collapse' into constituent particles, but maintained a degree of structural integrity, becoming almost but not quite unrecognisable: internally consistent, but semantically ambiguous.

I found that the most effective method for preserving the identity of source material was to use a combination of processes that had minimal impact on the original material's integrity when applied individually, but which in combination would distort the material enough to defamiliarise it. For example, the aforementioned process of removing perfect cadences certainly undermined the harmony of a piece of material, but left the material clearly recognisable. Then I could apply another simple process to this, such as arbitrarily removing every 10^{th} bar, and so on.

IV: Continuity vs. Discontinuity

Incrementally layering simple processes in this way meant that I could distort material while maintaining something of its original character and logic. In practice, this meant striving to preserve some vestigial sense of the source material's gestural shapes and

melodic contours, its harmonic functionality and its localised rhythmic dynamism. I would do this intuitively by applying processes until I felt that the material was approaching the point of becoming too atomised and unrecognisable, carefully moving along the gradations of distortion.

Above all I tried to maintain a sense of the original's *continuity*, by leaving the overall temporal order of events intact. I would 'cut' a gesture, a bar or multiple bars from a transcription but rarely reorder them by, for example, moving the last bar to the start. This is because I specifically wanted to avoid a disjointed effect, the archetypal 'discontinuous series of discrete gestures' reminiscent of much Contemporary Classical music. Instead, I aimed to superimpose multiple distorted continuities to create a more ambiguous result, situated somewhere in between the linear continuity of tonal music and the non-linear discontinuity of atonal music.

Practical Issues

Returning now to the central aim of my PhD, which was to compose notated acoustic instrumental music using electronic collage techniques, I will discuss the impact of the various practical issues associated with this. These were not only very different to those of purely electronic music, but also modified my compositional approach as least as much as the abstract, conceptual considerations described above.

Instrumentation: Real vs. Virtual Instruments

In the majority of the compositions in my PhD portfolio the instrumentation is the same as that of the source material used in its construction. Leaving the found musical 'object' timbrally intact underlined the contextual ambiguity between 'original' and 'collage' vital to the work's effect (see 'III: Intactness Revisited'). However, my choice of instrumentation was equally informed by practical considerations. My previous experience of composing for acoustic instruments and knowledge of instrumental technique was quite limited, and maintaining the original instrumentation had the benefit of ensuring that the final composition would fall

within the pitch range of the instruments I was writing for and, I hoped, would guarantee a basic level of playability.

Unfortunately, the situation turned out to be far more complicated in practice. I had assumed that it would be a simple process to translate my electronic collages into an acoustic instrumental medium, but problems arose because I didn't adequately take account of the fact that I was now writing music for real instruments (physical objects reverberating in space) as opposed to electronically generated virtual instruments.[9] These tend to be acoustically 'dry' with a sharp dynamic attack. When composing, I naturally reacted to the sound of the computer playback and made musical choices on the basis of this. I therefore tended to write music with:

- A very high level of textural and rhythmic density: to compensate for the dry sound of virtual instruments I added more notes, on the vertical and horizontal plane

- A high level of rhythmic precision: the sharp attack, in combination with the inhuman accuracy of computer playback, means that very complicated rhythms remain audible even at very fast tempi

Using a computer I was able to work at a microscopic level of detail when composing, but I found that when this music was performed (in real-time by humans playing instruments in a reverberant space), much of this detail would be inaudible.

In short, composing with virtual instruments negatively affected my musical decision making process. I was making choices based on the sound of the computer playback and the possibilities offered by computerised music making rather than working with (and within) the limitations of acoustic instruments performed by humans. In the future, I plan to solve this by working more closely with performers at an earlier stage of the compositional process.

[9] These virtual instruments can be purely synthesised (fabricated from electronic waveforms) or sampled instruments (in which every note of an acoustic instrument, such as a piano, is recorded separately).

Notation and Transcription

In addition to the problems of working with virtual instruments, my use of notation was not sufficiently attuned to the needs of human performers. To understand why this was the case, it is necessary to revisit the process used to create my final notated scores: as described earlier, I would transcribe recordings and edit these transcriptions as MIDI files within *Logic*, before copying the edits back into the notated transcription to make the final score. The function of the transcription process was essentially to convert audio recordings into MIDI information as accurately as possible. I therefore aimed for a high degree of rhythmic precision, working to a common tempo defined by the computer's metronome click track, against which I notated the rubato of the recordings.

There were benefits to this precision. Firstly, it retained the rhythmic relationship between pairs of recordings, and secondly, it allowed me to maintain control over the specifics of vertical harmony, which is of course dependent on rhythmic placement of notes. But despite the fact that my transcriptions sounded like accurate representations of the original recording when played back by a computer, the notation didn't convey the necessary visual information to a human performer to allow them to recreate this sound. This led to problems in practical realisation. Notation is a more or less stylised visual representation of music, and most performers expect it to communicate not only the pitches and rhythms that constitute a phrase or gesture, but also something of its 'essence'. Unfortunately, because I was working with computer sequencers that simply play each note as it comes totally objectively, I didn't adequately address this issue. In addition, my notational strategy was at odds with the result I was hoping to achieve. My aim was to write music with a continuous flow, but in practice the results tended to be rhythmically stilted and jerky because of my gesturally unclear notation,.

In the future I plan to try and solve this problem by developing a more transparent notational approach, which takes into account performer expectations, in short, the 'psychology of notation'. In the case of compositions with more than one performer, I

will also include more obvious reference points for players to use as aural landmarks, points of rhythmic stability.

Incidentally, I have realised that in fact it is not necessary to use rhythmically precise notation to maintain rhythmic inter-relationships, or even to control vertical harmony. In fact, experience has taught me that as long as each part has its own separately audible identity (which can be determined by clear melodic writing, harmonic identity, or gestural definition) this will remain intact even in a situation with no general synchronisation. Vertical harmony especially, has a surprising amount of tolerance in terms of rhythmic alignment, in fact the dividing line between specific and statistical perception of harmony is not as clear-cut as I originally thought.

Structure

So far in this commentary I have focused mainly on describing my approach to musical material: the reasons for working with found material, the processes I developed and the conceptual considerations that arose from this. But I have rather neglected discussion of the structural aspects of my work. Unfortunately I feel that this disparity between material and structure is also reflected in the work itself; the former is perhaps more developed and sophisticated than the latter. During this PhD I have focused the majority of my creative energy on:

- Achieving the specific soundworld I had envisioned

- Realising the potential of my electronic collage work and translating it into an instrumental medium

- Developing techniques for transcribing and notating the results

Structural considerations were slightly sidelined, and as a result I did not manage to develop an approach that I was entirely satisfied with, or solve the problem discussed earlier of creating monolithic structures. However, I have given much thought to the

issue both in a general sense and in relation to my own work, in an attempt to formalise the problems encountered and find solutions.

In the general case, a structure comprises one or more durational containers, which are filled with material. The proportions of these containers can be arbitrarily imposed, or they can emerge 'organically' through consideration of the properties of the material itself, or some combination of the two. My PhD work was in the latter category, structures were contingent and based on the properties of the source materials. I processed these in such a way as to maintain their continuity and temporal order, and allowed the structure to emerge automatically. The shape of a composition was therefore relatively pre-determined by the harmony, rhythmic density, and gestural landmarks delineated by the processing of material. Of course, the structure would be subjected to editing: I would cut bars or sections, add or remove silences, and use dynamics and tempo changes to shape durational proportions, but the overall framework was never drastically altered.

My aim was to render audible the structures that appeared to me to be immanent within the source material. As I have discussed, ambiguity and undecidability interest me greatly, so with this in mind I consciously wanted to avoid using unambiguous structural devices such as extreme or sudden shifts in texture, tempo etc, preferring instead to hover between different musical 'states'. Unfortunately, this resulted in a lack of audible change from a global perspective, and thus monolithic structures. This strategy also had a limiting impact on the length of compositions, because music of such constant similarity could not sustain momentum over a longer period.

Possible Solutions

If my contingent, emergent approach to structure is called 'bottom up', the alternative was to try a more 'top down' approach, whereby a structure is pre-compositionally determined using a series of durational containers that are filled with material. John Cage's *Piano Concert* (1957) is illustrative of this reversal of the relationship between form and content, in that the choice of material is not fixed, and its function is to express 'the boundaries of the piece…as margins of a spatial projection of the total

sound structure'.[10] The focus is the form, and content exists merely to render this audible. Audibly distinct materials can be used to underline the differentiation of sections. Textural composers of the 1960's, and others who shared similar concerns such as Messiaen and Xenakis, made effective use of this to create large-scale works.

However, I find this approach unsatisfactory because it doesn't solve the problem of monolithic structure, but merely juxtaposes multiple monolithic sections. In atonal music the effect can be stark and arbitrary sounding, one durational container filled with harmonically static material supersedes another filled with different but equally static material. A series of discontinuities are connected to create continuity. The limitation is that the music operates at two distinct levels at opposite ends of the spectrum: the very large (durational containers) and the very small (the material). With atonal music especially, the material generally bears no audible relation to the structure that it delineates beyond differentiating proportions, so the two exist on separate planes, with no potential for ambiguity or overlap. To borrow Schenkerian terminology, the music consists of foreground and background with no middleground.[11] There is, of course, an inherent and purposeful separation in atonal music between pitch and duration, indeed the decoupling of musical parameters was one of the major innovations of serialism, but as a result the various links that enable middleground groupings are weakened or absent.

However, using tonal found material, and leaving it intact enough to allow groupings to remain audible, means that the middleground is automatically restored. The relationships contained therein encode information at multiple interdependent levels, with much potential for further entanglement after being subjected to processing. I thus began to see how I might create structures using durational containers and thus avoiding the monolithic problem, whilst also maintaining the complex multi-layering of the middleground.

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[10] John Cage, *Silence* (Marion Boyars, 1973), p.54

[11] The grouping of individual notes into cells, motifs, phrases, and up to the various sections of a structure

My aim, therefore, was to develop methods for creating change within a composition without undermining the ambiguities that were a vital part of my work. Because of this, I felt it was important to retain and expand upon my method rather than discarding it totally. Initially, I experimented with using different source material to delineate sections, for example, "Section one: *Bach*; Section Two: *Beethoven*". But this proved unsuccessful because I was applying the same process (superimposition and transcription) to both, so the results were (surprisingly) very similar. Bach and Beethoven's music are recognisably, qualitatively different, but 'Processed-Bach' and 'Processed-Beethoven' are categorically similar. I soon realised that the process was as important as the material it was applied to, if not more important.

A musical system is defined by the limits of its parameters. A composition's tempo parameter, for example, is defined by the minimum and maximum allowable tempo within that composition. I started to consider the implications of this, and how it might apply to the question of creating change within a piece:

- How far could a system be transformed before it was no longer recognisable?

- At what point would it break down, or coalesce into, another type of system?

- Where are the points of contact, or pivots, between these different systems, and would they create interesting friction when contrasted?

- In other words, at what point does quantitative change become qualitative?

Ultimately, I came to the conclusion that to create contrast within compositions I would need to exaggerate the difference between sections more than I had been previously, by noticeably altering the parameters that defined the material (or musical 'system') within each section. To give each section an individual identity, I could either vary one parameter in an extreme way, or multiple parameters at once, as long as it created an audible difference. In addition, the limits of the parameters would need to remain relatively stable within each section, to allow time for each new change to establish itself. Indeed the more stable and therefore attenuated a particular

section, the greater the impact of change would be. The final piece in my portfolio, *Toward a more American style,* was largely an attempt to tackle these issues.

Collage and Found Material

My work is fundamentally rooted in the creation of collages from pre-existing musical 'found material'. In this section I will elaborate in general terms on why I choose to compose this way and the issues that arise as a result, and more specifically, on how and why I choose source materials. I will then present examples of other musicians who use collage related techniques that have influenced my work. By situating my work within a wider context, I hope to demonstrate the ways in which it represents not only a continuation of earlier lines of development, but also a form of opposition to dominant paradigms in contemporary classical music.

Initially, my decision to utilise collage as a compositional technique was guided by pragmatic as much as purely aesthetic considerations. In the light of a perceived lack of traditional composition training, I used instead the skills I had gained from producing electronic dance music. My experience is related to Jungle (a.k.a Drum and Bass), a genre of music that is constructed from multiple superimposed digital 'samples' of pre-existing recordings, essentially a form of collage. The aim was not only to utilise my technical knowledge but also to apply a similar attitude to music making from this vernacular genre to Contemporary Classical Music, thus retaining characteristics such as:

- Its rough and ready, contingent quality; a sense that the music has been thrown together from whatever material came to hand

- Its hybrid nature, resulting from the combination of samples taken from a variety of distinct musical genres

- Its multivalent quality, manifest in polyrhythmic, polytempic, polytonal aspects

- Its sense of relentless, insistent continuity, in combination with a tactile physicality

These characteristics are facilitated by, and at least in part result from, the use of collage techniques.

Jungle tracks are assemblages of disparate materials that, vitally, maintain an inherently 'messy', 'dirty' quality. The perceived energy level of a track, its visceral impact and rhythmic flow (colloquially, the 'vibe') take precedence over received notions of technical perfection; for example, mainstream commercial standards of sound quality. Moreover, not only is 'dirt' retained, it is foregrounded and thereby contributes to the music's impact. I will return to the topic of Jungle, but for now suffice to say that my PhD work has been informed by the experience of music making in which incongruity and inconsistency is central.

More generally, I would argue that such inconsistencies are not only inherent in the use of collage techniques, but also are indicative of the broader aesthetic implications of collage as a paradigm, one that creates (or reveals) a dichotomy between two distinct conceptions of what a composition can be:

1. A self-contained system, organised according to a single overarching logic, involving some kind of organic development ('from within')

2. A collection of separate musical 'objects', or multiple self-contained systems each organised according to their own logic, placed together in the same space ('from without')

In the former, more 'traditional' conception, compositional unity is achieved by deriving all material from a central kernel (a melodic theme, tone row, or generative musical process). In the latter, it is necessary to re-evaluate the very notion of unity as I will discuss in more depth below, but clearly a central factor will be the question of which materials are chosen and why.

Choosing Source Material (or Information Content Revisited)

I have described how I initially chose source material[12] on the basis of information content, and that material with low content tended to produce the most successful collages[13]. However, I will now clarify the ways in which my definition of what constitutes musical information has developed over the course of the PhD, progressing from a simple descriptive account of external acoustical properties, to a more complex consideration of the internal *relationships* between the material's various parameters. In addition to such 'purely musical' information, I have also begun increasingly to take account of extra-musical information, so-called 'cultural baggage'.

1. 'Purely Musical' Information

Given that I use audio recordings as source material as opposed to notated scores, working directly with sound as opposed to its symbolic representation, it is perhaps not surprising that the acoustical properties of these recordings were my initial area of focus. Parallels can be drawn with Pierre Schaeffer's research in the field of *Musique Concrete* during the 1950's and 60's. In his text *Traité des Objets Musicaux* (1966), Schaeffer created an all-encompassing typological and morphological classification of sounds, in which external characteristics (volume, duration, dynamic envelope,

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[12] For ease of reference, the source material I used was:

- *Canpiom:* Thomas Campion Lute Songs
- *Quartut:* Beethoven String Quartets (slow movements)
- *Untitled 1, Untitled A:* Beethoven Violin Sonatas
- *This Moving with Respect to That:* J.S.Bach, Fugue no.8 from WTC Book One
- *Toward a more American style:* M.Aufderheide, *Dusty Rag*; Brandy, *Long Distance*

[13] The parameters were:

1. Low rhythmic density
2. Sparse instrumentation
3. Simple gestural language
4. Harmonic stability

timbre, etc) were catalogued to facilitate the grouping or juxtaposing of similar or dissimilar sounds respectively, thereby defining the scope of possibilities for a new syntax of acousmatic music.

Indeed, I applied similar criteria in choosing which 'sound objects' I was going to use as source material. A central concern was that they should exhibit a critically low density of information, which I defined in terms such as 'events per second'. However, this is a rather one-dimensional way of describing music, because it focuses on external characteristics and fails to take account of the patterns encoded *within* the musical material that are dependent upon relationships between notes and parameters. As I became increasingly aware of the importance of these relationships, I gradually made a mental shift from thinking of material simply as 'sound objects' to 'carriers of meaning', and it thus became clear that the source material best suited to my purposes in fact tended to be that which had a very *high* information content, using the expanded definition of that term. I found that a useful distinction is drawn between complexity and complication, which mathematician Ian Stewart illustrates by comparing 'the text of Hamlet (complex) and a table of random numbers (complicated)'.[14]

With this in mind, it is clear why the use of Bach and Beethoven (and to a lesser extent, Campion) as source material proved successful for my purposes. Their music is highly complex, and I would argue that this is manifest in two key ways:

1. A high concentration of information within individual musical parameters, combined with:

2. A high degree of interconnectivity between parameters

To give a concrete example, a melodic line extracted from a Bach fugue will have a strong individual and autonomous identity that is melodically and harmonically logical, and yet it will simultaneously perform various functions within the wider contrapuntal and harmonic context.

[14] Ian Stewart, *Does God Play Dice?* (Penguin, 1997), p.369

Specifically, musical information is concentrated within the fundamental parameters of pitch and duration, exploiting relationships inherent within the tonal hierarchy to shape musical discourse, as opposed to relying on surface effects. The centrality of pitch and duration is a common characteristic of my chosen material, and is reflected in various ways in its instrumentation, dynamics and counterpoint.

Instrumentation

A composer's attitude to instrumentation reflects their priorities with relation to the fundamentals of pitch and duration. For example, if an orchestral piece is performed in piano reduction, it makes clear the extent to which the musical discourse is dependent on specific instrumental timbres or textures. In the case of Campion's songs, leaving aside the issue of the words, the rhetoric would remain unaltered if performed on other instruments, by violin and piano as opposed to voice and lute. As for Bach, the open instrumentation of *The Art of Fugue* is a clear indication of his priorities, different performances with varied instrumentation achieve a different balance of contrapuntal strands, but the essential rhetoric remains unchanged. The relational aspects of Bach's music are of central importance, and these are communicated by pitch and duration.

Beethoven uses instrumental colour to underscore important gestures and illuminate contrapuntal complexity, as evidenced by the opening chord of the final movement of his 9th Symphony, and the build up to the first vocal entry; but again, the rhetorical force of the dissonant chord would certainly not be undermined in piano reduction, and neither would the momentum of the successive layers of counterpoint be diminished. These gestures are not dependent on superficial timbral effects, but rather, derive their impact from their context, which is dependent upon melodic, harmonic, polyphonic and temporal interrelationships.

Dynamics

Dynamics tend to be similarly subservient to the role of pitch and duration in each case. Bach and Campion's music generally makes very little use of dynamic shifts, (no doubt partly due to the state of contemporary instrumental technology) and performing their music in a different dynamic register has minimal impact on the logic of their musical discourse; as long as the pitch material remains audible, the 'meaning' is not fundamentally altered.

Beethoven clearly makes greater use of the wider dynamic range available to him, exploiting extreme contrasts as a rhetorical device; however, if these contrasts are removed or flattened out (using computer sequencer MIDI playback, for example), the music is not rendered illogical. The rhetorical gestures are defined as much by strategies involving durational proportions (such as repetition) that function independently of dynamic shifts.

Counterpoint

Counterpoint, by definition, enacts an interrelationship between multiple strands of linear pitch material, and additionally, successful contrapuntal writing demands control of the durational proportions of these lines to allow the separate strands to be heard in the midst of the polyphonic texture. Therefore, music that utilises counterpoint as a central part of its construction inherently prioritises the interdependence of pitch and duration.

The use of fugue is obviously a central facet of Bach's compositional practice, and moreover he has a particular facility in balancing the demands of linear melodic writing and vertical harmony. The individual strands of the texture each have their own specific melodic identity and a high degree of apparent autonomy, while simultaneously integrating seamlessly into the totality.

Counterpoint similarly plays a central role in Beethoven's work, especially in his late period. In contrast to Bach, rhythm achieves a higher degree of autonomy in relation

to pitch material, the constant quaver and semiquaver motion that characterises Bach's *moto perpetuo* approach being replaced by rather more variegated rhythms used to define the gestural profile of thematic material. This increased autonomy implies a higher degree of specificity of rhythmic information in Beethoven's music, illustrated by imagining the degree to which the opening of his 5th Symphony would remain recognisable if the pitch material were removed, played on non-pitched percussion for example.

Within the confines of the particular stylistic demands of their own musical eras, both Bach and Beethoven used contrapuntal techniques to compose music in which individual parameters exhibit a maximum level of autonomy in conjunction with a deep interconnectivity. The result is a complex web made up of multiple strands of tangled information, and this is an important reason why I chose their music as source material. I too feel myself to be engaged in a kind of 'meta-polyphony' in the process of superimposing and editing multiple strands of found material. With this in mind, the choice of Campion's lute songs is also logical, despite a comparative lack of contrapuntal complexity (the lute accompaniment generally simply doubles the melody, and provides or amplifies the harmonic context), they are at least linear and thus create a web when combined.

The Limitations of Timbre

Pitch and Duration are not only the most fundamental musical parameters, but also in a sense have the greatest potential for abstraction, in that they are not 'tied' to a specific sound to the degree that timbre is. Of course, it is possible to group together different types of timbre into abstract categories, as per Schaeffer, but I find music that attempts to construct a discourse based on timbral interplay tends to have a distinctly arbitrary quality, due to the weakness of the relationships that can be formed.

The music of Helmut Lachenmann (b.1935) is an illustration of this, founded as it is on highly nuanced variations in timbral quality, resulting from the physical action required to produce those sounds instrumentally. Lachenmann's music often exhibits

a comparatively simple rhythmic profile, as exemplified in *Accanto* for orchestra (1975), which consists of a binary rhythmic opposition between sections of *sensa measura* and sections characterised by a repeated pulse. Such a simple framework is not only necessary to allow subtle timbral variations to be perceived as the intended focus of attention, but in addition anything more sophisticated would obliterate a discourse that operates on such an attenuated plane. Lachenmann's pitch material is similarly basic and generally highly fragmented, at least in part for the same reason.

Briefly, it may be worth considering why timbre appears so fragile a phenomenon in comparison to pitch and duration. As Karlheinz Stockhausen recognised, duration, pitch and timbre are not in fact qualitatively separate phenomena but rather, points along a quantitative scale of values representing vibrational intensity. Rhythm is at the low end, pitch in the middle, and timbre at the top, each parameter emerging from that which preceded it.[15] According to this paradigm then, timbre is simply a position on a scale of values, albeit the furthest away from the supposed fundamental vibration level, so its supposed fragility tells us more about the limits of human perception than anything objective about the nature of timbre itself.

However, my feeling is that the reality of the limits of our perceptive faculties denies timbre the kind of representational abstraction afforded by pitch and duration. One can imagine a grid representing pitch (y axis) and duration (x axis), and a note, or group of notes such as a melodic line outlining an abstract shape within this grid. Music that is concentrated on pitch and duration is focused on the shapes thus represented, which are at least as important as the actual sounds used in the representation. Chess provides an analogy here, in that it does not have to be played with specific objects, but rather can use any objects with agreed upon functions. The chessboard is a bounded space (both physically and in terms of the rules of the game) within which an enormous number of different games of chess can be played, but it is the relationship between the objects on the board, not the objects themselves that matter.

[15] Stockhausen exploited this realisation to compose *Kontakte* (1958-60) for piano, percussion and electronics.

Malleability

To recap, the characteristics I have found to be important in source material are:

1. A focus on pitch and duration (fundamental parameters)

2. A specificity of information in multiple parameters (autonomous identity); in combination with

3. A high degree of interconnectivity (relationships between parameters)

These characteristics combine to create material with a particular combination of solidity and flexibility, which is therefore very malleable and has a high tolerance for the distortions of compositional processing. The density and complexity of the material means that a lot of information can be removed without destroying its original momentum, continuity or even rhetorical logic. The material doesn't fall apart easily under processing but rather, maintains its identity, if only subliminally. In addition, when the material is recontextualised, for example when placed in a non-tonal harmonic context, it not only holds together on the strength of its interconnections and relationships, but as the relative strengths are altered new pathways are created or revealed that were implicit in the original.

Such malleability is certainly not common to all material. Indeed, the extraordinarily high tolerance for processing of Bach and Beethoven (and, to a lesser extent Campion) was thrown into sharp relief when compared with the results of applying similar processes to various forms of contemporary Pop music. After trying a number of experiments with very mixed results, I became aware of how much less robust Pop music was as material, because it tended to collapse very quickly under the weight of my musical processing and become uninterestingly nonsensical, a collection of unrelated atomised sounds. In addition, the possibilities for recontextualisation and recombination were far more limited. In general, the material didn't seem to be as conducive to the same kind of 'melting' and 'morphing', or at least, certainly not to the same degree. I came to the conclusion that this is due to the fact that the information contained within the fundamental parameters of pitch and duration is less

complex, in terms of its harmonic implications, level of gestural ambiguity and interconnecting relationships. Rather, much of the information is focused in other areas such as production values (reflected in timbral considerations), subtle gradations of rhythmic swing and so on. But often, certainly with badly written songs, when the decoration is stripped away the underlying framework is revealed to be not just simple, but simplistic. If a song can be reduced to a single chord progression, and the melody doesn't transcend this progression but simply reiterates it, then the music has a tautological quality. The potential for relationships between parameters is low, because source material is essentially a single idea or riff, musically amplified or orchestrated; if there is no second layer to relate to, the necessary friction between parameters, or planes of logic, cannot exist.

2. Extramusical Information

Of course, I did use various forms of popular music as the basis of *Toward a more American style*, and in this case the source material didn't collapse under processing as described above. But this is largely because I purposefully didn't process it too aggressively, and allowed it to largely remain audibly intact. I then compensated for the lack of resulting ambiguity by juxtaposing starkly differentiated types of rhythmic process and by exploiting the timbral disjunction between the Disklavier piano and electronic sounds to structural ends.

In fact, the pop music material I used exhibits superficially similar 'purely musical' characteristics to those described above. Both the ragtime material and Brandy's *Long Distance* have little or no variation in dynamics; the ragtime material also has, at least theoretically, the potential for open instrumentation, as the musical information it contains could be communicated equally well via mechanical organ, or string quartet arrangement. However, these characteristics are not the result of a focus on the fundamental parameters, but rather are largely due to a combination of technical limitations and commercial considerations inherent in popular music that encourage a level of standardisation. The individual identity of parameters is far less pronounced, and the interconnections between parameters (the implied equality of parameters) present in Bach and Beethoven are much reduced. On the contrary, harmonic and

melodic pitch material is subservient to rhythmic syncopation (in the case of ragtime) and timbral concerns or production values (in the case of *Long Distance*). In short there is a comparative lack of 'purely musical' information. However this is compensated for, to a degree, by extramusical information. The act of choosing material on this basis is increasingly becoming an important part of my practice.

Extramusical information implies a connection between music and society. All music is a product of the context in which it was written, although of course it is necessary to question how this manifests itself, and whether it can be said to be audible in some sense. It seems to me that musical material inevitably communicates something about its original context, but that it is very hard to be precise about what this might be. Given this situation, how then might one exploit this compositionally, and how might the recognition of music's cultural 'embeddedness' have an impact on my compositional approach?

Conceptual Background

In the first instance, an increasing engagement with extramusical content represents a continuation of my use of non-musical stimuli as inspiration. The difference is that previously such stimuli have been ultimately unrelated to my material – Quantum Mechanics, for example, is not obviously related to Beethoven String Quartets (see *Quartut)* – whereas now the conceptual framework of a composition is derived from the material used in its construction. I feel this gives my work a more convincing identity, as opposed to such information being a more or less arbitrary addition.

An obvious consequence of considering musical material in its cultural context is to reflect the process back onto my own work. Thus, the extent to which it is a reflection of, or commentary on, the world as I experience it becomes a vital issue. This was a key reason behind my decision to use Pop music material in *Toward a more American style,* for example; it is a central part of the musical landscape at the beginning of the 21st Century, and outstrips Classical music (let alone Contemporary Classical Music) not only in terms of sales but also in terms of cultural relevance. The Beatles are an almost universal cultural reference point, but the same cannot be said of Boulez. In

addition, I enjoy and listen to various forms of Pop music at as much as Contemporary Classical music. Thus it seemed logical to incorporate it into my work.

Politics

One of the most obvious possible 'uses' of extramusical associations is the potential for making political statements. As an example, using folk music from a country perceived as repressed could be considered a show of support and solidarity. However, my feelings about this are mixed. While I accept that music making is probably inevitably always politicised, because music cannot be disconnected from the context in which it is written, I also feel that there is some truth in the notion of musical autonomy, and am acutely aware of the potential for oversimplifying musical content for the sake of making a political point. Indeed, to make an unambiguous political statement, it may be necessary for the music itself to be unambiguous, which undermines one of the aspects I value most highly.

More generally, I believe that it is important not to use extramusical associations and information as a substitute for writing music that is interesting or convincing in its own terms, but rather that they should be used to enrich a composition. Ultimately, I feel that a composition already implies a political position, by virtue of the fact that it acts as a particular type of reference point, a model of the world which can either be 'open' and inclusive, or 'closed' and exclusive; the material used, and its extramusical associations form part of this.

Collage

Having discussed the factors that affect my choices of source material, I will now return to the more general topic of collage, to provide historical context as well as considering the wider implications of the technique for my practice.

In the visual art of the Twentieth Century collage, and related practices such as photomontage and the use of found objects, occupy a central position. By contrast, collage composition was a short-lived trend that began in the 1960s, resulted in works such as Berio's *Sinfonia* (1968) and Stockhausen's *Hymnen* (1966), and soon petered out in the following decades. I believe that the failure of collage to become common musical currency can be attributed to a number of basic misunderstandings about its creative and conceptual implications.

A key motivation for the use of collage techniques was to move beyond the limitations of Serialism, by injecting pre-existing historical material into what was perceived as a hermetically sealed, abstract system, and thereby reinvigorating the resulting compositions. However, despite superficial innovations such as 'shocking' stylistic juxtapositions and a greatly expanded soundworld, this strategy did not result in a fundamental paradigm shift. In practice the material changed but the system used to organise it remained the same. Many composers still used Serial principles to integrate their new materials into an internally coherent, consistent totality,[16] thereby disregarding the implicit refusal of totality implied by the use of collage, an approach that suggests a wholly different model of composition based on assemblage of disparate materials.

[16] It is worth noting, however, that Serialism is not an inherently totalising system, but rather depends on how it is used by the composer in question. Serialism certainly has the potential to be used more loosely, for example, as a method of generating or proliferating material that is then structured more or less intuitively, or indeed as part of a collage of disparate materials.

I would argue that the drive towards integration, consistency and compositional unity is a central priority in much Western Art Music, including contemporary music, and that this can be discerned in two key ways:

1. Structure

Defined broadly, to include both the construction and, by implication, conception of the work in question. The 'traditional' paradigm is manifest in works that create an impression of being self-contained: fixed and 'closed' as opposed to flexible and 'open'.

2. Material

Specifically, the attitude towards material implicit in a composition: what material is used, and how it is treated. These choices reveal the aesthetic priorities of the composer in question. Traditionally, 'acceptable' material is either (a) original, i.e. created from first principles (a tone row, melody or chord progression) and treated as the kernel from which the rest of the work is derived, or occasionally (b) pre-existing material, in which case it is seamlessly integrated into the composer's personal style.

Influences

By contrast, the music that has most directly influenced my compositional aesthetic is that which questions this traditional paradigm, and pursues an alternative conception of musical organisation that not only uses collage (or collage related techniques) in some way, but also engages with the implications of this usage. In addition to the musicians involved in Jungle,[17] this includes the composers Charles Ives (1874-1954), John Cage (1912-1992) and Michael Finnissy (b.1946). Specifically, I am interested

[17] A brief list of important influences is as follows,
Producers: *4hero, Photek, Dillinja, Lemon D, Goldie, Jonny L, Total Science*
Record Labels: *Shut up and Dance, Reinforced Records, Metalheadz, Prototype*
DJs: *Grooverider, Randall, Kemistry and Storm*

in works created from juxtaposition or superimposition of materials not obviously formally related, that utilise this technique as a guiding structural principle and thereby create an impression of being an assemblage of objects rather than a construction from first principles.

A central implication of this approach is the refusal of totality and a consequent avoidance of 'closed' systems, manifest in the following ways:

- A propensity for structures that are (or create the impression of being) open-ended, flexible, contingent or unfinished

- An inclusive attitude to material (musical and extramusical), utilising a wide range of sources

- Material is treated (or processed) 'honestly': allowed to retain a degree of its original identity, or engaged with on its own terms rather than being subsumed into a composer's style

- By extension, the foregoing implies acceptance of the inevitability of rupture; furthermore, this is not merely tolerated but embraced and foregrounded

Charles Ives

Ives's *Symphony No.4* (1910-16) is an archetypal embodiment of the characteristics listed above, most obviously in its inclusivity of material. It incorporates not only a very wide range of borrowed tunes from both 'high art' and 'low' or vernacular sources, but also reworkings of Ives's earlier works (*The Celestial Railroad*, and *1st String Quartet* are re-used as the basis for the second and third movements respectively). In addition to this, the work utilises a variety of tonal possibilities (from common practice tonality, through bi- and pan-tonality to atonality, via quartertone inflections), instrumental combinations, textural contrasts, and compositional processes. The field of musical action is thus as close to all-encompassing as Ives was capable of rendering it.

This multiplicity and simultaneity leads, on the simplest level, to perceptual overload. Burkholder writes, 'There is too much in it, too many things to grasp all at once. That is its point, for it represents events that cannot be fully comprehended or described, only experienced'.[18] Indeed, the function of this high density of information is not merely to create visceral excitement and superficially shocking effects, but rather to represent a model of Ives's experience of the world. In fact, the word 'represent' is inadequate, as it implies a separation between the thing represented and the thing in itself, whereas, according to John Cage, this work demonstrates Ives's 'tendency toward blurring the distinction between art and life'.[19]

Art becomes more like the subjective experience of reality when it creates an impression of contingency and irresolvability, as opposed to an arbitrarily formalised sense of closure. In practice, this often means purposefully *avoiding* closure, as illustrated by Ives's endings: the first movement avoids harmonic closure by ending on a repeated subdominant chord, the second avoids rhetorical closure by petering out without a concluding gesture, and the finale ends in a highly ambiguous manner with quiet, non-pitched percussion playing relatively arrhythmic material. The third movement is an exception, a 'textbook' tonal fugue that resolves according to traditional expectations (albeit on a plagal rather than a perfect cadence). However, the seeming anomaly of this movement in fact ensures the overall ('life-like') inconsistency of the symphony as a whole, through its refusal to conform to the stylistic expectations set up by the rest of the work.

A typical Ivesian strategy is to create literal, narrative depictions of the real world as defined by his subjective experience, including nostalgic memories of specific events. Of the *Holiday Symphony* (1913), he writes that the first three movements are 'but attempts to make pictures in music of common events in the lives of common people (that is, of fine people), mostly of the rural communities'.[20] This is undertaken honestly, in the sense that the chaotic aspects of remembered events such as the barn

[18] J. Peter Burkholder, *All Made of Tunes* (Yale University Press, 2005), p.409

[19] Richard Kostelenatz, *John Cage* (Praeger Publishers, 1970), p.19

[20] Charles Ives, *Memos* (Calder and Boyars Ltd, 1973), p.97

dance depicted in *Washington's Birthday* are not idealised or smoothed over, but rather are foregrounded; unintentional performance mistakes are incorporated as poor counterpoint, awkward harmonisation, and rhythmically uneven bars and phrases. This decision to embrace the roughness of everyday experience is a defining characteristic of Ives's music, one that is not only aided but also implied by the use of collage, and its inevitable ruptures.

The honesty of Ives's approach can also be perceived in his treatment of material, specifically his willingness to allow borrowed materials to retain their original identity, rather than automatically transforming them to fit into a pre-existing compositional style. By contrast, Robert P. Morgan gives the example of Berg's *Lyric Suite*, in which 'the reference to the opening of the *Tristan* prelude…passes almost unnoticed, so seamlessly is it embedded in its environment'.[21] Of course, for Ives a degree of audible recognisability is necessary if material is to perform its intended function of symbolising or evoking specific events or eras; in addition, the degrees of mediation applied to material create a continuum from recognisable to unrecognisable. But Ives's type of 'blatant and undisguised employment of traditional tonal music'[22] is surely unprecendented, and certainly runs counter to the aforementioned 'traditional' drive towards integration of materials that I have claimed is central to much Western art music, including 1960's collage compositions.

John Cage

'I think daily life is excellent and that art introduces us to it and to its excellences the more it begins to be like it'
p.75, *Conversing With Cage* – Kostelanetz

In many ways, John Cage's musical aesthetic is a continuation of ideas inherent in Ives, embodied in a similarly inclusive attitude to material, and an attempt to blur the

[21] Robert P. Morgan, *Twentieth Century Music* (W.W. Norton and Company, 1991), p.410
[22] ibid., p.410

boundaries between life and art by maximising the contingent and open-ended aspects of his compositions. But Cage greatly expands the scope of this conception; firstly, by incorporating all sounds as material, not just musical sound, and secondly by moving even further away from traditional formal rhetoric. Narrative and focused directionality are eschewed in favour of setting up situations that simply start and stop at an allotted time, during which the specific details are indeterminate and maximally flexible within the limits of the parameters established beforehand. This preference for contingency is clear when Cage describes *Concert for Piano and Orchestra* (1957-58) as a composition inherently ''in progress', which I intend never to consider as in a final state, although I find each performance definitive'.[23] This does not imply a 'Boulezian' project of constant revisions, a need to create perfect works, but rather an open-minded acceptance of whatever occurs in performance.

Many of Cage's works can fairly unproblematically be described as collages, such as *Williams Mix* (1952), *Variations II* (1962), *Hpschd* (1969), and the later *Europeras* (1987-91). They are constructed from the juxtaposition and superimposition of largely pre-existing materials, and the results exhibit an overwhelming degree of multiplicity and simultaneity, an 'aesthetic abundance'[24] familiar from Ives. This creates a similar effect of perceptual overload, high-density events to be experienced rather than fully comprehended, scrutinised randomly by the ear, rather than forced into an artificial narrative scheme. After the 1950's Cage extended the 'life-like' quality of his music by moving towards greater levels of flexibility, specifically by allowing for indeterminacy of sounding result. Composing for radically open instrumentation, sometimes literally any sound producing means, ensured the impossibility of total closure and resolvability.

The manner in which this indeterminacy is organised increasingly influenced my own compositions. It is a common misperception that 'anything goes' in Cage's music, but it would be more accurate to say that anything goes, within the limits of highly flexible boundaries. A central element of Cage's compositional strategy is the notion of categorisation; for example, the materials used to create *Williams Mix* are classified

[23] Richard Kostelenatz, *John Cage* (Praeger Publishers, 1970), p.131

[24] ibid., p.19

into six categories: 'country sounds, electronic or synthetic sounds, city sounds, wind-produced sounds and sounds so small they required amplification'.[25] In works such as the *Europeras*, material is chosen on grounds of genre, guaranteeing a level of stylistic consistency despite the fact that the specific material used will differ in each performance. Cage employs indeterminacy as a means of ensuring contingency, but in practice the categorisation process creates a kind of formal stability, by grouping multiple instances of similar material and presenting them simultaneously. This clearly resonates strongly with my own approach. As discussed at the beginning of the commentary, I am interested in the relationship between the general and specific that is implied in such situations. The importance of Cage's music is that it encouraged me to re-consider the nature of this relationship with regard to the role of material in my own work, by demonstrating that the *type* of material, and its function within a larger totality is as important as the external characteristics of that material. This realisation led to a more nuanced understanding of the nature of musical material, and the complex set of interactions that it exhibits with both its own formal characteristics, and the structural framework into which it is placed.

Michael Finnissy

Despite being broadly sympathetic to Ives and Cage, the music of Michael Finnissy maintains a wholly distinct identity, in part by virtue of a more acutely focused form of engagement with found musical materials, and their associated historical-cultural-personal 'meanings'. One of its defining characteristics is its capacity for utilising 'European' strategies of critical dissection and deconstruction in combination with the inclusive, open-ended priorities of the 'American' experimental tradition. In practice, it is constructed using a wide range of materials that are organised using a variety of technical means, but the overarching context is guided by what Finnissy has described as 'my musical 'philosophy', quite home-spun', explicitly dependent on precedents in the visual arts such as 'the 'found object', 'montage', 'collage', 'assemblage', 're-make' and various other sort of critical re-appraisal and usage of our past.'[26]

[25] Richard Kostelenatz, *John Cage* (Praeger Publishers, 1970), p.19

[26] Michael Finnissy, *Grieg Quintettsatz* Programme note (2007)

Structurally, many of Finnissy's compositions are created from the juxtaposition of 'block-like' sections, creating an effect similar to film montage in which 'it is the nature of the juxtaposing which alters one's sense of the whole'.[27] For example, *Anima Christi* for solo singers, choir and organ (1991, rev.2002), is made up of various different choral archetypes, texts set to historically appropriate music:

- Excerpt from the didache, Teaching of the Twelve Apostles 2nd Century:
  ('distant sopranos' singing heterophonically over organ drone or cantus firmus)

- '*Anima Christi*' 14th Century Anonymous devotional prayer:
  (solo alto or tenor singing modal monody over organ drone or cantus firmus)

- '*Easter*' by George Herbert:
  (tonal a cappella homophonic setting)

- (These are interspersed with passages of solo organ playing superimposed Bach chorales, a kind of messy, non-tonal polyphony.)

There is no attempt made to achieve a smooth transition from one type of material to another, in fact the transitions are often purposefully 'artless' and rough, highlighting the rupture inherent in the process. However, the very consistency of this seeming artlessness shows it to be a purposeful strategy. On a 'purely musical' level, it allows the formal sections to be more easily perceived, drawing attention to the proportions of the piece, and in the process exploiting the audibility of structural rhythm as part of the compositional rhetoric. This is most effective if the structural proportions are not only audible (achieved by the distinct stylistic identity of the material contained within) but also memorable, hence the unexpected contrasts and foregrounding of 'wrongness', such as the organ entry on page 17 of the score, whose tangled rhythmic complexity and harmonic ambiguity is particularly awkward in the context of the preceding tonal, homophonic a cappella singing (and also exploits the detuning inherent in a cappella singing by contrasting it with the organ's inflexible tuning).

[27] From e-mail correspondence, November 2011

A further consequence is that material is constantly being recontextualised, placed into a broader field of musical action than it inhabits in isolation. The possibilities for musical movement are more open, and the boundaries of the organising system harder to discern. In addition, this encourages us to make comparisons between different types of material. Similarities and differences are thrown into relief, and connections thereby implied. This recontextualisation is the result of a relatively simple process, and yet it dramatically alters the way we 'read' the material in question. It can simultaneously have a very stable identity (largely defined in stylistic terms: rhythmic-melodic-gestural profiles, instrumentation, texture, etc), and also appear highly unstable (due to the expansion of musical possibilities mentioned above). The material seems as if it *could* move in any direction, and the fact that it mostly *doesn't* imbues the material with potential energy.

This disjunction between outward simplicity of means and semantic ambiguity is a fundamental characteristic of Finnissy's music that has deeply affected my own compositional aesthetic. As *Anima Christi* illustrates, this applies not only to process but also to structure and material; its structure is both clearly audible and memorable (although the characteristic open endings point act as a clue to the underlying ambiguity) and much of its material is monodic melodic writing, a recurring feature of Finnissy's music that demonstrates his preference for simple materials in which the technical apparatus is entirely audible. However, such use of simple and direct means can create a cumulative sense of cognitive dissonance, because it implies the possibility of comprehensibility, whereas in fact the totality is ultimately elusive and ungraspable. I don't perceive this as being a purposefully obfuscatory tactic, so much as an honest reflection of reality as subjectively experienced.

Jungle

During the 1980's a number of new genres of electronic dance music were created such as Hip Hop, Electro, House, Garage, and Techno. In Britain at the turn of the 1990's, elements of all these different styles were combined to produce a hybrid genre that came to be known as Jungle, and later Drum and Bass. Producing Jungle is a central part of my musical background (see Appendix 3), and has thus defined my compositional approach.

Jungle is a form of collage created from multiple digital 'samples' of pre-existing records. Breakbeats from Funk, Soul and Hip Hop records (and other Jungle records) are speeded up and combined with other sampled and purely electronic sounds. One of Jungle's innovative and defining characteristics was precisely its inclusivity with regard to the diversity of samples that could be utilised in its construction. In the context of electronic dance music as a whole, Jungle was the genre open to the widest range of possible sounds, and could comfortably incorporate samples from many other forms of recorded music, as well as 'real world', or 'concrete' sounds. This was due in part to its rhythmic multivalency that enabled it to act as a comparatively loose and open framework. Despite the inevitable 4/4 time signatures and invariable computerised tempo, it was much less explicitly tied to an underlying pulse because it lacked the repetitive kick drum on every beat common to other genres. Rather, it was constructed from multiple layers of rhythmically independent drum patterns.[28] In addition to weakening the sense of a regular pulse and downbeat, this created polyrhythmic complexity that heightened rhythmic ambiguity. In addition, early Jungle was inherently polytempic, as half speed basslines derived from Reggae and Dub combined with double speed drums.

Jungle musicians tend to have a pragmatic attitude towards musical material, choosing samples and sounds on the basis of their generic function as much as their

[28] This is especially true of tracks written in the early and mid 1990's. Since then, the less sophisticated 'two-step' drum pattern is increasingly ubiquitous, with the snare on beats 2 and 4, and kick drum on beats 1 and 3½.

specific qualities. Pre-existing samples often remain audibly recognisable, but are nonetheless altered through recontextualisation; the sound of the sample may not change, but it will likely perform a different role within the new context. There are many examples of this phenomenon, so I will simply pick a personal favourite, *All of my* (1994) released on Tom and Jerry records. This track lifts a 4 bar loop, short piano riff and the chorus from Genobia Jeter's RnB track *All of my Love* (1986) and uses them in its introduction section, with overlaid double speed breakbeats. The original source now acts as a memorable melodic hook, and its bright timbral quality creates an increased sense of contrast when it is suddenly removed to make way for the bassline's much darker timbre. The sample is chosen according to a set of musical priorities unrelated to its original context. It is simply a shortcut, a way of easily achieving a certain effect with whatever materials come to hand. In a sense, it doesn't matter what the sample is, as long as it performs its new function.

This 'no-nonsense' attitude to material lends the music a particular directness that I find to be relatively uncommon in classical music (the composers above notwithstanding). In addition, Jungle embraces the results of making music using collage techniques by foregrounding rupture, inconsistency and 'dirt', all of which are not smoothed over, but rather are highlighted and thereby exploited musically in various ways. Examples include stark juxtaposition of highly contrasted sections, unexpected interruptions and cuts, distorted sound quality, untutored polytonality (arising from the superimposition of multiple samples in different keys), unnatural vocal effects (high pitched 'chipmunk' effect, timestretching, looping a single note so it lasts longer than would be possible for a human to sing without stopping to breathe).

Conclusion

In this section I have discussed my reasons for working with collage and found material in more detail, and more generally have used 'collage' not only to describe a technique, but also as a marker for an aesthetic paradigm that questions traditional notions of integration and unity. Of course, in reality there exists not a dichotomy but a continuum. Mahler's music, for example, embodies a specific kind of tension

between the traditional drive towards organic integration, and the collage-like preference for rupture, inconsistency and open-ended irresolvability (for example, the *Abschied* from *Der Lied von der Erde*). By situating my own work within this continuum, and describing the currents and precedents that resonate with my own approach, I do not wish to be prescriptive (or proscriptive) about the 'right way' to compose; however, it is my feeling that contemporary classical music shows a general lack of awareness about the 'paradigm shift' that collage represents, and that much of it is therefore unquestioningly and uncritically organised according to traditional notions of unity and consistency that do not speak to my experience of contemporary reality.

SECTION TWO: ANALYSIS

Overview

The central aim of my PhD was to develop a method for translating my electronic collage work into an acoustic instrumental medium, creating scores intended for live performance. In this section I will describe my technique in more detail, moving from a general outline to analyses of individual pieces. The timeline of my development divides approximately into three yearlong periods:

1st Year: Experimentation

Initially, I had a clear idea of the instrumental soundworld I wanted to achieve founded on my electronic collage work, but only a vague sense of how I might practically realise it. I planned to continue using the electronic techniques I had previously developed in combination with transcription, translating the resulting music into notation. However, I hadn't yet defined the necessary processes, or just as importantly, the order in which I would use them, and this was my goal for the first year. I wrote a series of short, mostly unfinished pieces, trying out different approaches to find the most successful outcome.

I began by simply creating electronic collages as before, then transcribing them to notation. However, this proved to be unsatisfactory because the transcription and notation were not an integral part of the process but an afterthought, so my compositional method had not fundamentally expanded or developed, and therefore the resulting music suffered from the same limitations as the earlier work.

I also experimented with recording my own live performances using a MIDI keyboard connected to a computer sequencer, superimposing and editing multiple performances to create new compositions. This approach had one major advantage, in that by working with MIDI information rather than audio files, I was now able to edit the individual notes of my material, as opposed to simply juxtaposing and superimposing 'blocks' of sound. The piano piece *Classical Charade* (see Appendix 2) resulted from

this, constructed from performances of a selection of Beethoven Piano Sonatas chosen at random from within the complete set. The resulting texture was edited in *Logic* and then transcribed to notation. This approach was more successful, but I still felt that the transcription and notation stage was rather 'tacked on' at the end, as opposed to being integral to the compositional process.

Eventually, I realised that I should exploit the capacity of MIDI information to be transferred between different kinds of software. Material in *Sibelius* (notation software) could be transferred into *Logic* (sequencer software) and vice versa. Moving freely between the two I could utilise a mix of the different editing facilities each offered.

2nd Year: Consolidation

By the second year I had settled on a general methodology which I used to write a series of three finished compositions, *Canpiom*, *Quartut*, and *Untitled 1, Untitled A*. I described this method in general terms in section one, and I will now illustrate it in greater detail using *Quartut* as a case study:

1. Choosing Source Material

For *Quartut* I chose the CD *Beethoven, The Late String Quartets,* performed by the Lindsay String Quartet.

2. Superimposition

I 'imported' the CD's tracks into *Logic* as AIFF audio files, and superimposed pairs of recordings, listening for combinations with interesting characteristics. It soon became clear that slow movements combined most effectively, as they were more likely to merge and become 'tangled', due to slower rates of harmonic change and less clearly defined rhythmic identity and textures. By contrast the faster movements tended to remain audibly separate after superimposition due to the 'self-contained' nature of their rhythmic units and tutti gestures. After listening to the various

permutations of different combinations, I chose a single pair of slow movements: Op.127, 2nd Movement, and Op.131, 1st Movement.

3. Transcription

Having chosen my material, I then transcribed both recordings to a common tempo, in this case 72bpm, using the metronome click track in *Logic* as a reference pulse[29] (Track 1: Analysis Examples CD). I transcribed each recording separately, looping around one or two beats and then re-writing the rhythms of the original in relation to the click track (the pitch material was added afterwards, either transcribed aurally or copied from the score). My aim was to notate and thereby retain the rhythmic rubato of the original recordings in the transcriptions, and perhaps more importantly the rhythmic relationship between them; it was important to me to capture the specific rhythmic gestures and vertical harmonies that resulted from this combination.

I used *Sibelius* to create these transcriptions, and in the process would alternate constantly between it and the *Logic* sequencer, which I used simultaneously to playback and loop the audio recording. The finished transcriptions were then 'exported' from *Sibelius* as MIDI files and transferred into *Logic* for editing.

[29] The tempo of the click track was chosen with ease of transcription and eventual performance in mind, I tried to find a tempo that divided the source material into simple rhythmic units.

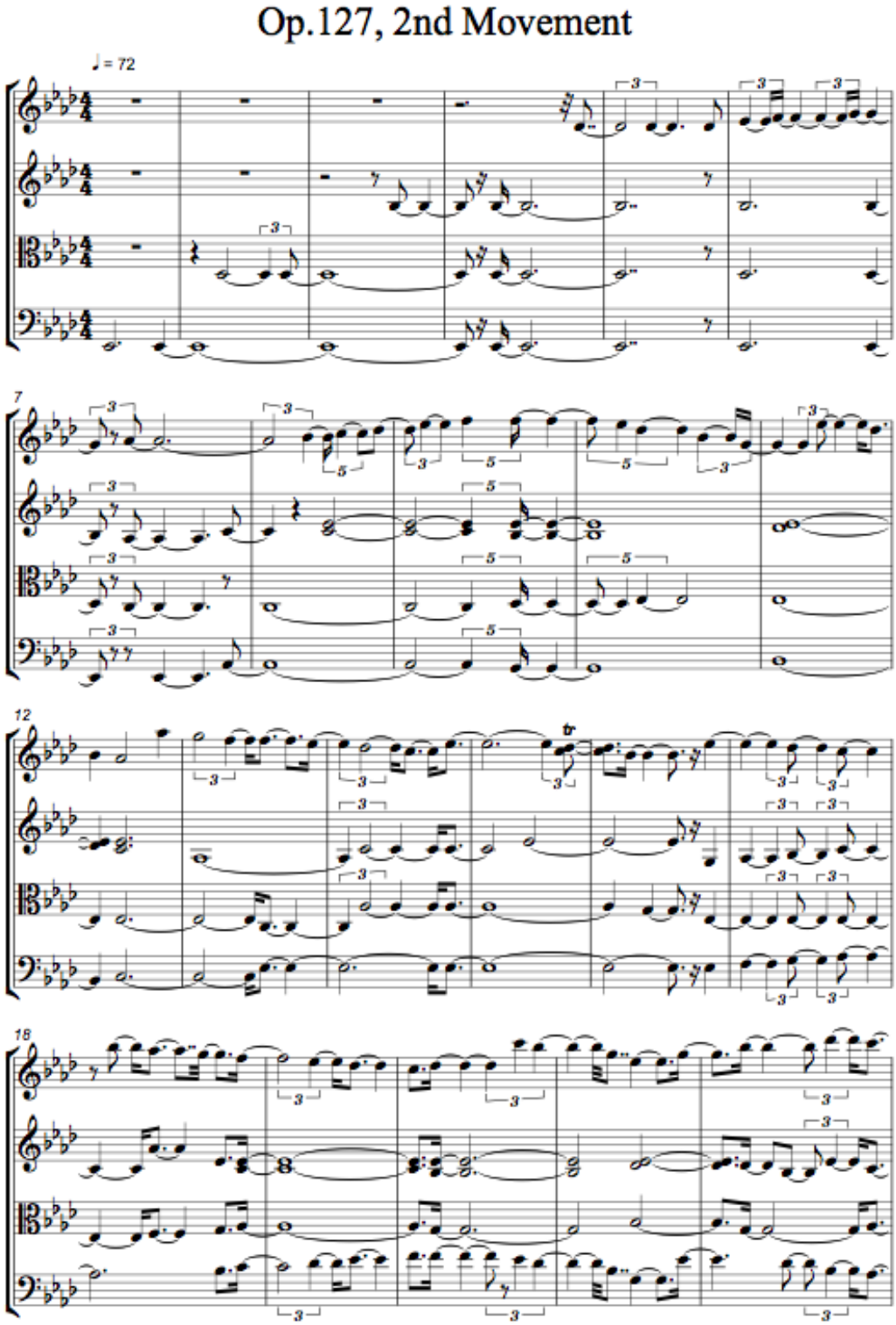


Figure 3: The first 22 bars of Op.127, 2nd Movement as transcribed in *Sibelius*

4. Editing

Figure 4: The same 22 bars as above, now transferred into *Logic* as a MIDI file, represented visually in the standard 'piano roll' format, a grid depicting time (x axis) and pitch (y axis, the piano keyboard). This was the format in which I edited material.

Working with the transcriptions as MIDI information in *Logic* I could edit the individual notes of my chosen material. The majority of the creative (as opposed to technical) compositional decisions are made at this stage, and the editing process was different for every composition. I will describe this stage in more detail in the individual analyses.

5. Notation

After completing the editing process, and therefore the composition, I transferred the edits made in *Logic* (erasure and transposition of notes, etc) to the *Sibelius* transcription, creating the final score. It is worth noting that during the editing stage in *Logic* I purposefully limited myself to using processes that could be easily transferred to the *Sibelius* transcription. For example, it proved much less complicated to erase or 'jump cut' an entire bar than to erase a single quaver in the middle of a bar. This is clearly restrictive, but in practice the benefits of working in this way far outweighed the time it took to do more complicated edits.

Further work was then needed to condense multiple parts into single lines, and to ensure that the final score and individual parts were practical, legible and playable.

3rd Year: Exploring New Territory

Having established my compositional method and used it to write a series of pieces, I felt that I had, to a degree, achieved the original aim of translating my electronic collage work into an acoustic instrumental medium. However, I was becoming increasingly frustrated with the time-consuming nature of the transcription stage. Converting audio recordings into MIDI data via transcription took many weeks, and this made the compositional process less enjoyable, and disproportionately skewed towards the technical, pre-compositional stage as opposed to the more creative editing stage. As a result of concentrating on the finer details of transcription, broader issues such as structure were inevitably sidelined.

There were a number of possible solutions to this problem:

- Reduce the amount of time spent transcribing

- Defer transcription to a later stage in the compositional process, after the broader creative decisions had been taken

- Remove transcription from the compositional process altogether

My aim now was to develop strategies to put one or more of these into practice.

Internet MIDI File Experiments

During my PhD I regularly searched the Internet looking for potential inspiration from other composers and musicians who use MIDI technology. The results were normally disappointing, but in the process I discovered a number of websites that store MIDI files of music freely available to download. I realised that I could

download these MIDI files and import them directly into *Logic*, thereby bypassing the transcription stage.

Sources of MIDI

There are many such websites storing thousands of MIDI files, often maintained by amateur musicians who either share their own computer sequenced compositions, or other composers' music of various genres. Many of these websites date from the era when slow dial-up modems were the only method of connecting to the Internet, and because these charged by the minute it was prohibitively expensive to download large digital audio files. Therefore, MIDI files were used because they are very small, even in comparison with compressed mp3 audio files, and were the quickest and most practical format for sharing music until widespread broadband Internet. Many of these early MIDI sharing websites are still online.

Continuing this research also led me to a number of websites hosting player piano-rolls converted into MIDI files. The player piano is an important pre-cursor to the development of MIDI technology and recorded music in a similar way, as a sequence of pitches and durations. In fact, the 'edit pages' of most sequencers are modelled on the piano roll, as can be seen in the *Logic* screenshot above. This connection was an attraction for me, and led me to use piano rolls in my final piece.

Implications

The original aim of working with pre-existing MIDI files was simply to make the composition process as fast and enjoyable as possible. Previously, the longwinded transcription process deflated my enthusiasm before the more creative editing stage, but now I could now try out ideas very quickly by loading a MIDI file into *Logic* without having to spend weeks transcribing. However, this increase in speed also had wider consequences for my practice. Firstly, it enabled me to see the areas in which I had become slightly dogmatic in my approach. For example, I had thought that it was essential to transcribe rhythmic rubato in precise detail to create my desired soundworld, but I found that superimposing two MIDI files and altering the tempo of

one in relation to the other creates a very similar effect in under 10 minutes. I no longer had to spend weeks creating material, and was thus able to devote more attention to wider structural issues, and to attempt to compose larger-scale works.

New Approaches to Rhythm and Tempo

During the third year I also re-examined my previous works in an effort to codify common properties, evaluate strengths and weaknesses, and generally reassess my approach in the hope that this might suggest areas for further exploration. At the suggestion of my colleague Justin Christensen, whose work explores notions of musical time and perception, I began to experiment with tempo, listening to my compositions played back at different speeds and informally analysing the results. I was surprised to learn that they exhibited a wide tolerance for tempo fluctuations, sounding 'natural' at a range of tempi and exhibiting an almost fractal quality of self-similarity at different scales of measurement. This was a result of condensing multiple layers of music with different tempi into one layer, and is analogous to the harmonic pantonality that results from combining multiple layers of tonal music in different key signatures. A lack of tempo specificity is both reflected in, and caused by, the music's irregular rhythmic profile and lack of stable pulse, either stated or implied. It exhibits a kind of all-encompassing rhythmic saturation, again similar to the harmonic effect created by total chromatic pitch saturation, not least because it denies the possibility for change in a given parameter. This was a fascinating realisation, but also seemed to be a potential source of limitation, given my growing recognition that change and contrast were going to be essential for developing longer, non-monolithic structures.

I therefore decided to approach the question of rhythmic identity in a new way. Rather than superimposing multiple live recordings (each with their own tempo and rubato), which automatically created an irregular rhythmic landscape, I would start with some form of rhythmically regular material and then distort that. In this way I would have the option of using both regular and irregular rhythmic material over the course of a composition, and in the process this would open up a number of parameters that could be utilised to create audible change, such as:

- The relationship between rhythmic regularity and irregularity, marking opposite ends of an imagined scale of values

- Tempo specificity created using rhythmic regularity, which could be contrasted by degrees with increasingly polytempic material

- The degree of 'intactness' and recognisability of material, defined by its level of rhythmic regularity

The results of these experiments with rhythm and tempo, as well as the use of pre-existing MIDI files, formed the basis of the final two pieces in my portfolio: *This Moving with Respect to That*, and *Toward a more American Style*.

Analysis 1: *Canpiom*

Instrumentation: Alto voice, Countertenor voice, 2 Guitars, Violin, Viola, Cello
Duration: Approx. 5'20"

Source Material

The CD I used for this composition was *English Ayres,* a compilation of songs composed by Thomas Campion, performed by Countertenor Michael Chance and Lutenist Nigel North.[30] This music had a number of characteristics that made it suitable for superimposition:

1. Sparse, clearly differentiated instrumentation

Most of the songs are organised around a single line of vocal melody, with lute accompaniment doubling the line or providing simple harmonic support and rhythmic context; elementary triadic chords also act as punctuation.

2. A low level of rhythmic density, combined with gestural simplicity

Most of the songs are played at a slow tempo, and consist of clearly defined melodic phrases separated by rests, thus the rhythmic or 'horizontal' density ('events per second') is low. Multiple songs can therefore be superimposed and the resulting texture will not be impenetrably dense. The global effect is mildly chaotic and free floating, while remaining locally rhythmicised.

3. Simple, 'alternating' harmony

From a 21st Century perspective, the harmony of these songs is very simple and stable, as it never modulates to distant key signatures or explores extended chromaticism. However, the characteristic alternation between major and minor modality provides harmonic interest, and an instability that appears to multiply

[30] Linn Records; catalogue number CKD 105

exponentionally when songs are superimposed, creating a sense of irregular harmonic 'flip-flopping' as collisions either clash and cancel each other out, or coalesce into unusual progressions.

Conceptual Background: Quantum Foam

When composing I find it helpful to relate my musical ideas to a non-musical reference point, which acts as inspiration and as a focal point for directing and containing, or at least usefully limiting, musical experimentation. This reference point informs the conceptual background of the composition, thereby guiding musical choices. My aim is not to write programmatic or descriptive music, but rather to make connections to analogous non-musical phenomena. Translating ideas from one medium into another gives rise to unexpected and compositionally useful material.

The reference point for this composition was an image from *The Elegant Universe* by Brian Greene (see below), a visual representation of 'Quantum Foam', which describes the texture of the Universe at the smallest possible scale. It is turbulent, amorphous and chaotic, with energy constantly being created and destroyed, emerging briefly then dissipating and being reabsorbed. This image resonated with me strongly, as it seemed to me to be analogous to the sounding result of superimposed tonal music, specifically:

- The irregular gestural shapes

- The relentless continuity created by overlapping fragments

- The positive and negative energy cancelling itself out

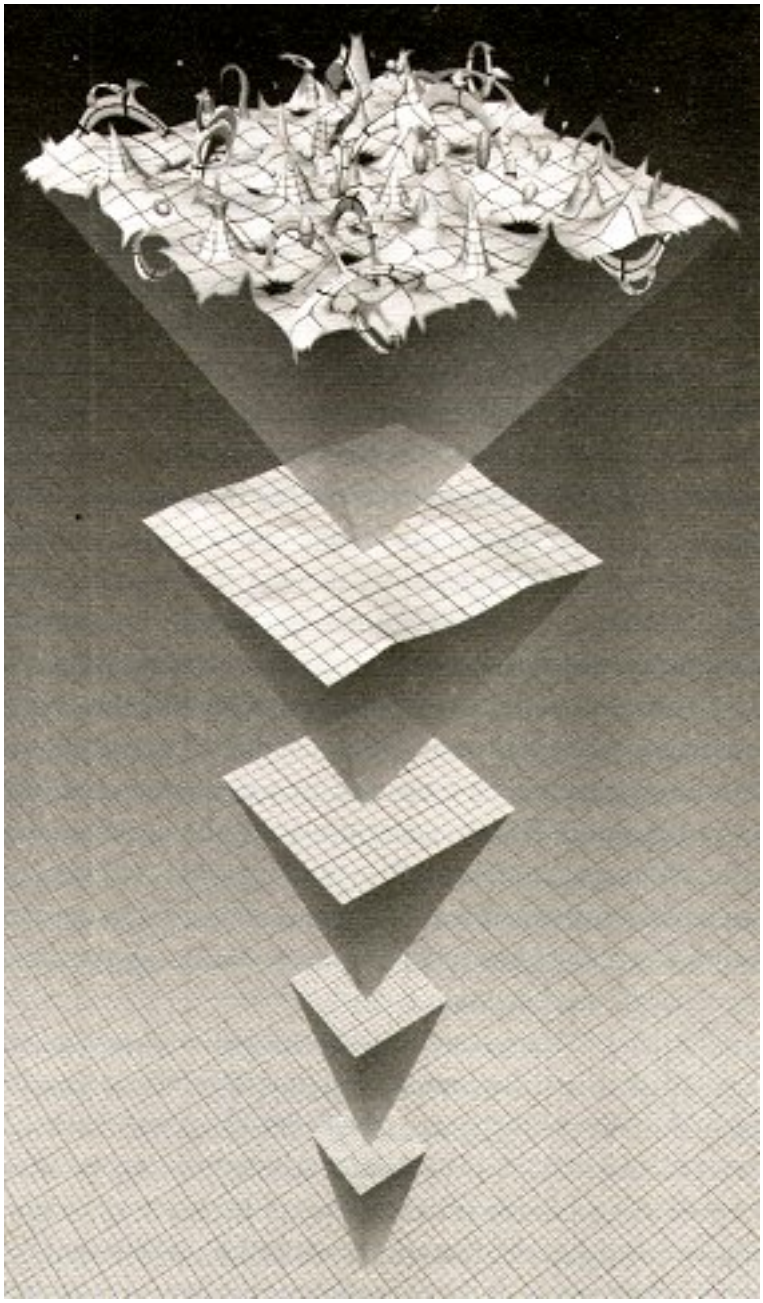


Figure 5: *'By sequentially magnifying a region of space, its ultramicroscopic properties can be probed. Attempts to merge General Relativity and Quantum Mechanics run up against the violent quantum foam emerging at the highest level of magnification'* Brian Greene, *The Elegant Universe* (Vintage, 2005), p.207

Structure

Having chosen my source material I superimposed different pairs of songs to find interesting combinations, and transcribed them using *Sibelius*. These transcriptions were transferred as MIDI information from *Sibelius* to *Logic*, and I then sketched out a basic structure by juxtaposing them in series:

Bar Number (refers to final score)	**Pair of transcriptions used**
Bars 1 – 37	*"It fell on a summer's day"* *"Shall I come then, sweet love, to thee?"*
Bars 37 - 65	*"Turn back you wanton flyer"* *"My love hath vowed"*
Bars 65 – end	*"All looks be pale"* *"The cypress curtain of the night is spread"*

This resolved into a simple binary form, organised according to tempo and rhythmic character:

Section	**Bars**	**Tempo**	**Character**
Section One	Bars 1 – 64	90bpm	Rhythmically 'choppy'
Section Two	Bars 65 – end	66bpm	Sustained notes, more melodic

Editing

With this basic structure in place, I constructed the composition in instrumental layers. In section one I worked 'bottom up', first creating a guitar layer then adding fragments of vocal melody; in section two I worked in reverse, 'top down' starting with the vocal material which I used to create an overlapping, continuous line before adding fragmented guitar accompaniment. The slow moving strings were added to both sections at the end of the process, to provide timbral and rhythmic contrast.

(Track 2 on the Analysis Examples CD) is a recording of the original superimposed source material used to create bars 1 – 37. When I had transcribed this material I separated the guitars (originally the lute accompaniments) and edited them as a self-contained layer. The examples below show this guitar material before and after editing, which consisted of removing or altering notes that disrupted the sense of continuous flow I wanted to achieve, using three simple sub-processes:

1. Erasure: of individual notes, chords, phrases or bars

2. Transposition: as above, usually no more than a semitone or tone in either direction, so as to retain the original melodic contours

3. Addition: of simple linking material, to connect discrete phrases and maintain continuity; or extra notes added to alter harmonic implications

These processes served to undermine pitch centrality, melodic-harmonic closure and goal-orientated directionality, by subtly disrupting the sources' pitch material and rhythmic profiles. Overall, the aim was to create a sense of continuity, by:

- Maintaining a relatively consistent textural, rhythmic, harmonic density

- Distorting the musical syntax to avoid closure (for example, removing perfect cadences and repeated pitches)

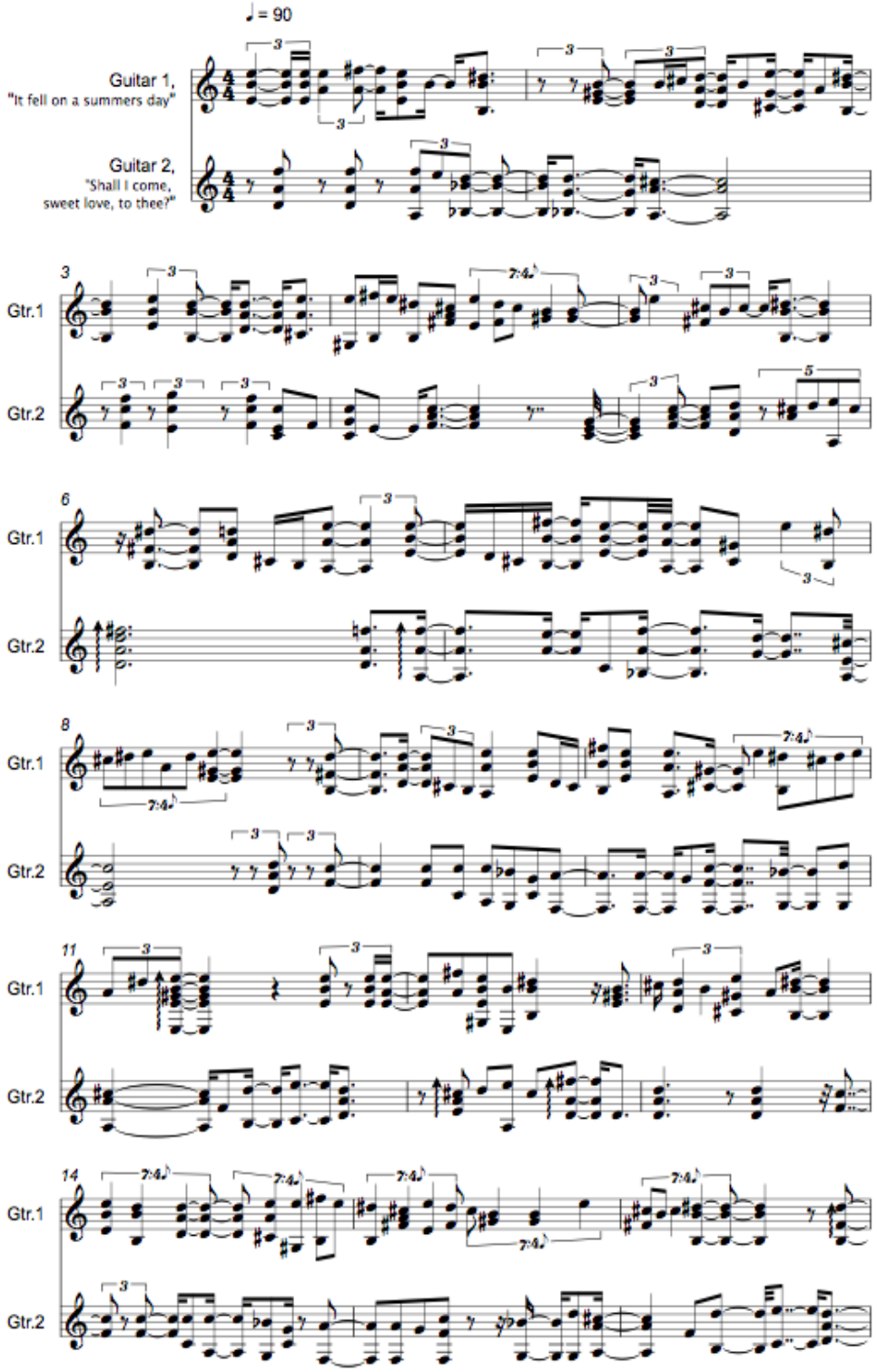


Figure 6: Guitar layer before editing, Bars 1 – 37 (Track 3: Analysis Examples CD)

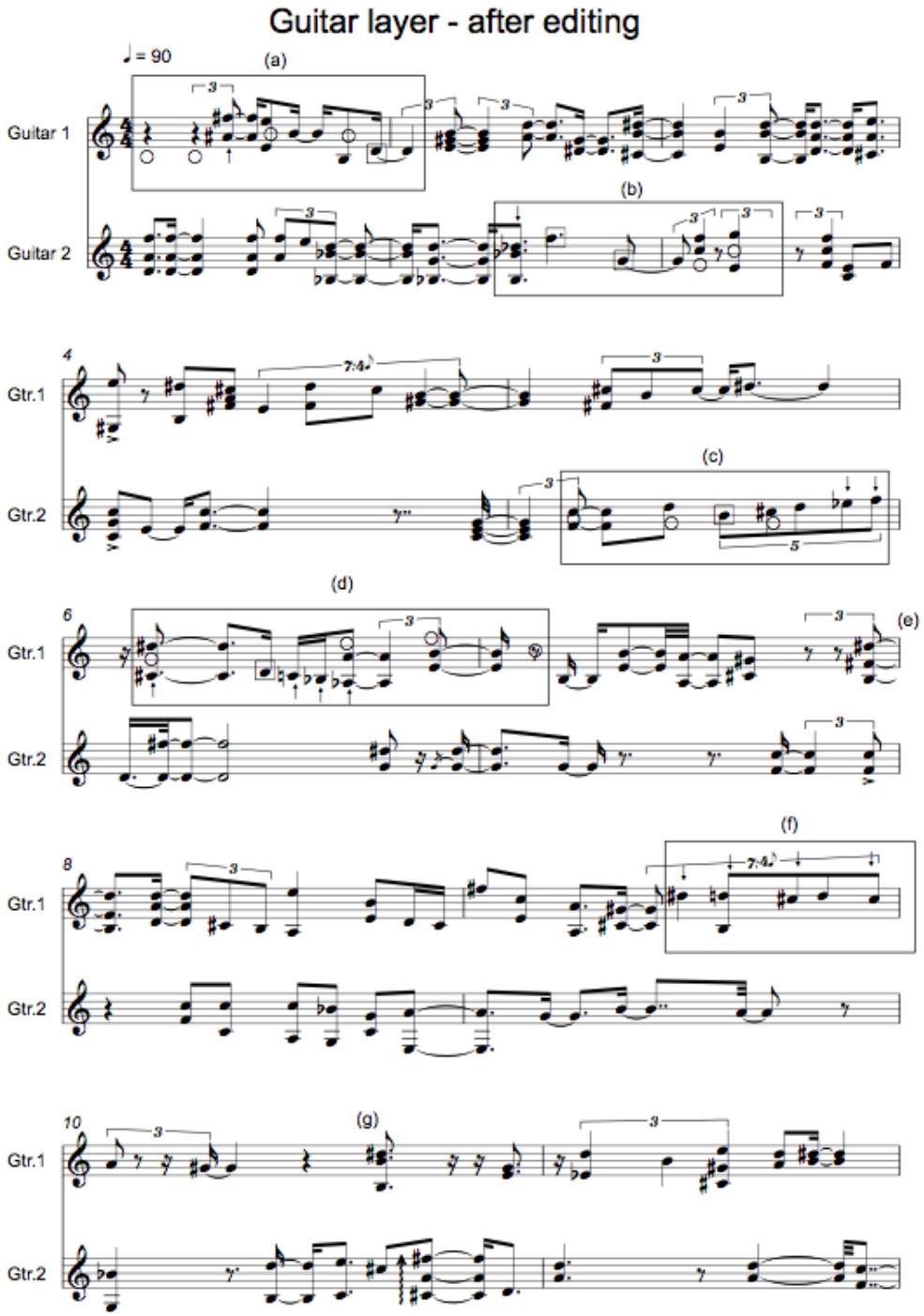


Figure 7: Guitar layer bars 1 – 37 post-editing (Track 4: Analysis Examples CD)

□ = Additions

O = Erasures

↑↓ = Transpositions

I have highlighted passages in Figure 7 to demonstrate my editing processes:

(a) In the original transcription Guitar 1 plays a self-contained phrase moving from tonic (E open fifth) to dominant (B Major), which immediately undermines the sense of continuity I want to create, and sets up unambiguous harmonic expectations. I solve this by erasing the opening tonic chord and corrupting the logic of the following melodic line with transpositions, erasures, and an added linking note.

(b) Again, here I deny Guitar 2's move from tonic (D minor) to dominant (A Major) by altering the first chord in this box so that it becomes instead Bb minor, which renders the harmonic movement more ambiguous, and is especially confusing in the context of the preceding Bb Major chord. The added linking notes (F + G) create a sense of continuity, and the erasures thin out the texture so that it does not become too dense, which would undermine momentum.

(c) The first two erasures thin out texture, as above. The following changes are all used to distort the melodic movement towards the perfect cadence in the following bar, rendering the harmony more ambiguous and weakening the sense of closure.

(d) The edits here, especially the transpositions, serve to muddy the harmony by adding extraneous dissonances whilst maintaining the momentum of the original chord sequence by roughly retaining its melodic direction.

(e) A full bar is erased here, because it was originally a point of unambiguous closure and lowered energy, as Guitar 1 cadenced and Guitar 2 held a sustained chord, destroying the sense of continuous movement.

(f) This passage originally led up to another perfect cadence that created a similar point of audible closure (bar 11 in the original transcription), so I distorted the melodic shape by transposing notes, as well as erasing most of the notes from the following tonic chord.

(g) Again, a full bar is erased here. The original material sounded harmonically redundant because of the repeated E's in Guitar One (bar 11½ - 12½ in the original transcription). This also created a sense of harmonic centrality, something I was specifically trying to avoid

Having thus edited the guitars to create a continuous base level 'quantum foam' out of which gestures could emerge, it was a simple task to create the vocal and string layers, because the general structure and harmonic framework of the piece were now in place. I overlaid fragments of vocal melody taken from the corresponding songs used to create the guitar layer, choosing interesting melodic, harmonic or rhythmic gestures that occurred naturally via the superimposition process, and would therefore require minimal editing. The strings were created by superimposing transcribed sections from *'Never Weather-Beaten Sail'*. Both the vocal and string layers were edited using the same simple processes that I had applied to the guitars: erasure, transposition and addition.

Analysis 2: *Quartut*

Instrumentation: String Quartet
Duration: Approx. 7'40"

Much of the process used to compose *Quartut* is described in the introduction to the analysis section. I will now concentrate on the conceptual background to the piece, the editing process, and how this relates to issues of structure.

Conceptual Background: *Quarantine* and Quantum Mechanics

The inspiration for *Quartut* was a science fiction novel, *Quarantine* by Greg Egan. The plot revolves around the implications of Quantum Mechanics, a theory that describes how a single subatomic particle exists in a superposition of multiple states, until it is observed, at which point it assumes a single position or *eigenstate.* In *Quarantine* a race of aliens exist in a so-called 'smeared state', a kind of meta-level consciousness that emerges from, and is smeared across, all possible co-existing quantum states.

In *Quartut* I explored this idea musically, representing separate quantum states with two super(im)posed pieces of found material. The resulting composition exists somewhere in between these two pieces, in an analogous 'smeared' state.

Editing

After transcribing my source materials in *Sibelius* I transferred the MIDI information into *Logic* for editing. Superimposing two quartets resulted in doubled instrumental parts (i.e. two cellos, violas and two pairs of violins), and I condensed each pair into a single line by applying a process of interruption: each note in either quartet interrupting the one that preceded it in the other.

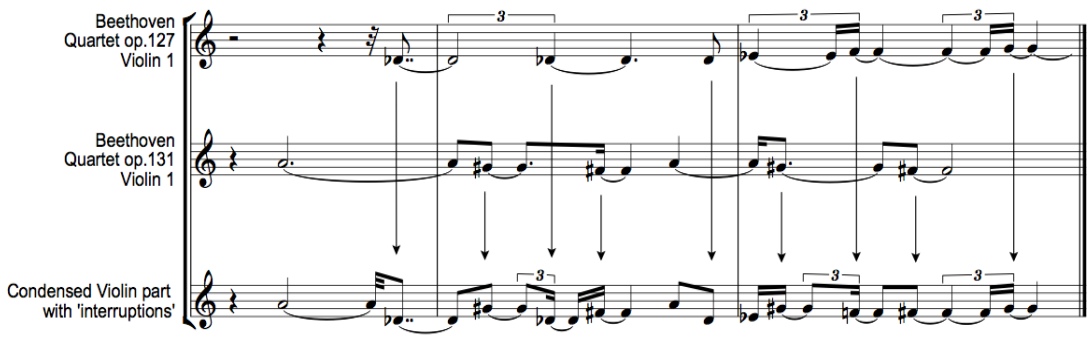


Figure 8: The upper two staves show the transcribed first violins from op.127 and op.131, the bottom stave shows the result of the interruption process, with vertical arrows representing interruptions.

The individual instrumental lines of my piece alternate continuously and independently between the two original Beethoven quartets. The combined quartet is constantly in flux, a 'smeared' superposition of two states. The various strands cannot be perceived individually within the resulting texture because they are too 'entangled', and it is impossible to aurally determine at any moment which quartet is statistically predominant. (Track 5, Analysis Examples CD: tutti quartet, transcribed material post-processing)

Structure

After completing this initial process of interruption I began the next stage of editing, with the aim of rendering audible the immanent structural shape of the processed material. As with *Canpiom*, I used a combination of erasure, addition, and transposition to clarify the texture that resulted from the first stage of processing, and thus reveal the musical gestures contained within. I listened to the material repeatedly to find interesting, attention-grabbing phrases or passages that could potentially act as structural landmarks (Timings refer to track 5 on CD):

1’20”	Climax and moment of synchronisation; all the instruments alternate simultaneously between the two Beethoven quartets
2’01’’ - 2’06’’	A ‘wonky’ perfect cadence
2’14’’ - 2’37’’	Bi-tonal harmonic progression
3’52’’	Chord emerges starkly from the dense texture
4’05’’ - 4’30’’	Rhythmically choppy
5’32’’ - 5’40’’	Constant rhythmic semiquaver movement leading to a climax in high register

Having catalogued a number of such passages I began editing them, ‘tidying up’ the texture approximately 10 seconds either side of the passage in question to make it come into focus. Then I would listen through to the material again to gauge how this had affected the ‘balance’ of the structure as a whole, and choose the next section to edit.

When this editing was complete I realised that there was a more general problem with the material, namely that the textural density level remained too consistent throughout. This lack of variation became monotonous, so I attempted to solve the problem by creating textural contrasts. At bar 100 (rehearsal mark ‘F’) I removed

material from the first violin, viola and cello, creating a monody section for the second violin, with fragmented interjections from the other instruments. At bar 113 (leading into rehearsal mark ‘G’) the first violin and viola join the second violin to create a heterophonic-sounding section; at this point the music also moves to a noticeably higher register.

These new contrasts set up a tension between the immanent structure (of the original superimposed material), and my artificial structure (of durational proportions defined by material density). My original intention- to address a lack of textural variation- had unexpectedly suggested a new approach to structure based on interaction between two opposing varieties of structural logic. The first is a ‘bottom up’ approach in which the structure emerges organically from the immanent properties of the material; the second is ‘top down’ in which a more or less arbitrary structure is created that is potentially unrelated to the material it contains. The combination of these approaches gives rise to ambiguous readings, because it is not always possible to perceive which one is organising the music at any particular moment. In fact they can operate simultaneously as in the final section of this piece (bar 113), which is defined both by its high register, a feature of the original material, and by its heterophonic density, a feature of my overlaid structure. This interrelationship has informed my work from this point on.

Analysis 3: *Untitled 1, Untitled A*

Instrumentation: Piano, Flute, Violin, 'Cello
Duration: Approx. 5'40"

Source Material

The CD used for this composition was *Beethoven, Complete Violin Sonatas* performed by Augustin Dumay and Maria Joao Pires.[31] I chose this not only because I had been pleased with the results of using Beethoven String Quartets, but also because there were points of contact with the Campion lute songs, namely its texture (melody and accompaniment) in combination with clearly differentiated instrumentation. On this occasion I didn't limit myself to superimposing only two recordings, but instead chose three mutually complementary movements, as I was planning to allocate the melody line from each sonata to one of the three melodic instruments in the group, and to condense the multiple piano parts into one:

- Sonata No.3, Op.12 No.3: 2nd Movement, Adagio con molt'espressione
- Sonata No.6, Op.30 No.1: 2nd Movement, Adagio
- Sonata No.7, Op.20 No.2: 2nd Movement, Adagio Cantabile

(Track 6, Analysis Examples CD: source material, all three tracks superimposed)

Conceptual Background: Emergence

Emergence is a phenomenon by which complex behaviour arises from a multiplicity of interactions between simple components. Examples range from the self-organisation exhibited by flocks of birds, to consciousness arising from inanimate matter. Michel Baranger writes, 'Emergence happens when you switch the focus of attention from one scale to the coarser scale above it…behaviour is said to be

[31] Deutsche Grammophon DG: E4714952

emergent if it cannot be understood when you study, separately and one by one, every constituent. The emerging behaviour is a new phenomenon, special to the scale considered, and it results from global interactions between the scale's constituents.'[32]

The relationship between simplicity and complexity is also one of the defining characteristics of Beethoven's music. As Charles Rosen writes 'the use of the simplest elements of the tonal system as themes lay at the heart of Beethoven's personal style from the beginning. It was only little by little, however, that he realised its implications'.[33] Beethoven's music is constructed from simple thematic material, which is nonetheless densely packed with musical information, containing a complex web of potential relationships and multiplicity of implications. In his later compositions 'Beethoven tends to simplify as the texture becomes more complex. For this reason, his late variations give the impression that they are not so much decorating the theme as discovering its essence'.[34]

I processed the Violin Sonatas with these ideas in mind, removing all recognisable or audibly thematic material to leave only traces of the original Sonata, a skeletal framework of generic melodic fragments. When I applied this process to multiple sonatas and superimposed the results, the effect seemed to me to be aurally analogous to the aforementioned self-directing behaviour. In isolation the processed material (the fragments) had an inanimate, mindless quality; when combined they spontaneously organised into phrases and gestures, which also had a kind of neutral, generic character.

The effect is reminiscent of 20th Century developments such as the Textural music of the 1950's and 60's; compositions like *Metastasis* (1953-54) by Iannis Xenakis that consist of large-scale 'statistical' gestures created from the combination of small-scale components. Similarly the Total Serialism of the 1950's led to music like Karlheinz Stockhausen's *Kontra-Punkte* (1953), which appears to emerge automatically out of the musical processes from which it is constructed. However, despite some superficial

[32] Michel Baranger, *Chaos, Complexity and Entropy*

[33] Charles Rosen, *The Classical Style* (Faber and Faber, 2005), p.389

[34] ibid., p.437

similarities to these earlier examples, there are also a number of differences in my composition. Firstly, unlike much Textural music it is not dependent for its effect on a large number of instrumentalists. Secondly, in contrast to Total Serialism, the use of Beethoven as material ensures a vestigial sense of tonal implications, and therefore a much more complex set of interrelationships. For example, the pitch distribution of the source material is statistically uneven, and this imbalance automatically creates a more varied harmonic landscape than the constant chromatic saturation of Total Serialism. In addition, the middleground rhythmic units remain audible (melodic cells and phrases), and it is therefore possible to perceive an impression of continuous forward movement, as opposed to the stasis of Stockhausen's 'moment form'.

Processing

As usual, the first three stages of the compositional process remained the same: Choosing Source Material, Superimposition and Transcription. I then converted the transcriptions from *Sibelius* into MIDI information and transferred them into *Logic* for editing. To create the piano part, firstly I erased all the single line melodic writing in both hands, leaving only isolated chords and short passages of polyphonic writing. From these remnants I then erased all the lower notes in the left hand, and the higher notes in the right hand, leaving only the middle voices:

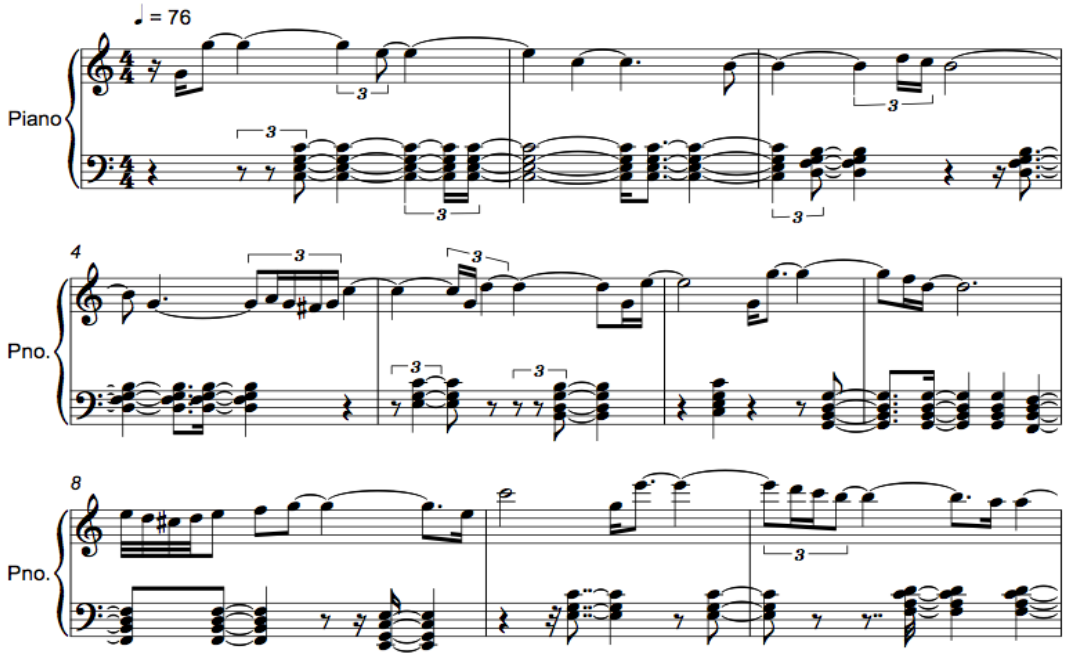


Figure 9: Stage 1, Excerpt from original transcription of Sonata Op.12, No.3

Figure 10: Stage 2, all single line melodic material removed (in this example, this is all the right hand material)

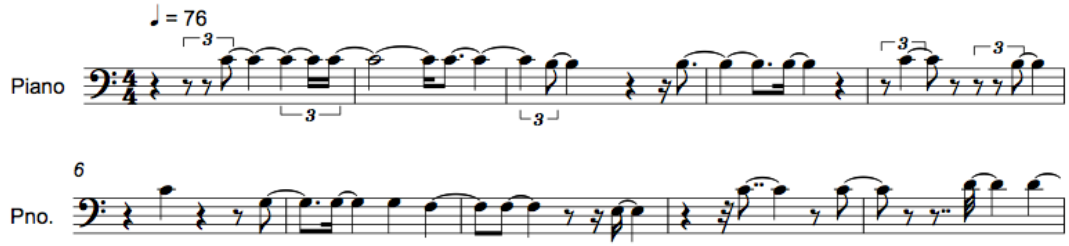


Figure 11: Stage 3, all lower notes removed from remaining chords, to leave a selection of melodic fragments.

Unfortunately, having processed all three transcriptions in this way, I found that the result was too simple, sounding simply like accompaniment without melody even when all three were superimposed. To avoid this, I displaced the left hand material by moving it two bars to the right to avoid rhythmic coincidence between hands.

To create material for the melodic instruments, I divided the three violin transcriptions into single bars, and erased two of every three bars. I then condensed the result into a single line:

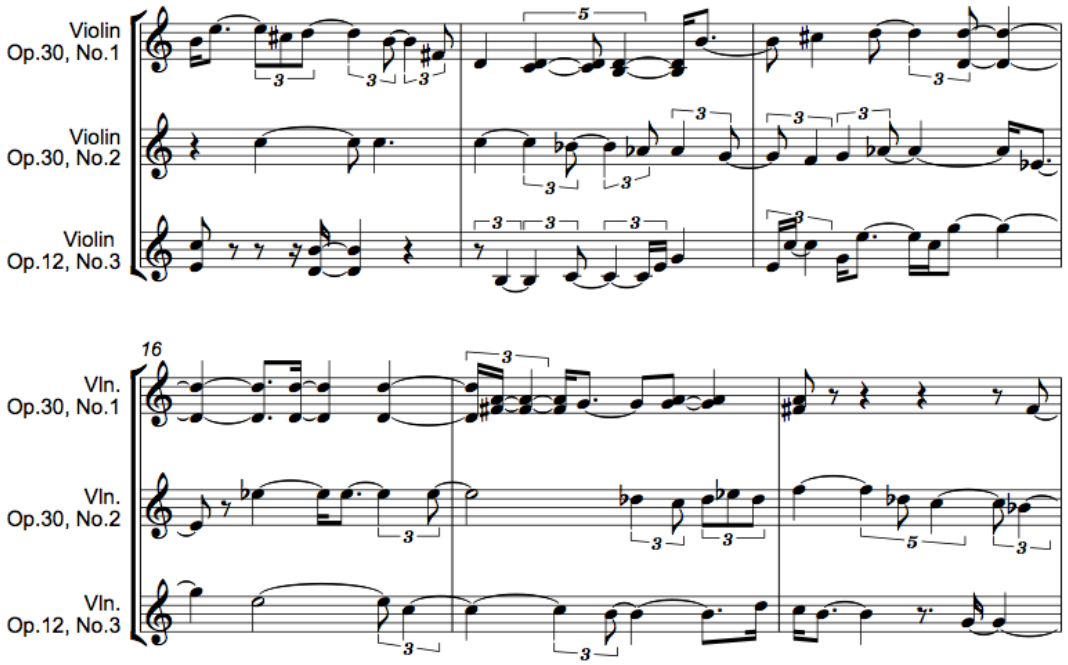


Figure 12: Stage 1, violin parts from the three transcriptions superimposed

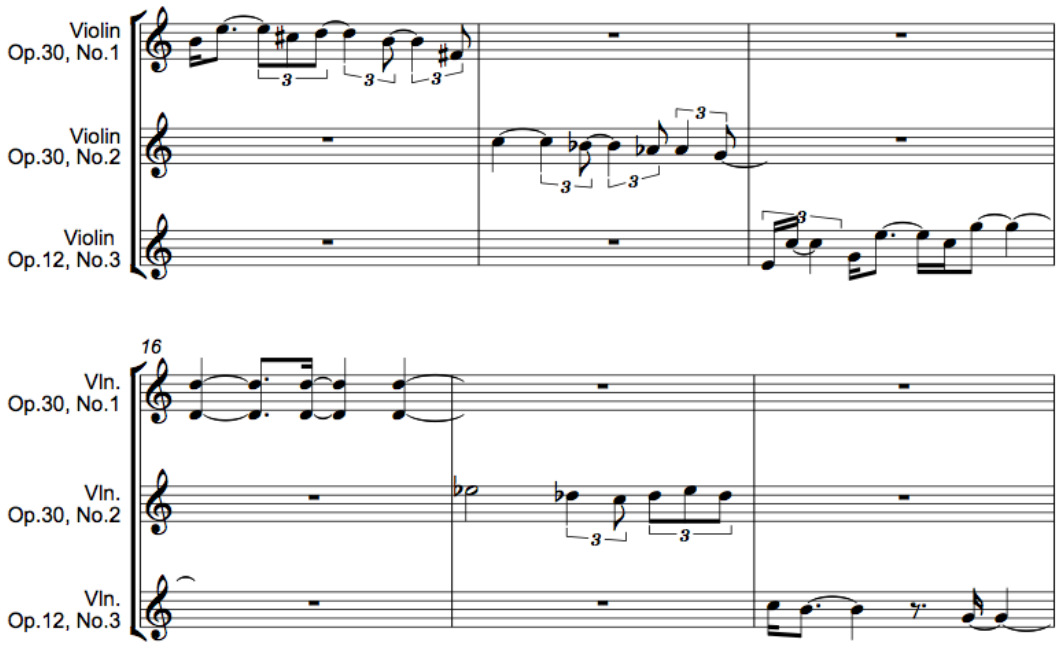


Figure 13: Stage 2, two of three bars are erased from each transcription

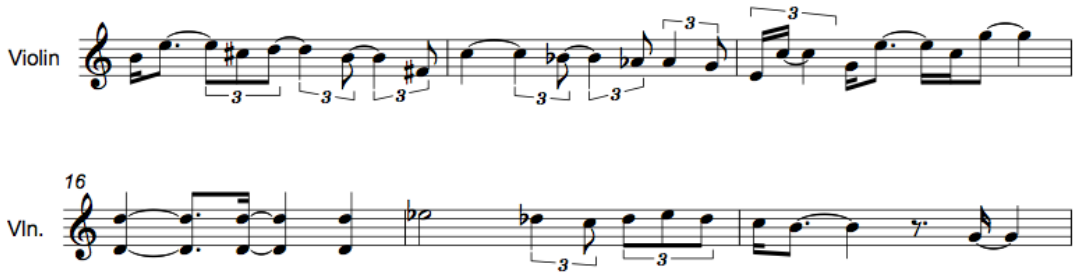


Figure 14: Stage 3, this material is condensed into a single line

Structure

I edited the resulting materials using the aforementioned techniques of erasure, addition and transposition, before concentrating on defining the structure. I felt that the existing material began too abruptly, so I re-ordered it to begin at bar 53 of the original transcriptions, and rotated material from the end to the beginning to act as the introduction. The final structure was outlined with simple durational proportions delineated by instrumentation:

Bar Number	**Instrumentation**
Bars 1 – 40	Piano + Staccato Melodic Instruments
Bars 41 – 76	**Piano + Legato Melodic Instruments**
Bars 77 – 88	Piano Solo
Bars 89 – 99	**Piano + Legato Melodic Instruments**
Bars 100 – 108 (End)	Melodic Instruments ‘Solo’

Analysis 4: *This Moving with Respect to That*

Instrumentation: Two Pianos
Duration: Approx. 4'30"

Source Material

The source material for this piece is a MIDI file of J.S.Bach's *Fugue No.8 in D sharp minor (Well Tempered Clavier, Book One)* downloaded from the website www.classicalmidiconnection.com[35]. (Track 7, Analysis Examples CD)

In addition to experimenting with MIDI files I had decided at this time to adopt a new approach to rhythm, avoiding rhythmically irregular source material (superimposed transcriptions of live recordings), in favour of regular, stable musical 'objects' that could be distorted with processing. The MIDI file was ideal for this purpose because of its metronomically rigid tempo, and simple rhythmic profile consisting mainly of crotchets and quavers. This approach had various implications and opened up new parameters that could be exploited, for example:

1. Degrees of Recognisability

The simplicity of the fugue's characteristic rhythmic cells, or gestural conventions, meant that they remained audibly recognisable despite the distortions of processing, and the level of recognisability could be altered by degrees.

2. Audibility of Process

It was now possible to gauge the distance from the original source material after processing, and as a result the *process itself* became audible via its effect on the material. With process and material perceptibly distinct entities, the interaction

[35] An unnamed contributor created the file, presumably by transcribing the original score into notation or sequencer software.

between the two could be exploited compositionally.

Conceptual Background: Relativity Theory and Cultural-Historical Context

A recurring theme in my work is the interrelationship between Science and Art. Both create models of reality that reflect and influence the cultural context in which they were formulated. The Bach fugue material is a product of 18th Century Europe, and the dominant scientific model at that time was Newtonian mechanics, which describes a so-called 'clockwork universe' functioning in accordance to deterministic laws. The fugue is taken to be emblematic of this worldview, constructed using an audible, rational process that unfolds with almost mechanistic inevitability. I recontextualised this fugue by situating it in a 21st Century context, incorporating recent musical developments and taking inspiration from updated scientific knowledge.

Einstein's General Theory of Relativity explains gravity as being a consequence of the curvature of Space. This can be visually represented as a two dimensional grid, warped and distorted by objects contained within. The Bach MIDI file is analogous to this grid in that its inherent rhythmic regularity acts as a reference point against which distortions can be measured and perceived.

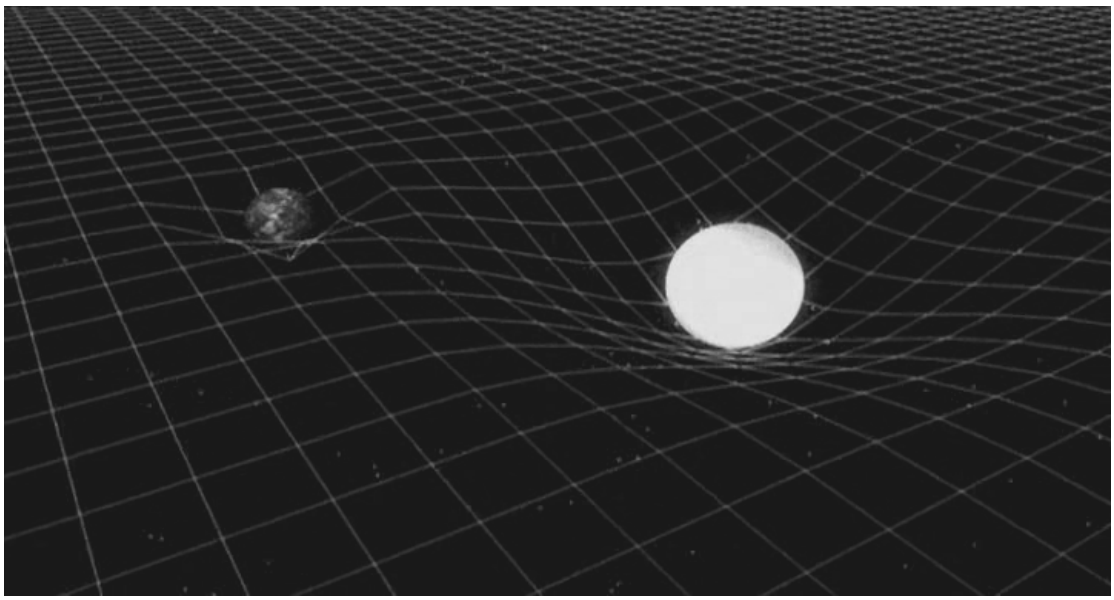


Figure 15: An illustration of the Universe as described by Relativity Theory; the grid is a two-dimensional representation of Space, warped by the Sun and the Earth. (Screenshot from BBC's Horizon: *What on Earth is Wrong With Gravity?* (2008))

Whereas Newtonian mechanics assumes that space and time are independent, absolute phenomena, Einstein proved that they are in fact enmeshed and relative. Physicists refer to 'Spacetime', the fabric of the Universe that is constantly warping and distorting. These distortions depend on an observer's point of view - when and where they are situated within Spacetime. There is no such thing as an objective description of space or time. Our experience of reality is inherently relative.

My piece takes these assertions as its point of departure. The pianists play a different version of the fugue, each 'warped' and temporally distorted from the point of view of the other. To achieve this warping effect I used tempo curves that affected both speed and pitch, similar to the sound of a record being speeded up or slowed down. The resulting material is constantly in flux, continuously accelerating and decelerating, moving up and down the pitch register respectively. Appropriately, a kind of meta-level polyphony emerges, resulting from the interaction of the tempo curves, which is analogous to the interweaved melodic lines of the original.

Process: 'Warping'

Despite the fact that I applied different tempo curves to the two copies of the fugue, the process was the same in each case:

Step 1: I loaded the MIDI file into *Logic*

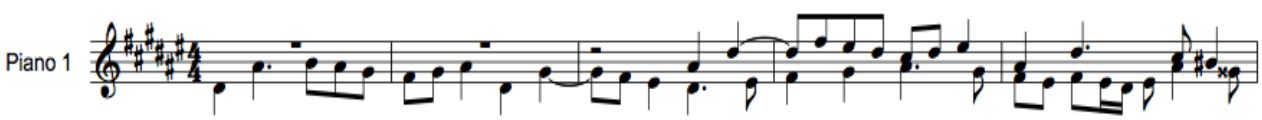


Figure 16: Opening bars of source material, J.S.Bach's *Fugue No.8 in D sharp minor*

Step 2: I converted the MIDI file into an audio file to load into *Turntablist* software, which can slow down and speed up audio files in the manner of a record player (when the tempo increases the pitch gets higher, and vice versa[36]). By drawing tempo curves, I could therefore 'warp' the original material:

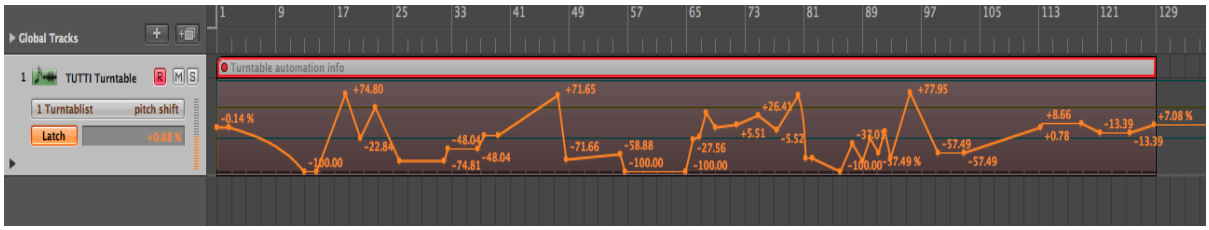


Figure 17: Example: Piano One's tempo curve, represented by the orange line (Track 8, Analysis Examples CD)

Step 3: When I was satisfied with the curves thus created, I matched the pitches and rhythms of the original MIDI file to this distorted version. For rhythms I simply used *Logic*'s 'match quantise' function; but to match the pitch material I had to loop the warped audio file around the attack point of each note, then transpose the pitch of the corresponding note in the original MIDI file to match as closely as possible, quartertones notwithstanding.

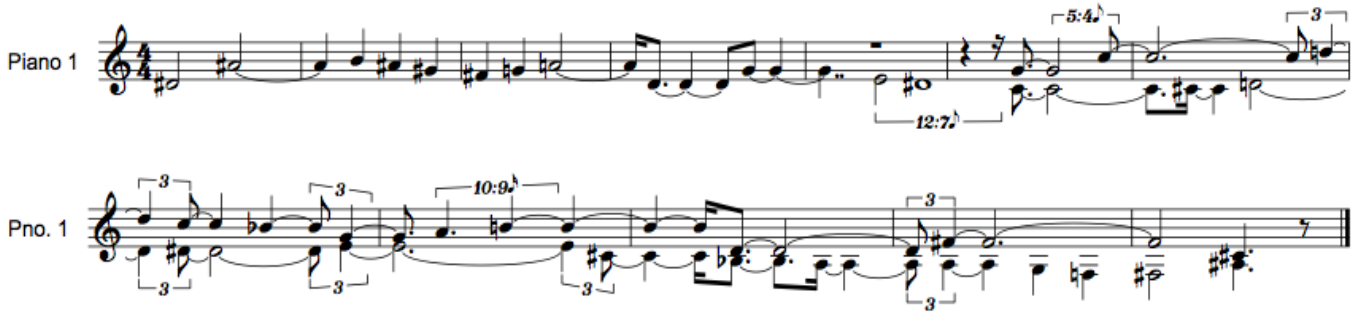


Figure 18: Opening bars of Piano One fugue as it sounded post-warping and matching (Track 9, Analysis Examples CD)

[36] If the tempo of a MIDI file is altered the pitch will not be affected. I used *Turntablist* so that the pitch and tempo would be 'enmeshed'.

Having thus created the material for piano one I repeated the process for piano two, creating complementary tempo curves in response.

Structure

My previous compositions utilised a combination of emergent ('bottom up') and artificially created ('top down') approaches to structure: the superimposition process created a structural outline, and I responded to this with textural clarification (using erasure, addition or transposition of notes) and by artificially inserting new sections.

However, with this composition I had greater control over the shape of the structure from the outset, and was less dependent on the pre-existing outline of the source material. In the original fugue, harmonic and contrapuntal relationships were important factors in delineating structure; however, my processing largely denies the coherence of this musical information by undermining the sense of tonality. The resulting stream of notes thereby effectively function simply as a rhythmic marker, which renders audible the distortions of the basic quaver pulse. The vertical density of this stream fluctuates, but the pitch relationships are largely neutralised. Therefore, the gestures that I created using tempo curve processing delineated the initial structural outline. I then responded to this, using a 'top down' approach as in previous compositions to create durational proportions:

Bar Number	**Instrumentation**
Bar 1 -33	Duet (*tempo 120bpm*)
Bar 34 -74 Rehearsal Mark 'B'	Duet (*switching between pianos*)

Bar 75 -84	Piano One ‘Solo’ (*with piano two interjections*)
Bar 85 – 97 Rehearsal Mark ‘F’	Piano Two ‘Solo’ (*with piano one interjections*)
Bar 98 – 107 Rehearsal Mark ‘G’	Duet (*“climactic”*)
Bar 108 – 119 Rehearsal Mark ‘H’	Duet (*slower tempo, jumps to 100bpm*)
Bar 120 – End Rehearsal Mark ‘I’	Duet (*pianos play single line material*)

With previous compositions, editing consisted of Erasure, Addition and Transposition. However in this case there was no need to add or transpose notes to undermine the tonal harmony, because the tempo curve processing had already achieved this. The majority of the editing therefore consisted of erasures, the function of which was to delineate the structure by means of contrasts in textural density; for example, the two solo sections (bar 75 and 85) were created by simply erasing material in one or other of the two pianos.

After completing the piece the final task was to create a score, by transcribing the music from *Logic* into *Sibelius*. This was, as usual, a time-consuming task but crucially this technical work hadn’t disrupted the creative decision-making stage of the process, because it was completed after the piece was finished.

Analysis 5: *Toward a more American style*

Instrumentation: Disklavier and Loudspeakers
Duration: 10'20"

Aims

At the time of writing this final piece I had the opportunity to compose for the Disklavier MIDI piano, an updated version of the old mechanical player pianos that can record and playback MIDI information. I decided to take advantage of the freedom from performance practicalities to address the problems with structure that I had perceived in my earlier work. In addition, I wanted to assimilate the experiments that I had been conducting throughout my PhD alongside my instrumental work, in which I created collages from recordings of Pop music.

Source Material

The two main sources for this composition were American popular songs written 100 years apart (Tracks 10 and 11, Analysis Examples CD):

1. *Dusty Rag* – May France Aufderheide (1908)

2. *Long Distance* – Brandy Norwood (2008)

I downloaded the MIDI file of *Dusty Rag* from a website dedicated to the preservation of player piano rolls,[37] and the audio file of *Long Distance* from iTunes. Both were edited in *Logic* to create two separate streams of musical information, assigned to the

[37] http://members.shaw.ca/smythe/archive.htm. This website acts as a central point for a group of amateur player piano enthusiasts. Their aim is archival, they design and build their own equipment to visually scan old piano rolls and convert them into MIDI files, which are made freely available to download.

Disklavier and the loudspeakers respectively; the Disklavier playing material derived from the piano roll, the loudspeakers playing an overlaid electronic collage derived from the audio file. In performance both are triggered from a computer sequencer.

Conceptual Background: Music as Cultural-Historical Artefact

Placing two musical 'objects' next to each other in this way invites comparison; similarities and differences are revealed, and the inherent gap (temporal-historical-cultural) between the two is rendered audible. The materials are emblematic of the time and culture in which they were created, acting as reference-points which bookend a notional space. I processed both according to a similar harmonic, gestural and structural framework, and they were left intact enough that their respective stylistic characteristics remain audible through the various distortions of the compositional process. But a separation nonetheless inevitably maintains itself; the two strata of musical information play simultaneously without cohering into a unified whole. This separation is alluded to in the lyrics of the pop song that refer to physical and temporal distance, and is also underlined in a number of extra-musical ways:

1. Technology

The technologies used to project the composition (which are 'historically appropriate' to the source materials used) embody highly contrasting approaches to digital sound reproduction, defined by the method in which they store and reproduce musical information; the Disklavier mechanically reproduces a series of pitches and durations on a real instrument, whereas the loudspeakers reproduce digitally stored sounds acousmatically. The respective timbral signatures of these forms of technology are starkly differentiated.

2. Space

The Disklavier and loudspeakers are situated three metres apart in the performance space, representing the temporal distance separating the source materials.

3. Artwork

The different cultural contexts in which the source materials were created are clearly illustrated by their respective cover artworks, which are to be displayed or projected during performance. Apart from the glaring differences in the depiction of African Americans (both highly stylised; one a staged, airbrushed vision of 'perfect' beauty, the other a caricatured racial stereotype), there are also noticeable differences in media (photography vs. hand drawn cartoon) and stylistic choices (typeface, number of colours etc).

My intention with this composition is not to be superficially provocative, to make a clumsy, simplistic political statement regarding racial or gender issues in America, for example, but simply to present the material and my response to it. The intrusion of the wider cultural context on this presentation I see as an inevitable consequence of the inseparability of music from society.

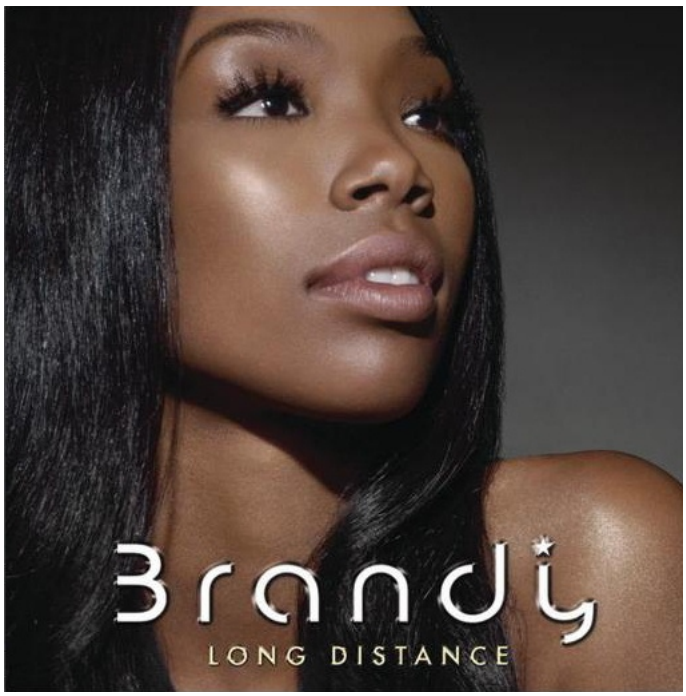


Figure 19: *Long Distance* cover art used for CD packaging and download

Figure 20: *Dusty Rag* sheet music cover art

Structure and Process

After analysis of my previous work, I had come to the realisation that in order to create differentiated, non-monolithic structures it would be necessary to establish audible contrast between structural sections. My strategy to achieve this was to create different types of material using processes that had audibly distinct results, which would be categorised according to their imagined distance from the original source material: the more layers of processing applied, the greater the distance from the original. This movement away from a recognisable starting point is presented clearly over the course of the composition; beginning with the *Dusty Rag* material subjected to a simple 'jump cutting' process, which horizontally compresses the music by removing bars whilst leaving the harmonic progressions and melodic outlines largely intact; and as the piece progresses the material is increasingly distorted by additional layers of processing, the relationship to the source becoming harder to discern. In this way, the structure is delineated: processing defines the identity of the material, and the contrast between different materials demarcates the durational proportions of the structural outline.

The piece divides broadly into two equal halves, defined by a large-scale repetition:

SECTION ONE **DISKLAVIER SOLO** 0'00'' – 5'15"	- Material derived from *Dusty Rag* and other piano rolls
(5'00" – 5'15")	- *Overlapping electronic sounds, leading into…*

SECTION TWO **DISKLAVIER AND LOUDSPEAKERS** 5'16" – 10'22" (end)	- Disklavier repeats Section One - Loudspeakers play overlaid electronic collage constructed from samples of *Long Distance*
(9'37" – 10'22")	- *Electronic sounds have faded out, leaving Disklavier solo*

SECTION ONE: DISKLAVIER SOLO

The first half is divided further into short sections:

1. 0'00" – 1'11": Jump Cutting

By erasing bars from *Dusty Rag*- in the manner of jump-cutting frames in film editing- it is compressed into a much shorter time frame. The source material remains recognisable because the temporal order is unaltered, gaps notwithstanding, and its harmonic progressions and melodic outline are thereby audible despite the purposefully clunky editing. This passage repeats, or 'restarts', at 0'42", foreshadowing the large-scale structural repetition that happens at 5'16".

2. 1'12" – 2'20": Crossfading

Crossfading consists of switching every ½ second between "Dusty Rag" and the other piano rolls[38]. The result was increasingly atomised, rhythmically irregular, harmonically and melodically disrupted.

[38] I used six other rolls, all downloaded from the same website:

1. Frog Legs Rag: James Scott (1907)
2. Patricia Rag: Joseph Lamb (1916)
3. Weeping Willow: Scott Joplin (1903)

(Track 12 Analysis Examples CD: *Dusty Rag*, ½ second chunks with gaps)
(Track 13, Analysis Examples CD: As above, with gaps filled by other piano rolls)

3. 2'21" – 2'54": Quantisation

This process was very simple: I applied *Logic's* quantise function to the previously created crossfaded material. This caused the irregular rhythms to 'snap' into position on the grid defined by the metronome.
(Track 14, Analysis Examples CD: crossfaded material after quantisation)

4. 2'55" – 3'30": Extremely Slow Tempo

This was also a very simple process, in which I superimposed all seven piano rolls then slowed the tempo down.

5. 3'31" – 4'58": return to Quantisation

6. 4'59" – 5'15": return to Crossfading

The electronic sounds enter at this point, the Disklavier later beginning an exact repeat of Section One at 5'16", this time with the loudspeakers simultaneously playing the overlaid electronic collage.

SECTION TWO: DISKLAVIER AND LOUDSPEAKERS

To create this collage I divided the audio file of *Long Distance* into unequal segments, or 'samples', which I could then trigger using a MIDI keyboard. I improvised with these sounds as the Disklavier repeated section one, retroactively editing the improvisations to match its harmony and rhythmic gestures as closely as possible. However, as I have mentioned, the electronic sounds do not begin at 5'16" when the Disklavier begins its repeat but 15 seconds earlier, and they end before performing a

---

4. Greenwich Witch Rag: Zev Confrey (1921)
5. All That Meat and No Potatoes: Fats Waller (1930)
6. Bowery Buck Rag: Tom Turpin (1899)

complete cycle. In effect the collage is displaced in relation to the Disklavier's structural outline:

|--------ELECTRONIC SOUNDS--------|

SECTION ONE	SECTION TWO

The purpose of this displacement is to disrupt the symmetry of the large-scale repetition and therefore avoid creating an overly predictable structure. In addition, it has the effect of rendering ambiguous the structural function of the section between 5'00" – 5'15". Initially, the visceral shock of the electronic sounds (in conjunction with the Disklavier's move from regular to irregular rhythmic material) implies the beginning of a new section, but this is quickly undermined by the large-scale repetition at 5'16"; what appeared to be a new beginning is in fact the coda for section one, but this only becomes clear retroactively.

Structural Repetition: Implications

In this way, the composition not only allows for multiple readings at a formal, structural level, but also dramatises the difference between the experience of an event as it happens, and the experience of remembering that same event at a later date. The past is experienced through the filter of the present, and thereby inevitably coloured by the intervening passage of time. Structural repetition allows this to be rendered audible by recontextualising the repeated material, which alters its function and 'meaning'. This kind of mediated relationship with the past is appropriate to, and inherent in, the use of found material. As Metzer writes of Charles Ives, '(Ives) heightens nostalgia by doubling the distance between a melody and its origins, since

to the chronological gap between a quotation and its period of currency there is added a musical one between the transformed and original versions.'[39]

In a sense, any repetition is an act of recontextualisation; repeated material, assuming it is recognised as such, creates a sense of recognition, and therefore a different set of expectations that were not present the first time it was heard. It appears less contingent, more inevitable, and this inevitability can be exploited in opposing ways, either to increase potential energy (the perceived density of the material increases as a result of the additional 'layers of meaning') or a sense of futility and emptiness (as the material is now simply 'going through the motions' rather than building up momentum, an effect that increases with further repetition).

The addition of the electronic sounds further enriches the effect of the recontextualisation created by the large-scale repetition. The electronic sounds enlarge the frame of musical action, or the 'space' in which the music is operating, and this alters the role of the Disklavier material that now performs a supporting, accompanying function. This is due at least in part to the presence of vocals in the electronic collage, as the piano automatically adopts a supporting role in the presence of a voice, a fact that may be explained by musical conditioning, an unconscious propensity in the listener to ascribe instruments traditional roles. This relationship is maintained until 9'37", when the electronic sounds have faded out and the solo Disklavier once again becomes the sole focus of attention. However, the material it plays is now heard in the absence of the electronic sounds, and is thus altered. It now appears to perform opposing functions simultaneously, soloistic and accompanying. In addition to this, there is a sense that the enlarged frame of musical action that was opened up by the electronic sounds has been compressed into a smaller space, thus imbuing the Disklavier material with a greater perceived density of information.

[39] David Metzer, *Quotation and Cultural Meaning in Twentieth Century Music* (Cambridge University Press, 2003) p.23

SECTION THREE: PORTFOLIO

Portfolio: CD Tracklisting

1. **Canpiom**

Instrumentation: Solo alto and countertenor, 2 Guitars, Vln, Vla, Cello

Duration: 5'20"

2. **Quartut**

Instrumentation: String Quartet

Duration: 7'40"

3. **Untitled 1, Untitled A**

Instrumentation: Piano, Violin, Clarinet, Flute

Duration: 5'40"

4. **This Moving with Respect to That**

Instrumentation: Two Pianos

Duration: 4'30"

5. **Toward a more American Style**

Instrumentation: Disklavier and Loudspeakers

Duration: 10'15"

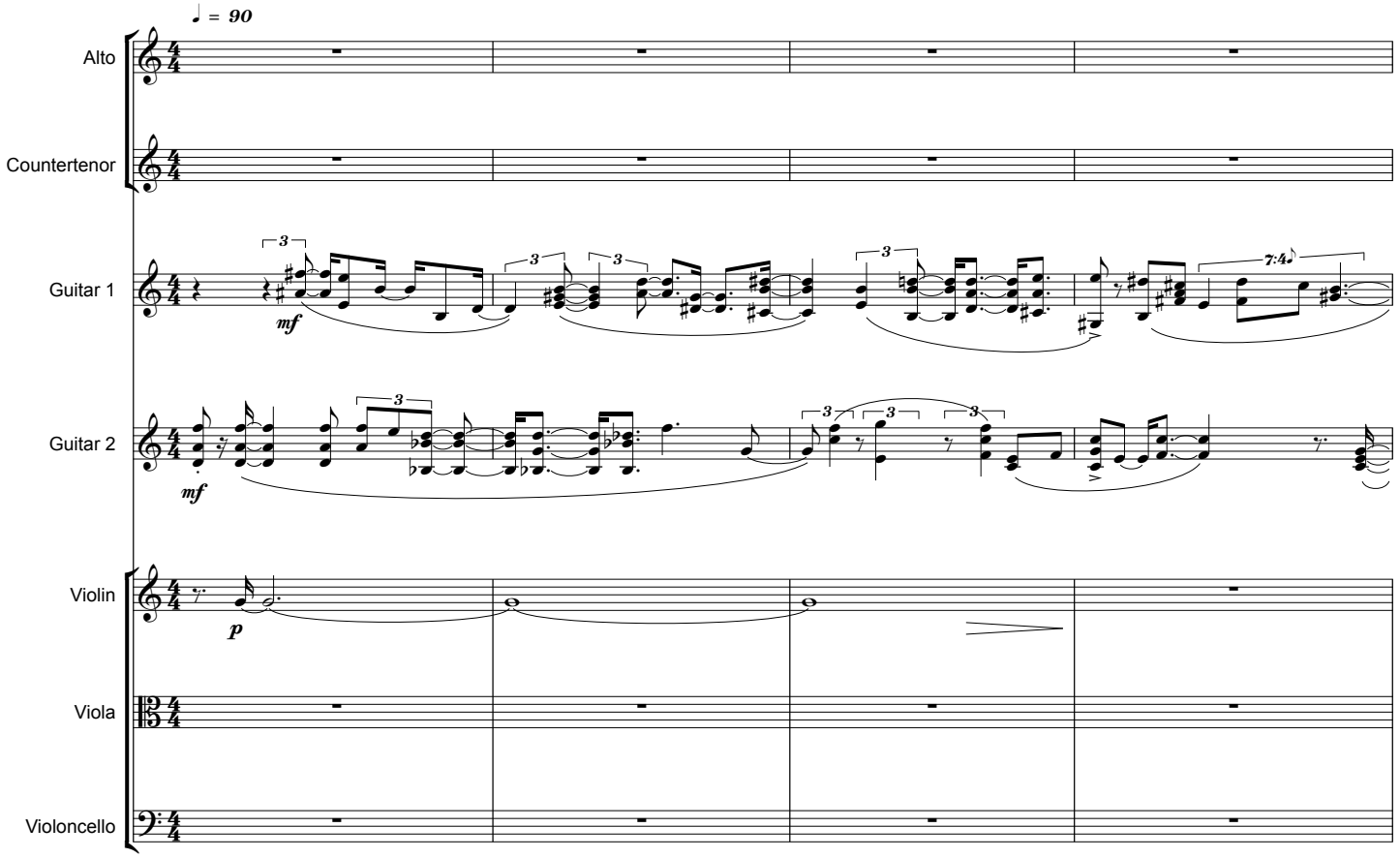
Leo Grant

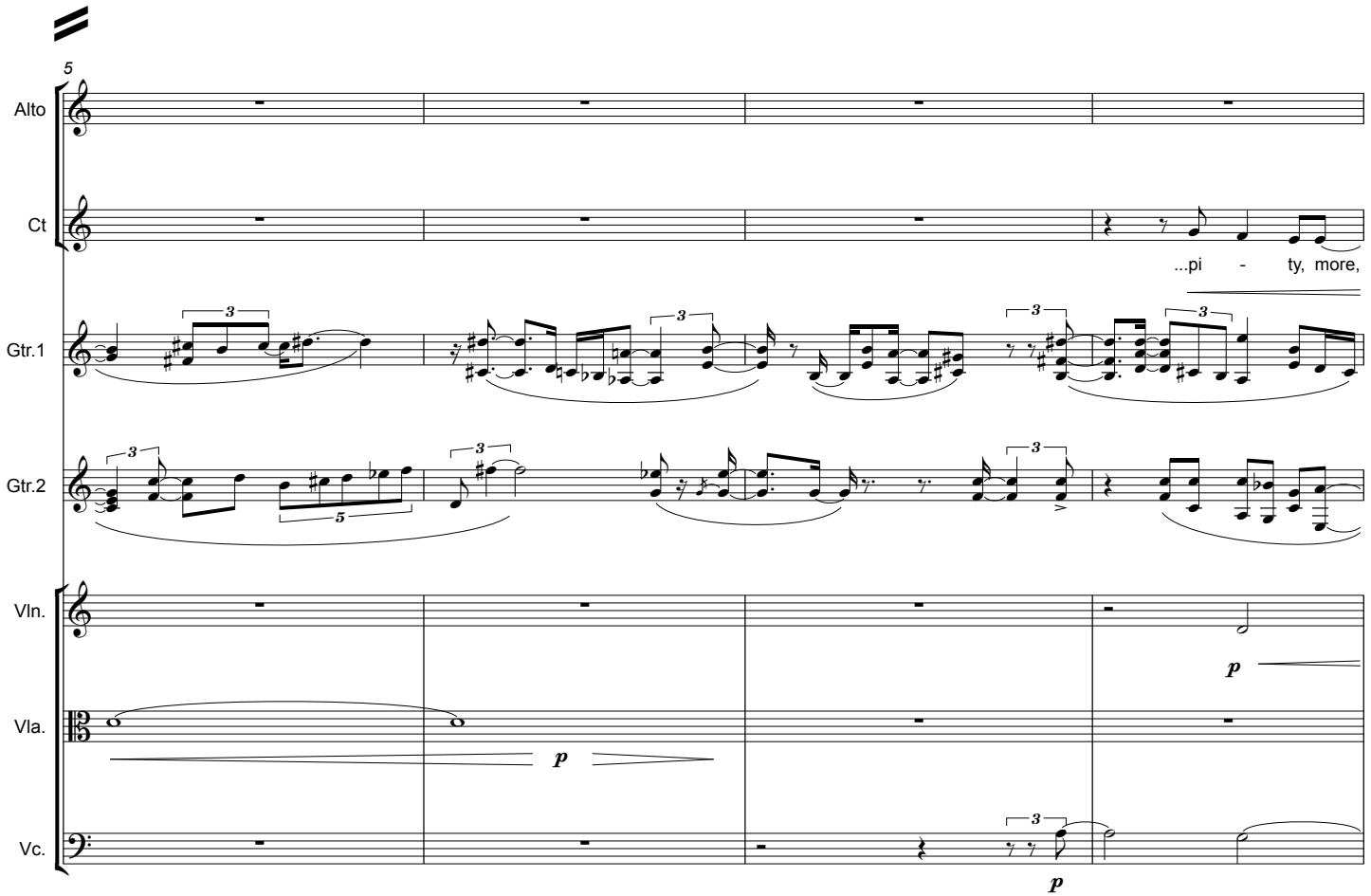
Canpiom (2009)

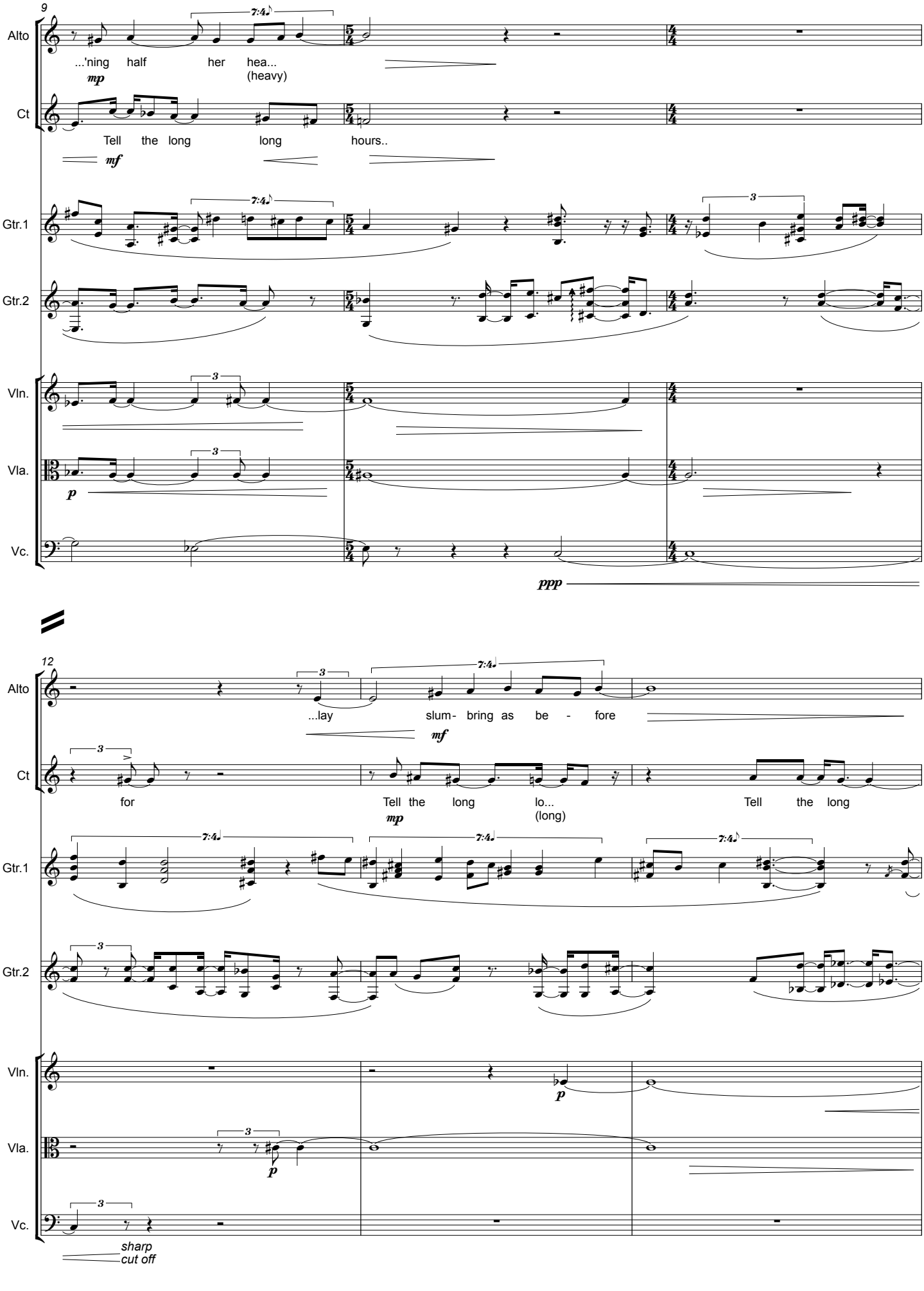
Instrumentation: Alto voice, Countertenor voice, 2 Guitars, Violin, Viola, Cello

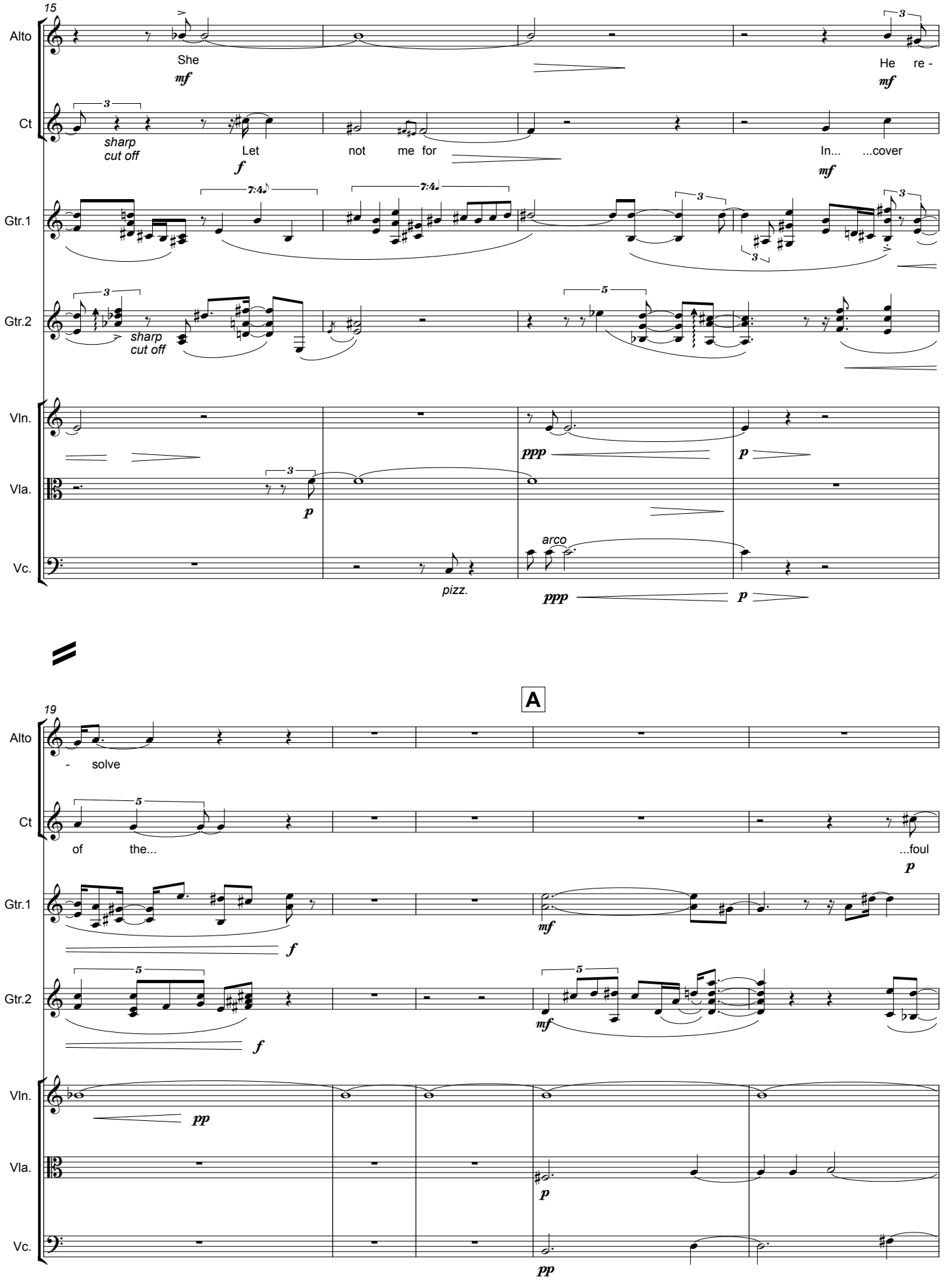
Duration: Approx. 5’20’’

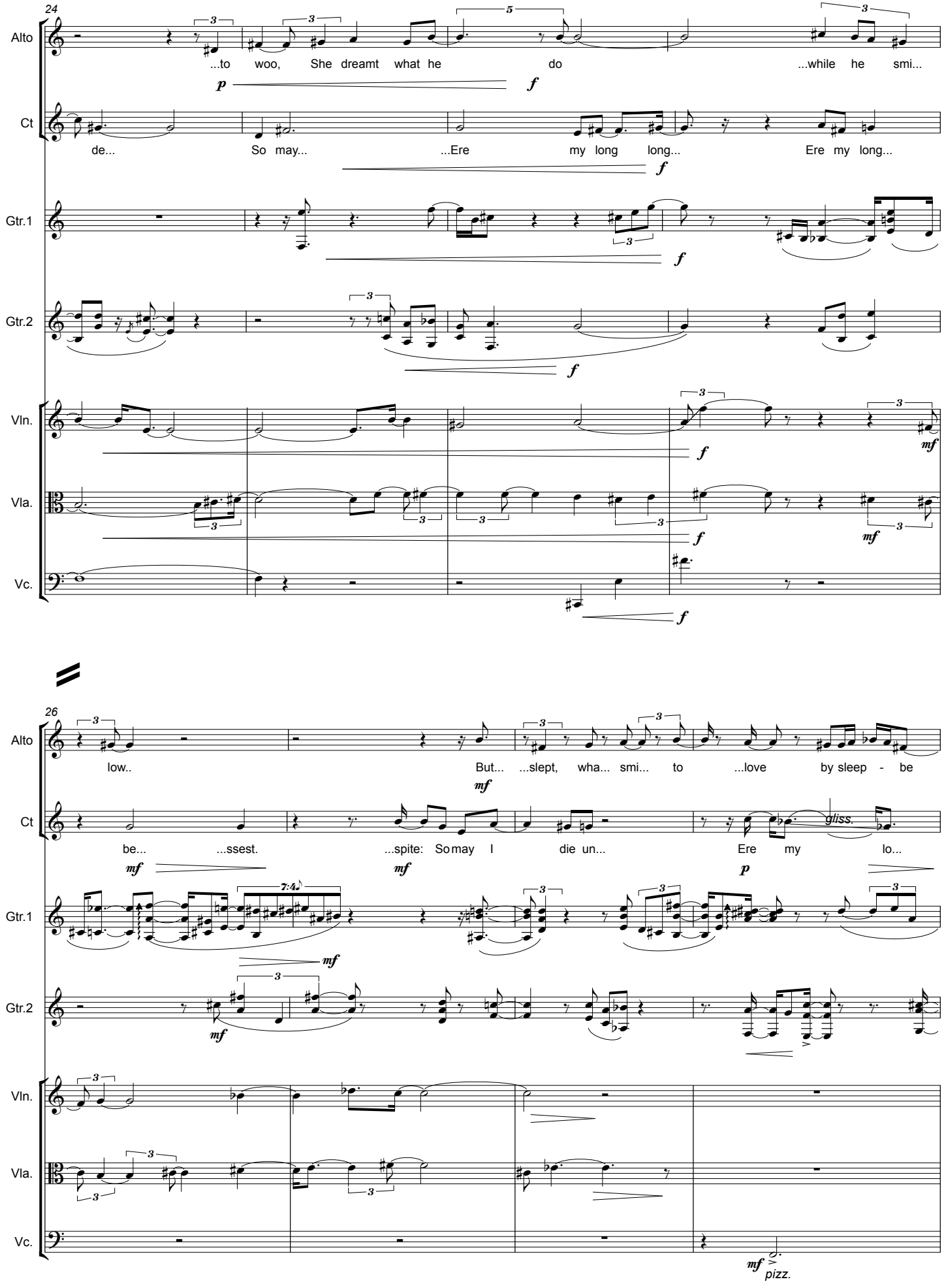
(Accidentals remain in force throughout the bar, as in conventional tonal music)

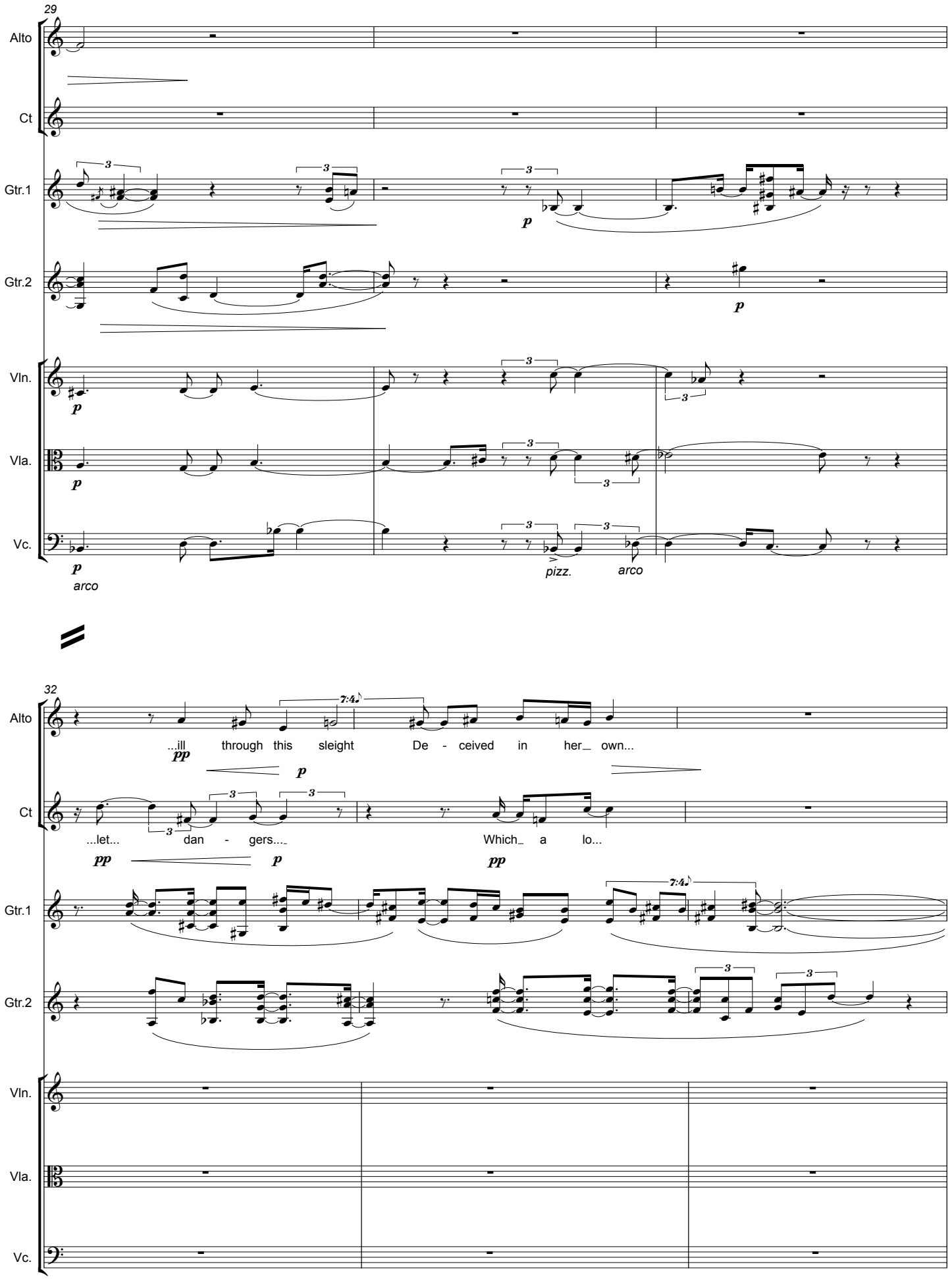


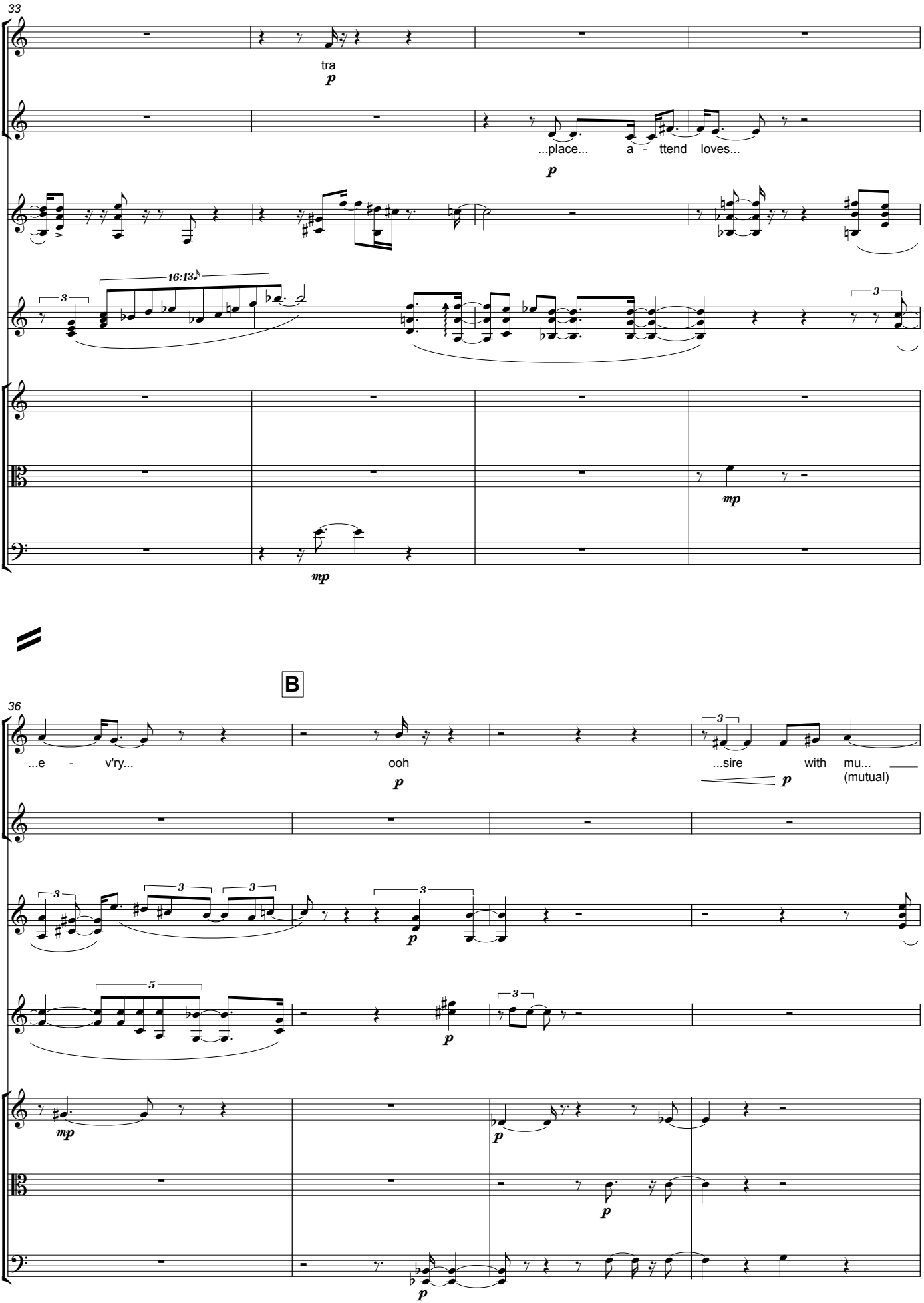


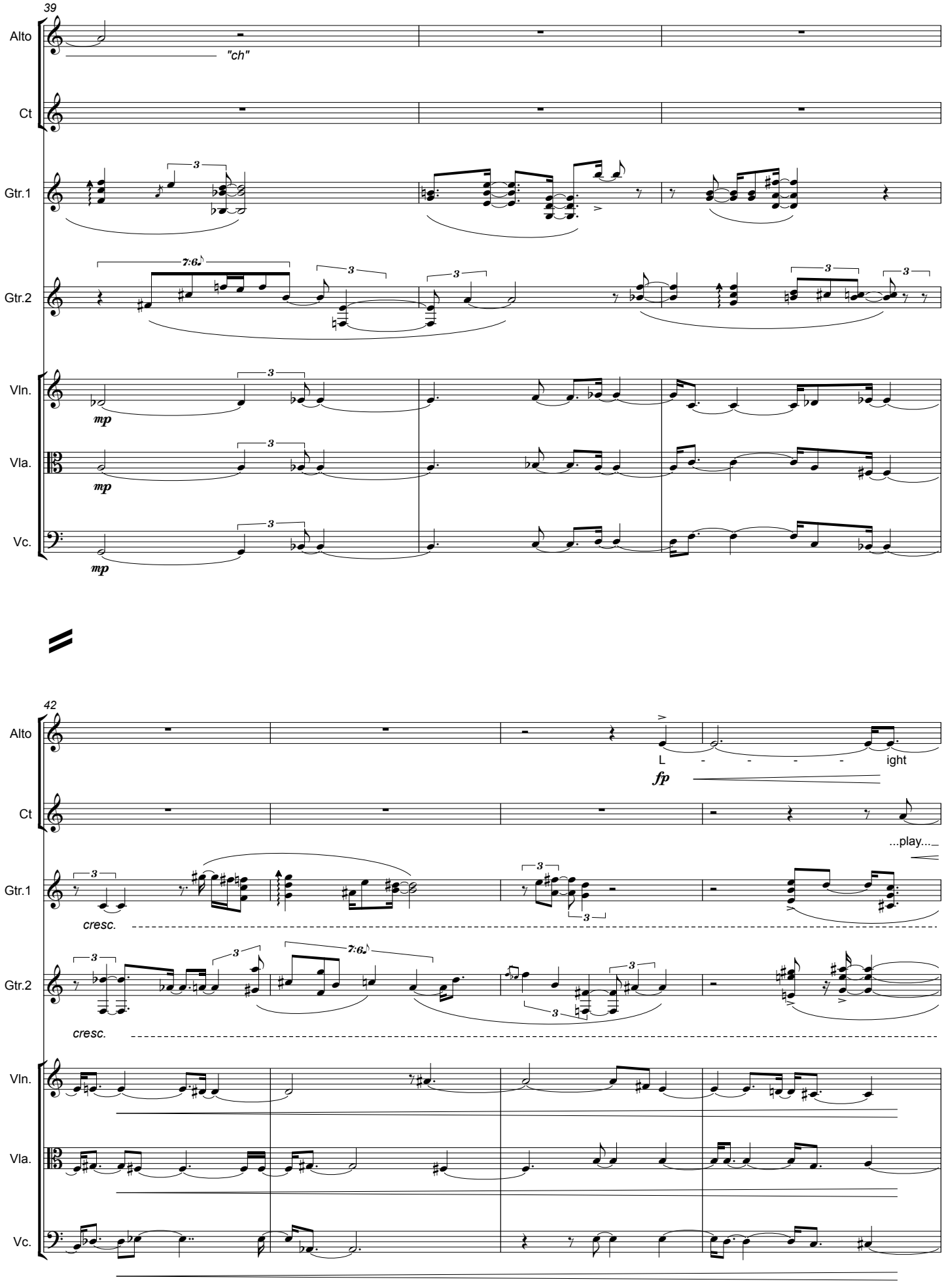

9
Alto
...'ning half her hea...
mp
(heavy)
Ct
Tell the long long hours..
mf
Gtr.1
Gtr.2
Vln.
Vla.
p
Vc.
ppp
12
Alto
...lay slum- bring as be - fore
mf
Ct
for Tell the long lo... Tell the long
mp
(long)
Gtr.1
Gtr.2
Vln.
p
Vla.
p
Vc.
sharp
cut off

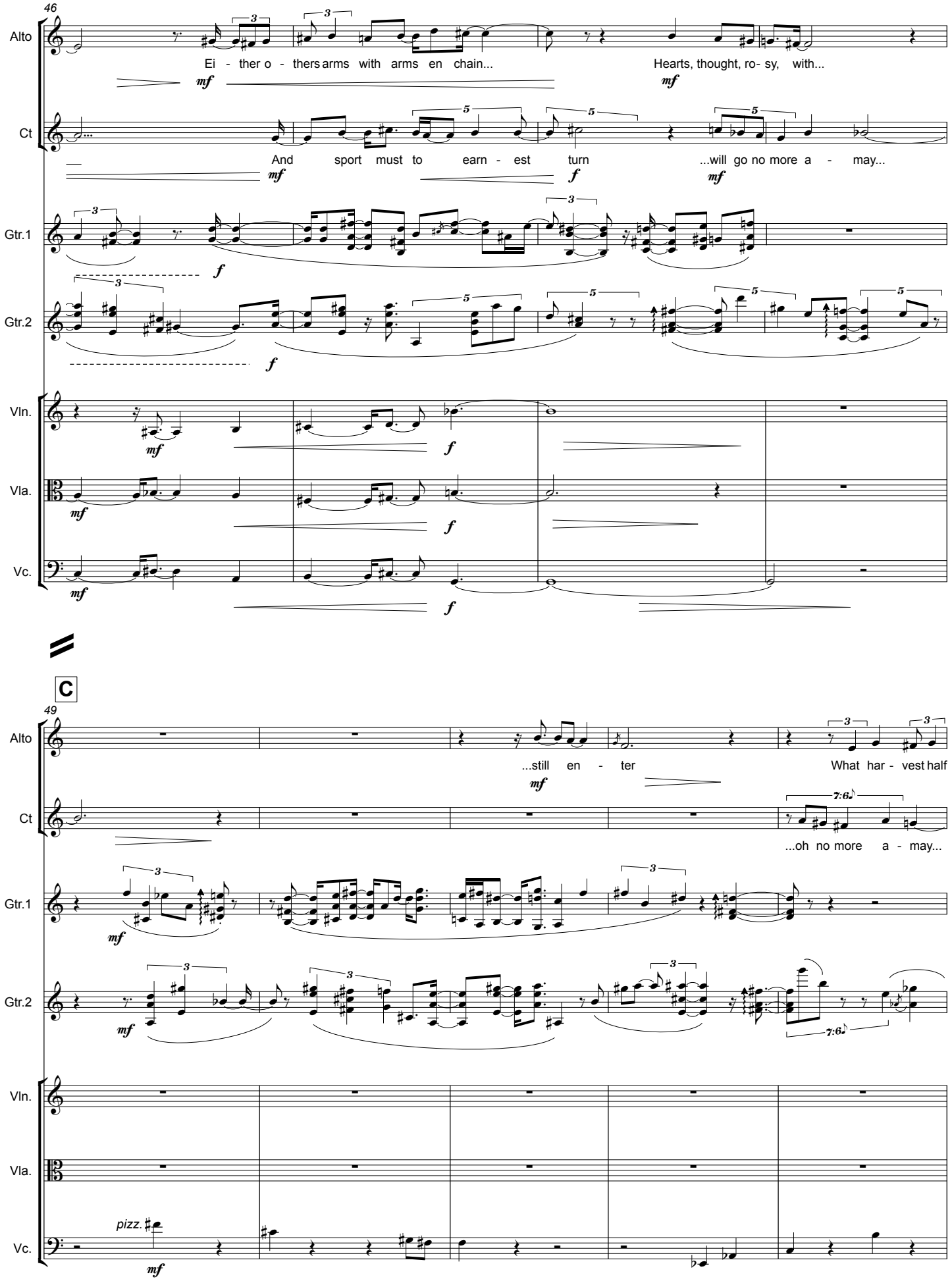

15
Alto
She
mf
He re -
mf
Ct
sharp
cut off
Let not me for
f
In... ...cover
mf
Gtr.1
Gtr.2
sharp
cut off
Vln.
ppp
p
Vla.
p
Vc.
arco
pizz.
ppp
p
A
19
Alto
- solve
Ct
of the...
...foul
p
Gtr.1
f
mf
Gtr.2
f
mf
Vln.
pp
Vla.
p
Vc.
pp

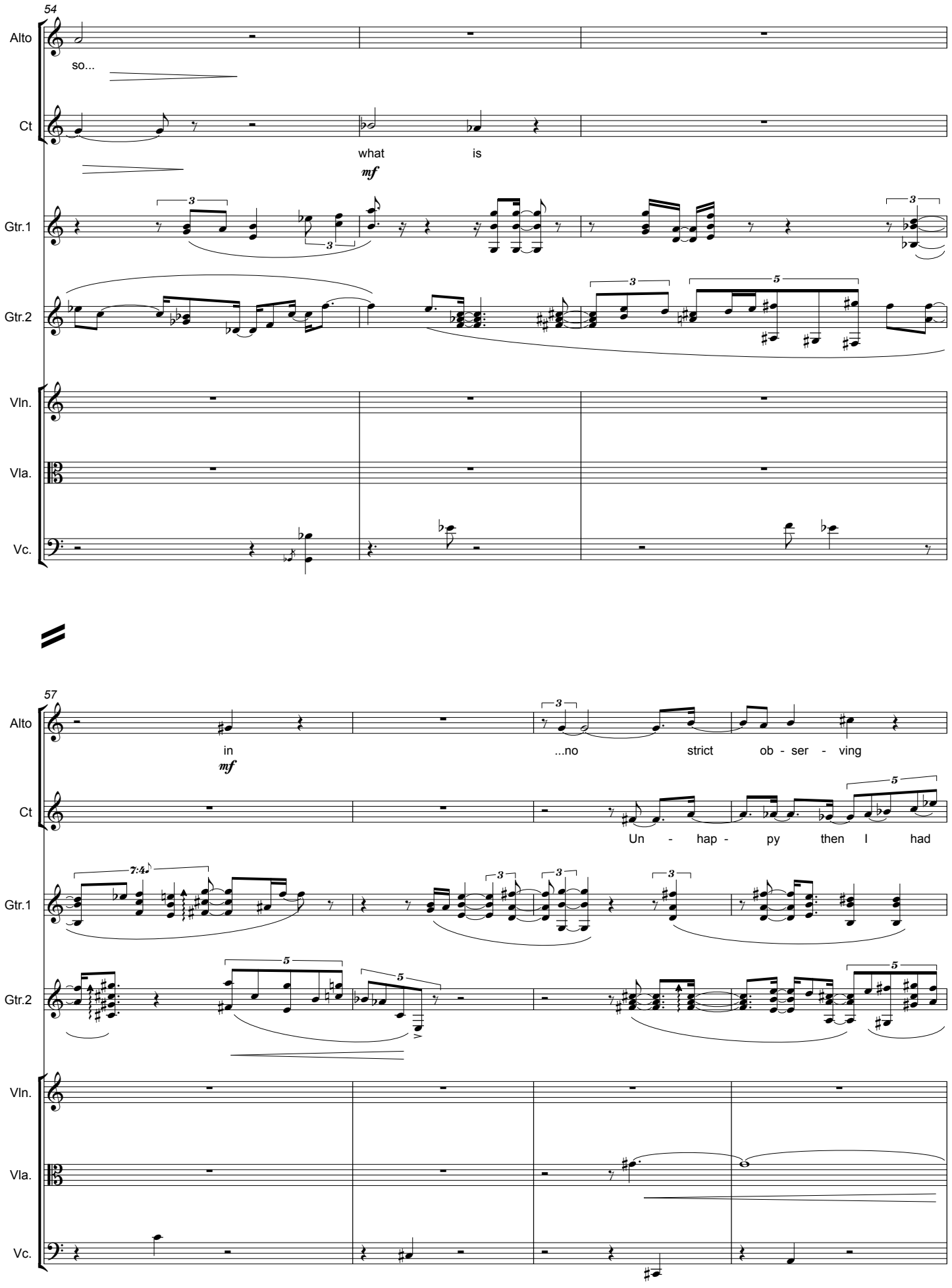

24
Alto
...to woo, She dreamt what he do ...while he smi...
p
f
Ct
de... So may... ...Ere my long long... Ere my long...
f
Gtr.1
f
Gtr.2
f
Vln.
f
mf
Vla.
f
mf
Vc.
f
26
Alto
low.. But... ...slept, wha... smi... to ...love by sleep - be
mf
Ct
be... ...ssest. ...spite: So may I die un... Ere my lo...
gliss.
mf
mf
p
Gtr.1
7:4
mf
Gtr.2
mf
Vln.
Vla.
Vc.
mf
pizz.

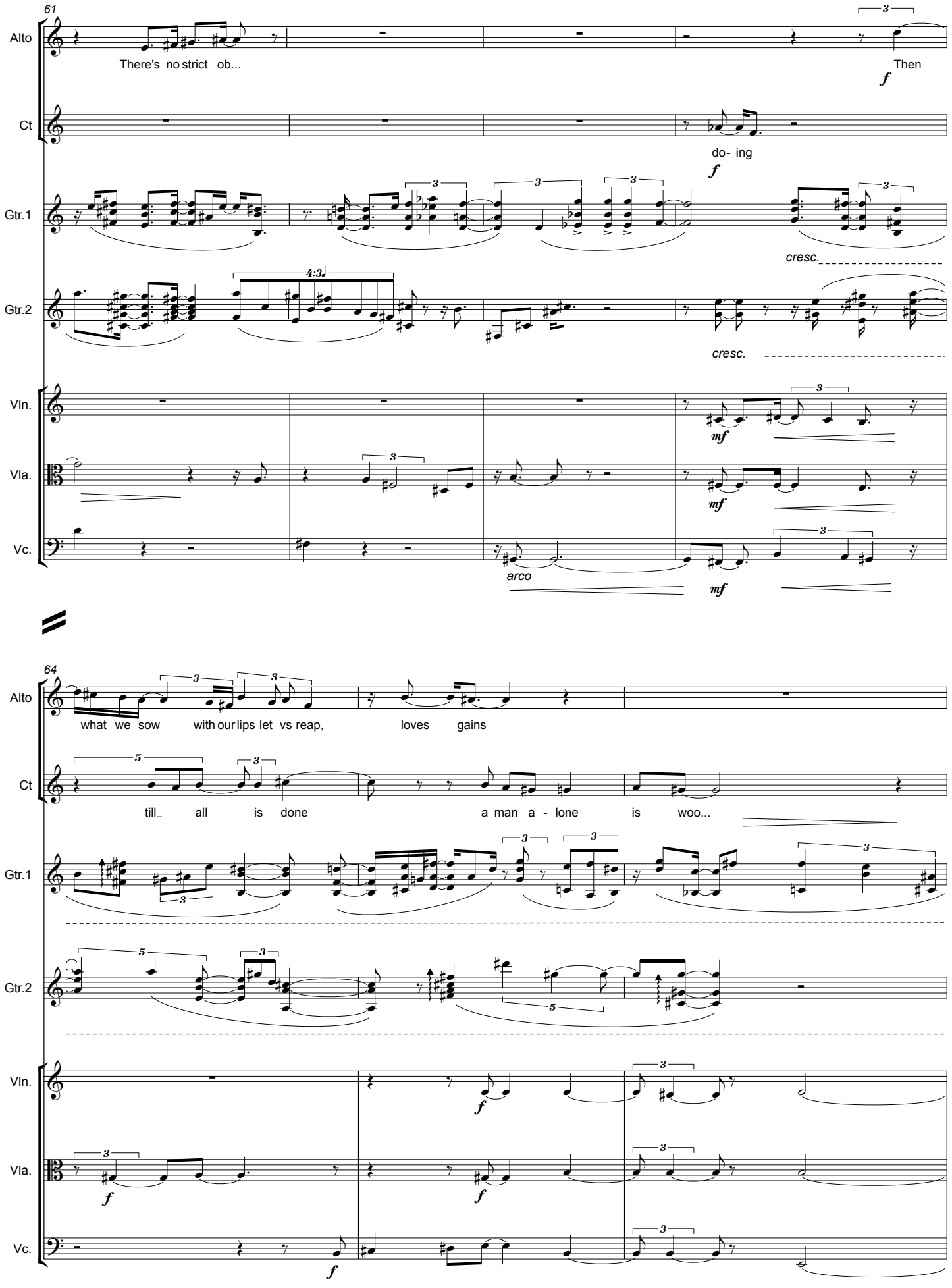

29
Alto
Ct
Gtr.1
Gtr.2
Vln.
Vla.
Vc.
p
arco
pizz.
arco
32
...ill through this sleight De - ceived in her_ own...
pp
p
...let... dan - gers..._ Which_ a lo...
pp
p
pp
7:4

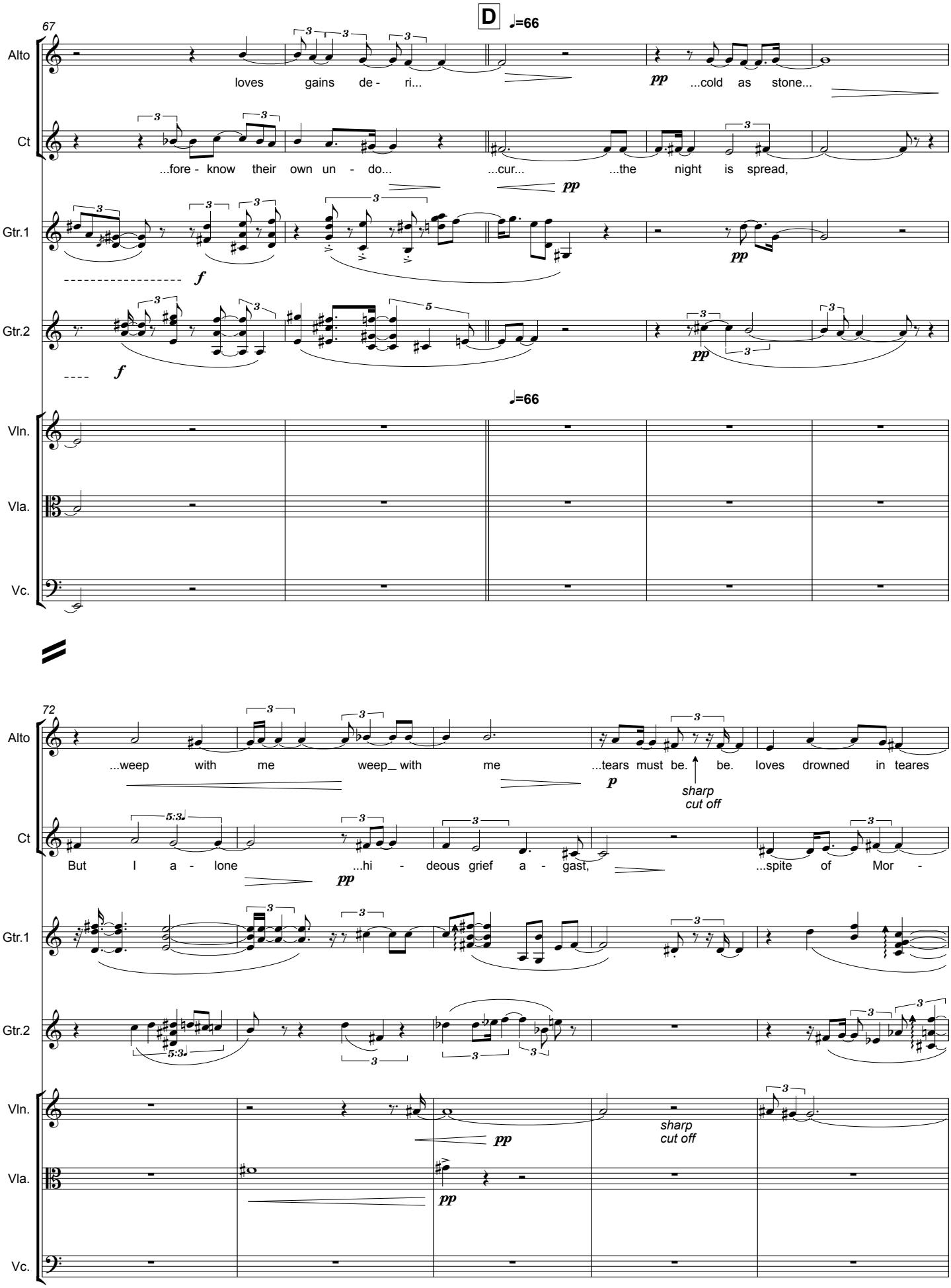

33
Alto
tra
p
Ct
...place... a - ttend loves...
p
Gtr.1
Gtr.2
16:13
Vln.
Vla.
mp
Vc.
mp
B
36
Alto
...e - v'ry...
ooh
p
...sire with mu...
(mutual)
p
Ct
Gtr.1
p
Gtr.2
p
Vln.
mp
p
Vla.
p
Vc.
p

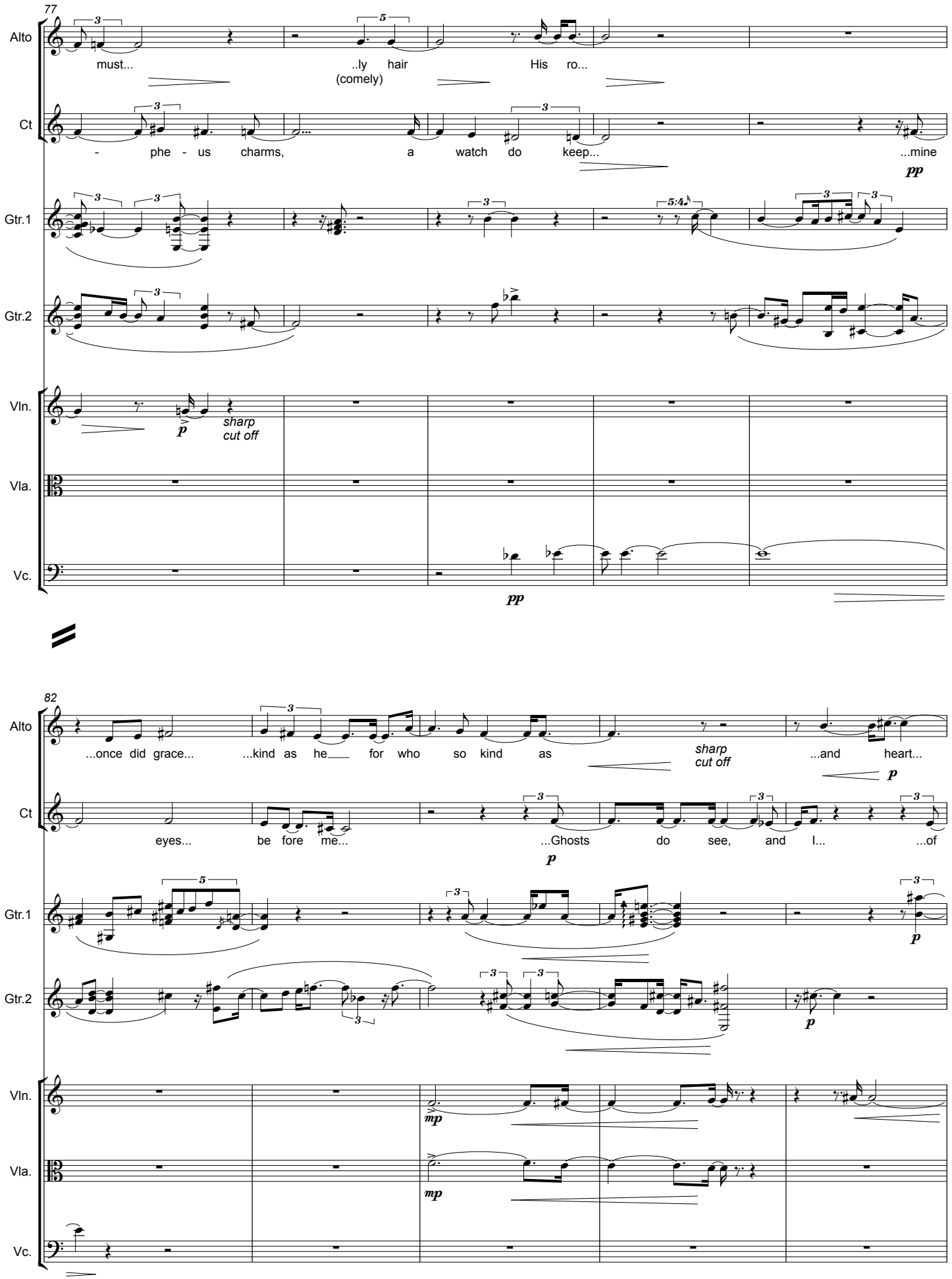

39
Alto
"ch"
Ct
Gtr.1
Gtr.2
Vln.
Vla.
Vc.
mp
42
L - - - - ight
fp
...play...
cresc.
cresc.

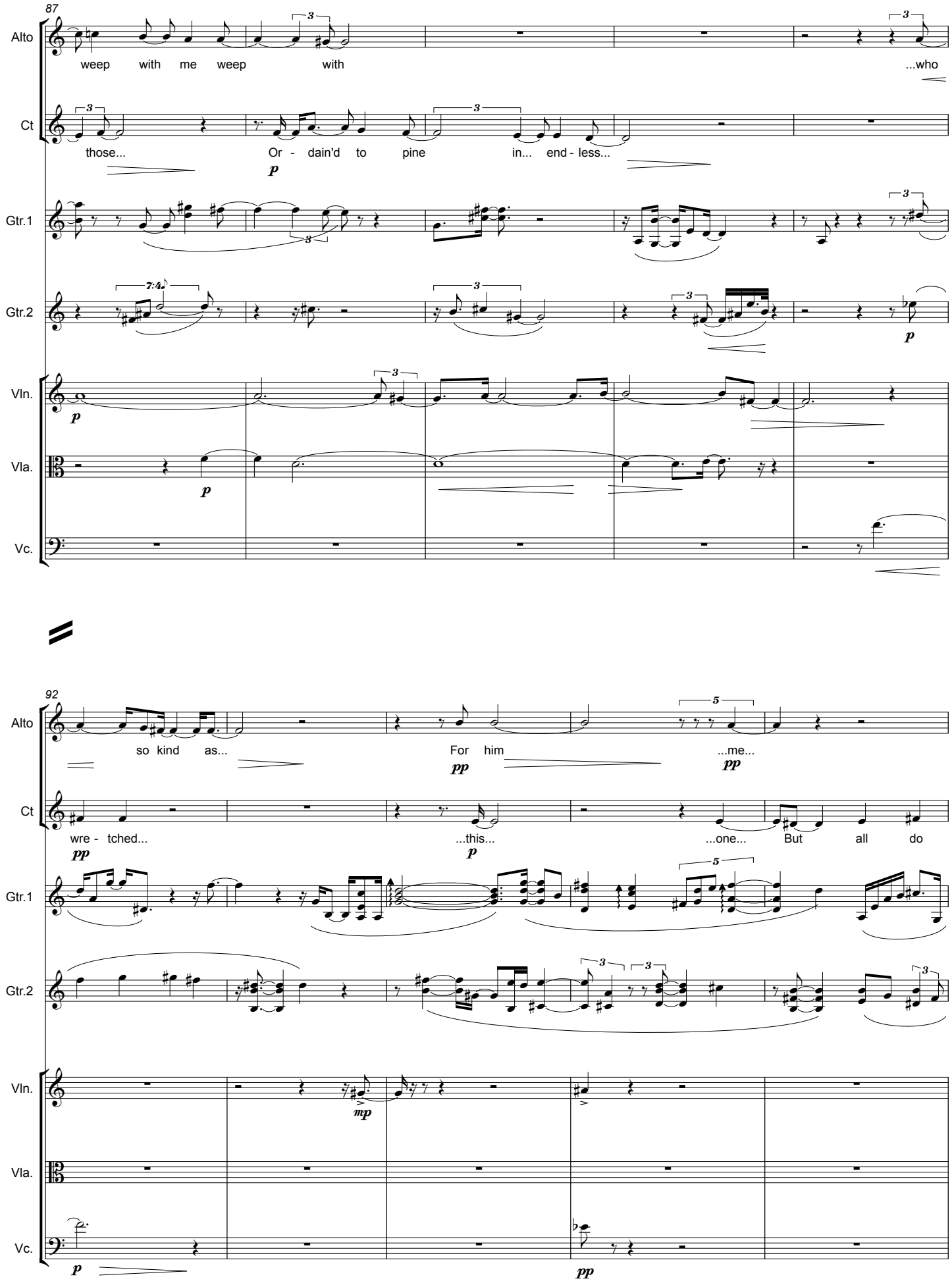

46
Alto
Ei - ther o - thers arms with arms en chain...
Hearts, thought, ro- sy, with...
Ct
And sport must to earn - est turn
...will go no more a - may...
Gtr.1
Gtr.2
Vln.
Vla.
Vc.
C
49
...still en - ter
What har - vest half
...oh no more a - may...
pizz.

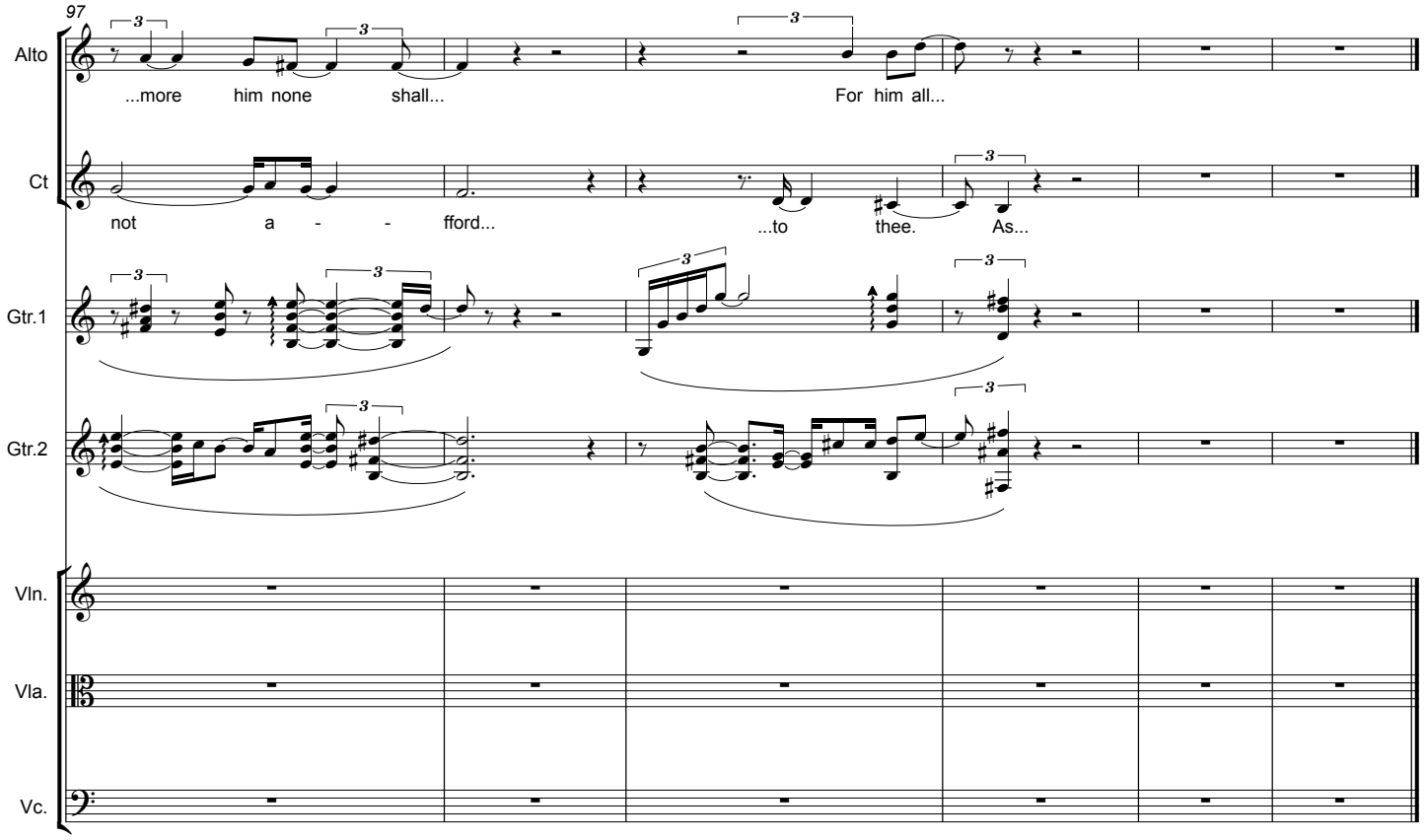

54
Alto
so...
Ct
what
is
mf
Gtr.1
Gtr.2
Vln.
Vla.
Vc.
57
Alto
in
mf
...no
strict
ob - ser - ving
Ct
Un - hap - py
then
I
had
Gtr.1
Gtr.2
Vln.
Vla.
Vc.


61
Alto
There's no strict ob...
Then
f
Ct
do- ing
f
Gtr.1
cresc.
Gtr.2
4:3
cresc.
Vln.
mf
Vla.
mf
Vc.
arco
mf
64
Alto
what we sow with our lips let vs reap, loves gains
Ct
till_ all is done a man a - lone is woo...
Gtr.1
Gtr.2
Vln.
f
Vla.
f
f
Vc.
f


D
♩=66
67
Alto
loves gains de - ri...
pp ...cold as stone...
Ct
...fore - know their own un - do...
...cur... ...the night is spread,
pp
Gtr.1
f
pp
Gtr.2
f
pp
♩=66
Vln.
Vla.
Vc.
72
Alto
...weep with me weep_ with me
...tears must be. be. loves drowned in teares
p
sharp cut off
Ct
But I a - lone
pp
...hi - deous grief a - gast,
...spite of Mor -
Gtr.1
Gtr.2
Vln.
pp
sharp cut off
Vla.
pp
Vc.


77
Alto
must...
..ly hair
(comely)
His ro...
Ct
- phe - us charms,
a watch do keep...
...mine
pp
Gtr.1
Gtr.2
Vln.
p
sharp
cut off
Vla.
Vc.
pp
82
Alto
...once did grace...
...kind as he
for who so kind as
sharp
cut off
...and heart...
p
Ct
eyes...
be fore me...
...Ghosts do see, and I...
...of
p
Gtr.1
p
Gtr.2
p
Vln.
mp
Vla.
mp
Vc.


87
Alto
weep with me weep with ...who
Ct
those... Or - dain'd to pine in... end - less...
p
Gtr.1
Gtr.2
7:4
Vln.
Vla.
Vc.
92
so kind as... For him ...me...
pp
wre - tched... ...this... ...one... But all do
mp

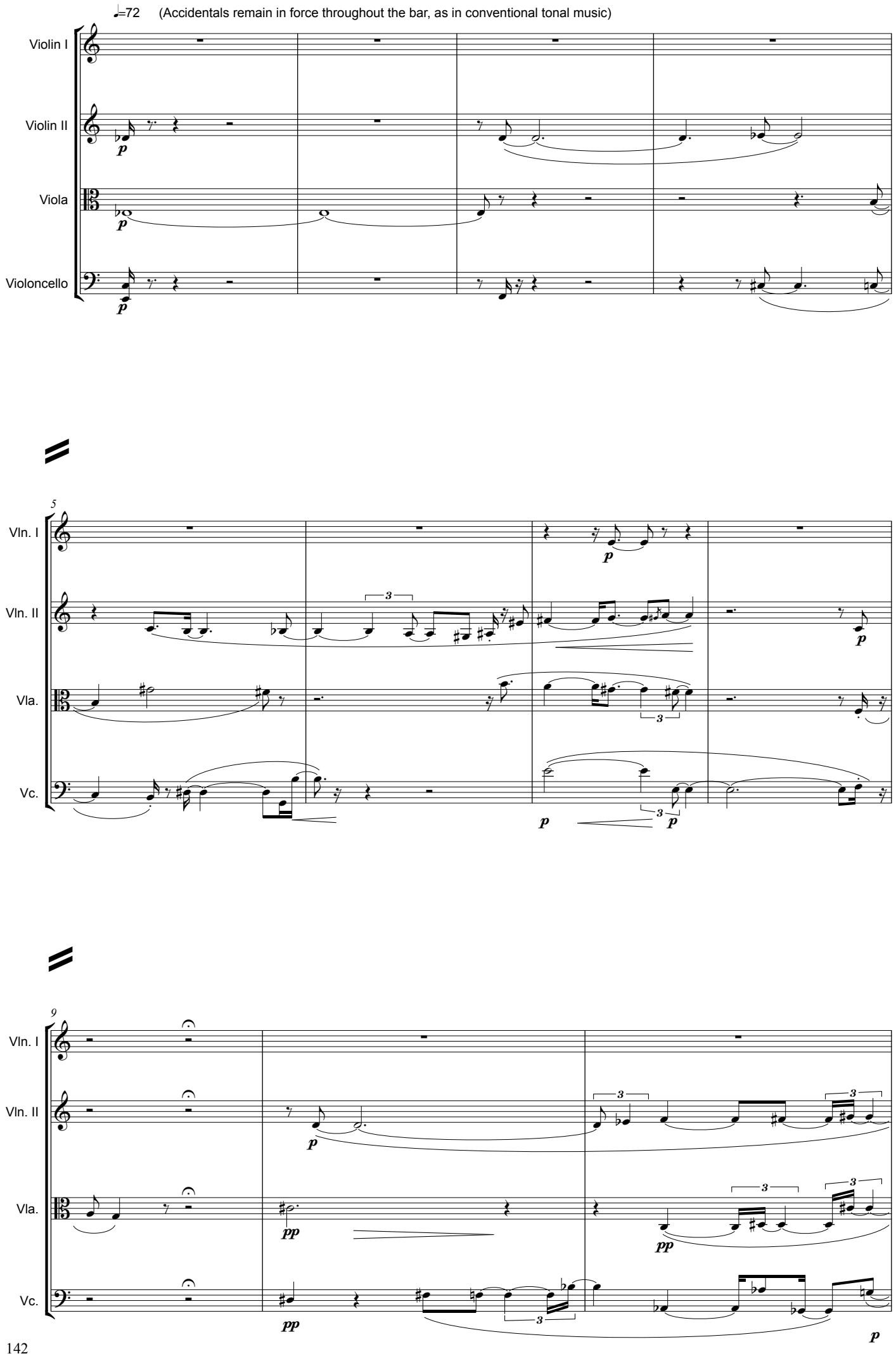

97
Alto
...more him none shall...
For him all...
Ct
not a - - fford...
...to thee. As...
Gtr.1
Gtr.2
Vln.
Vla.
Vc.

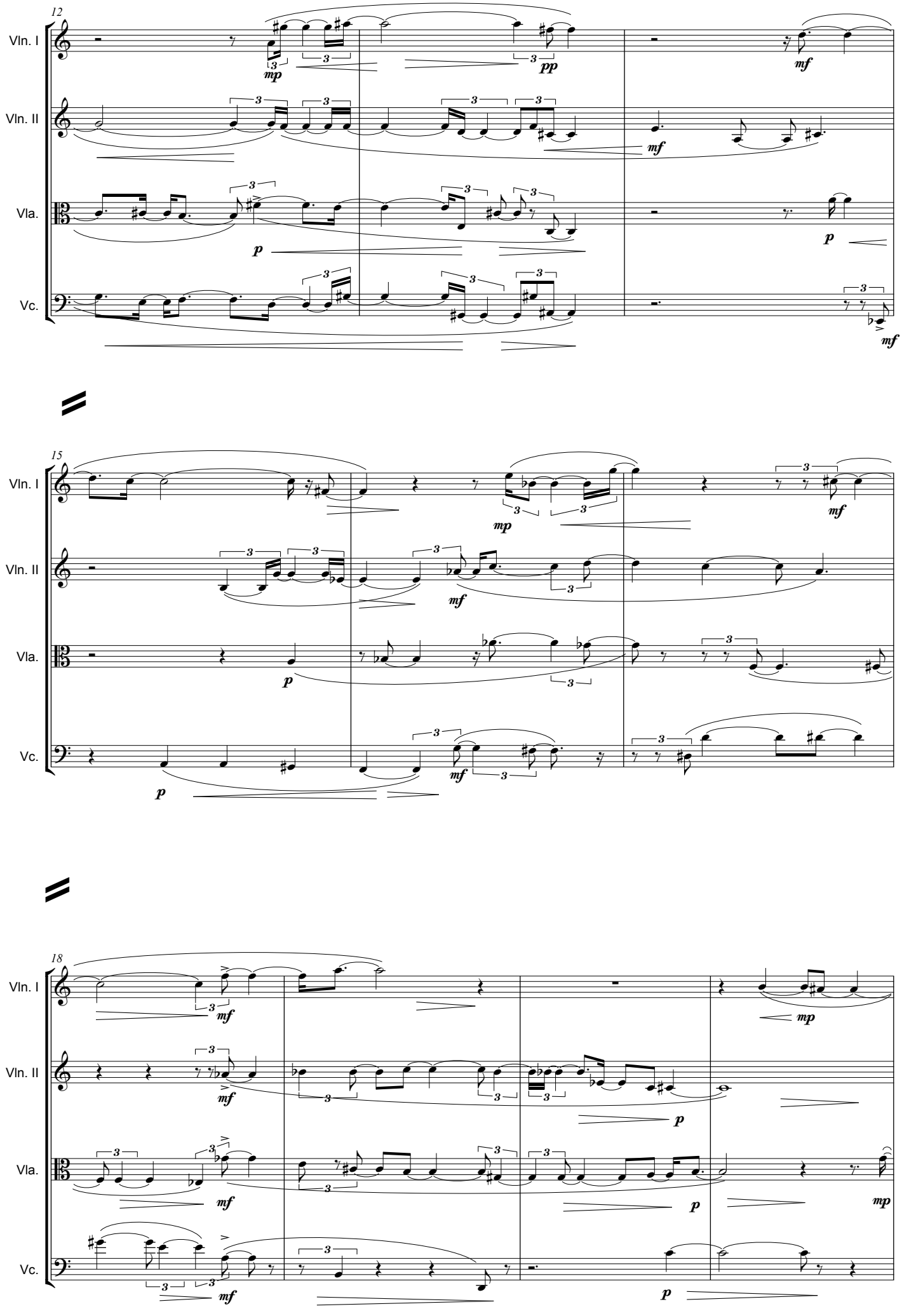
Leo Grant

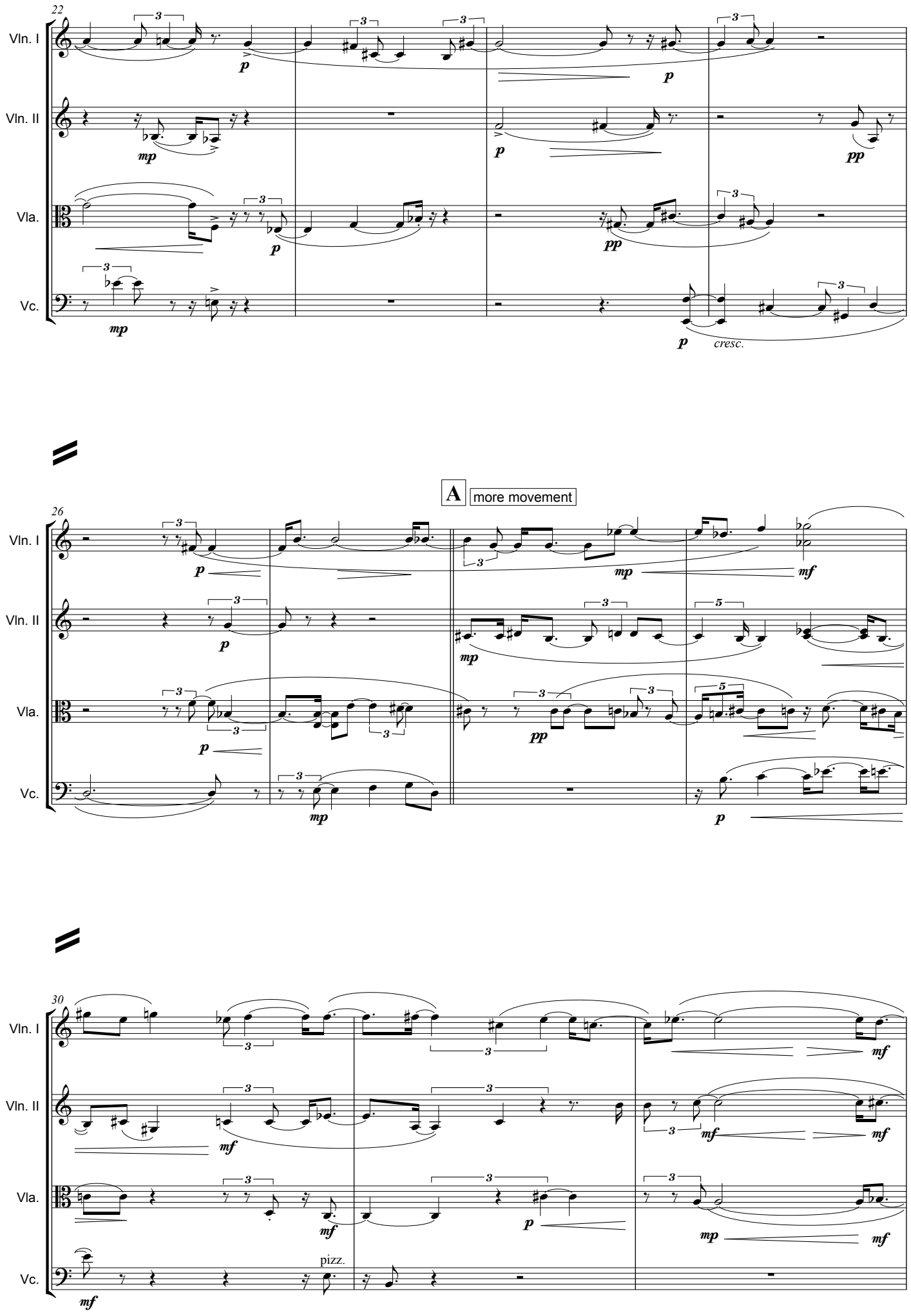
Quartut (2009)

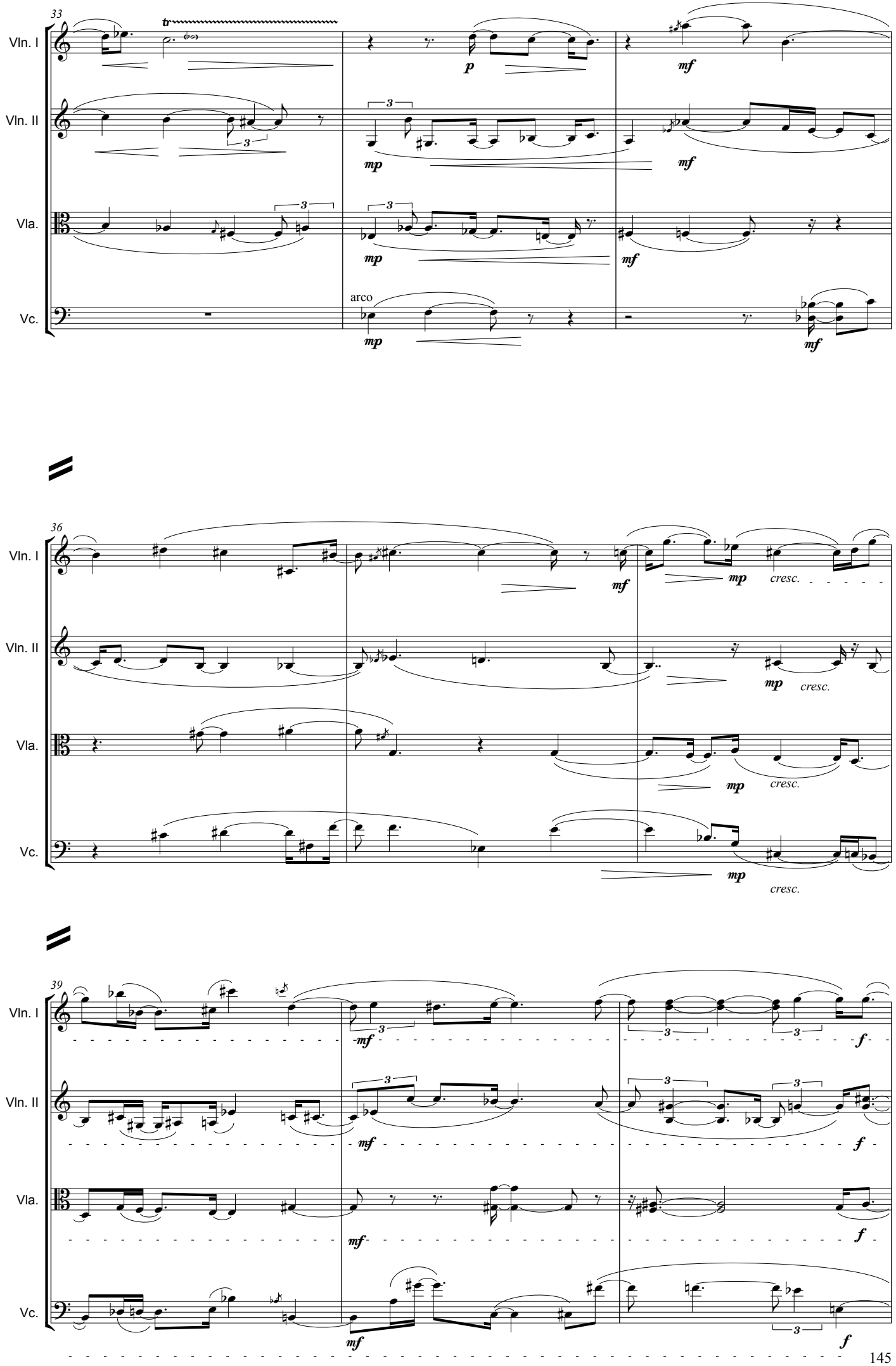
For String Quartet

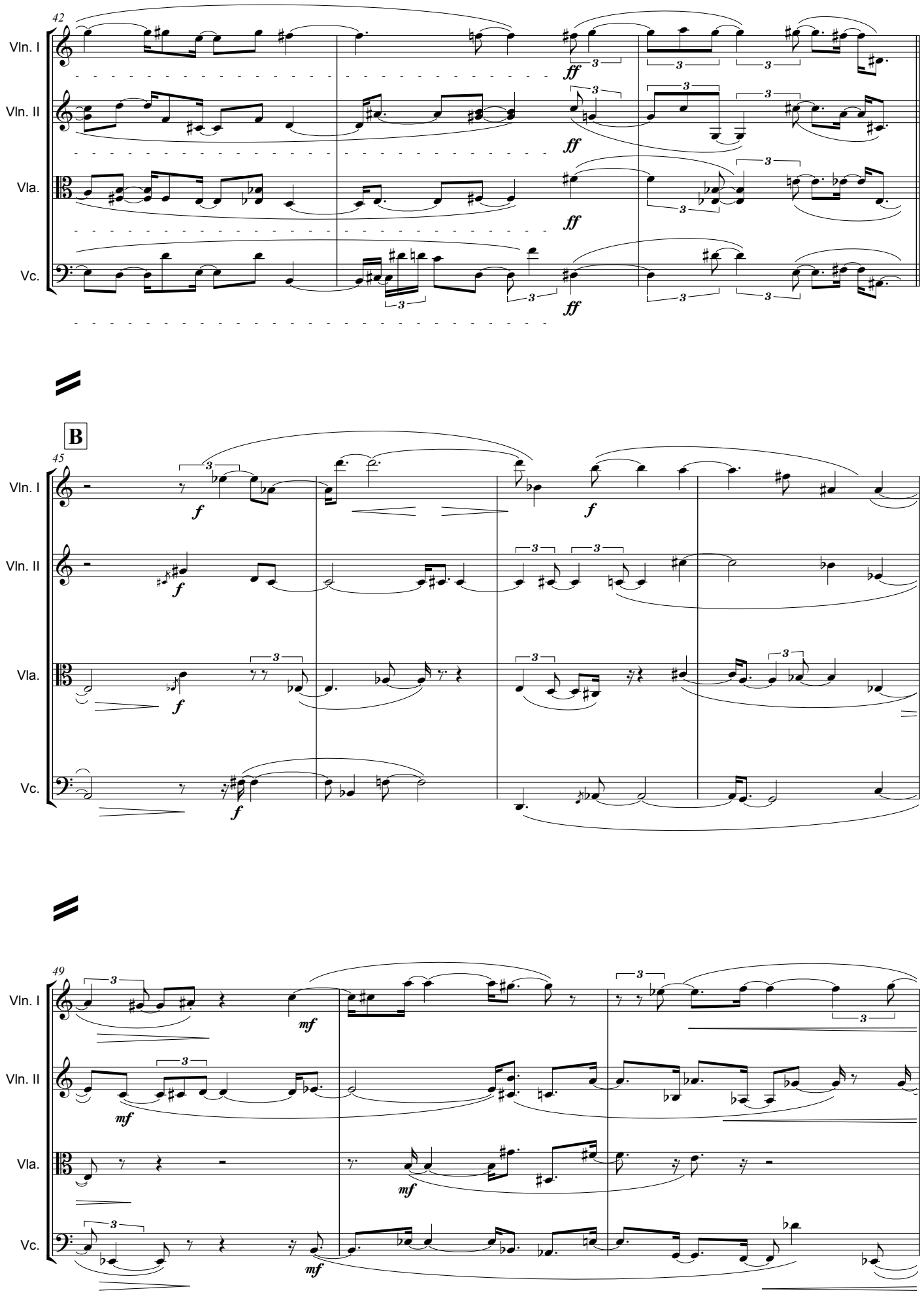
Duration: Approx. 7’40’’

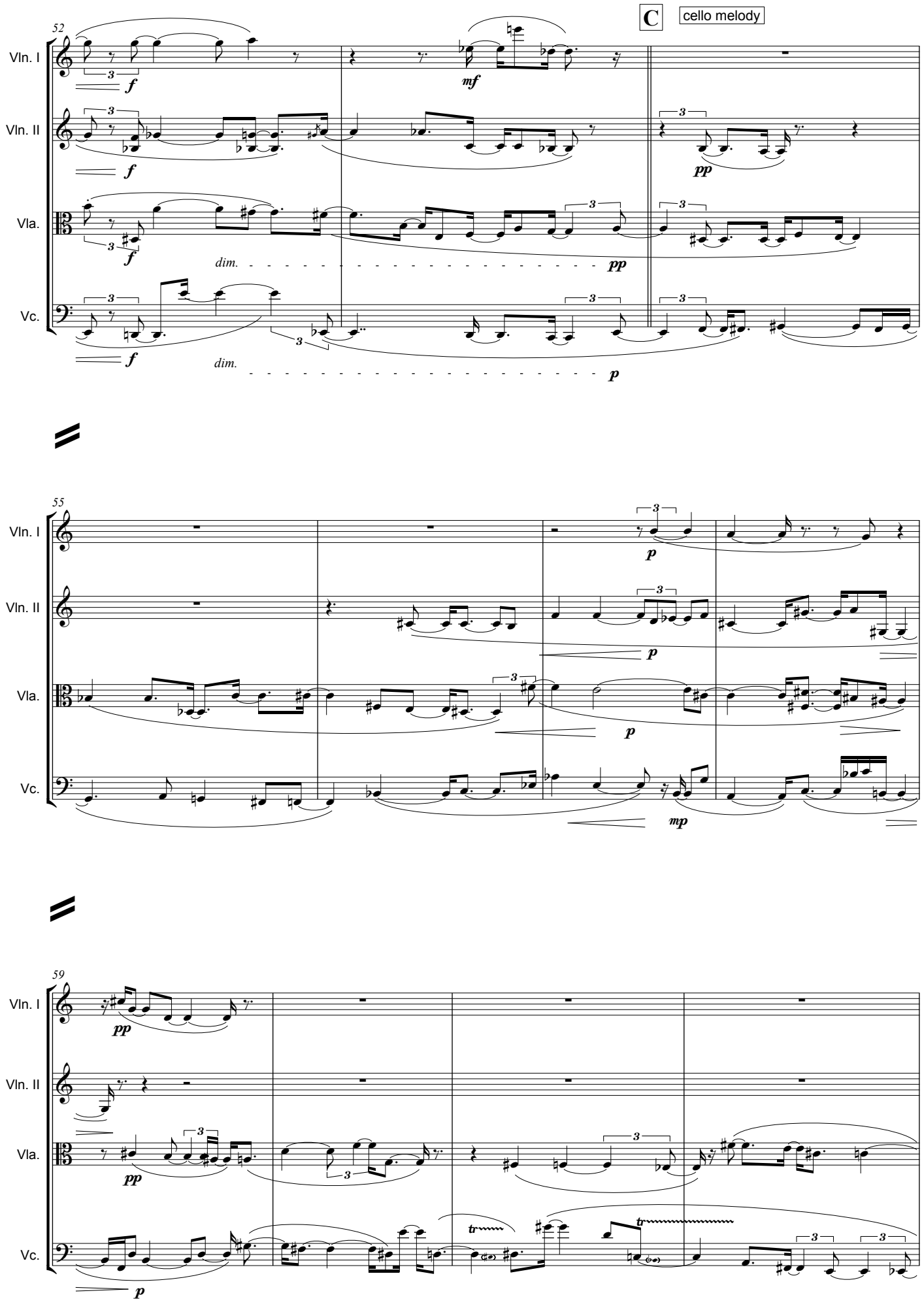

♩=72 (Accidentals remain in force throughout the bar, as in conventional tonal music)
Violin I
Violin II
Viola
Violoncello
p
5
Vln. I
Vln. II
Vla.
Vc.
3
9
pp

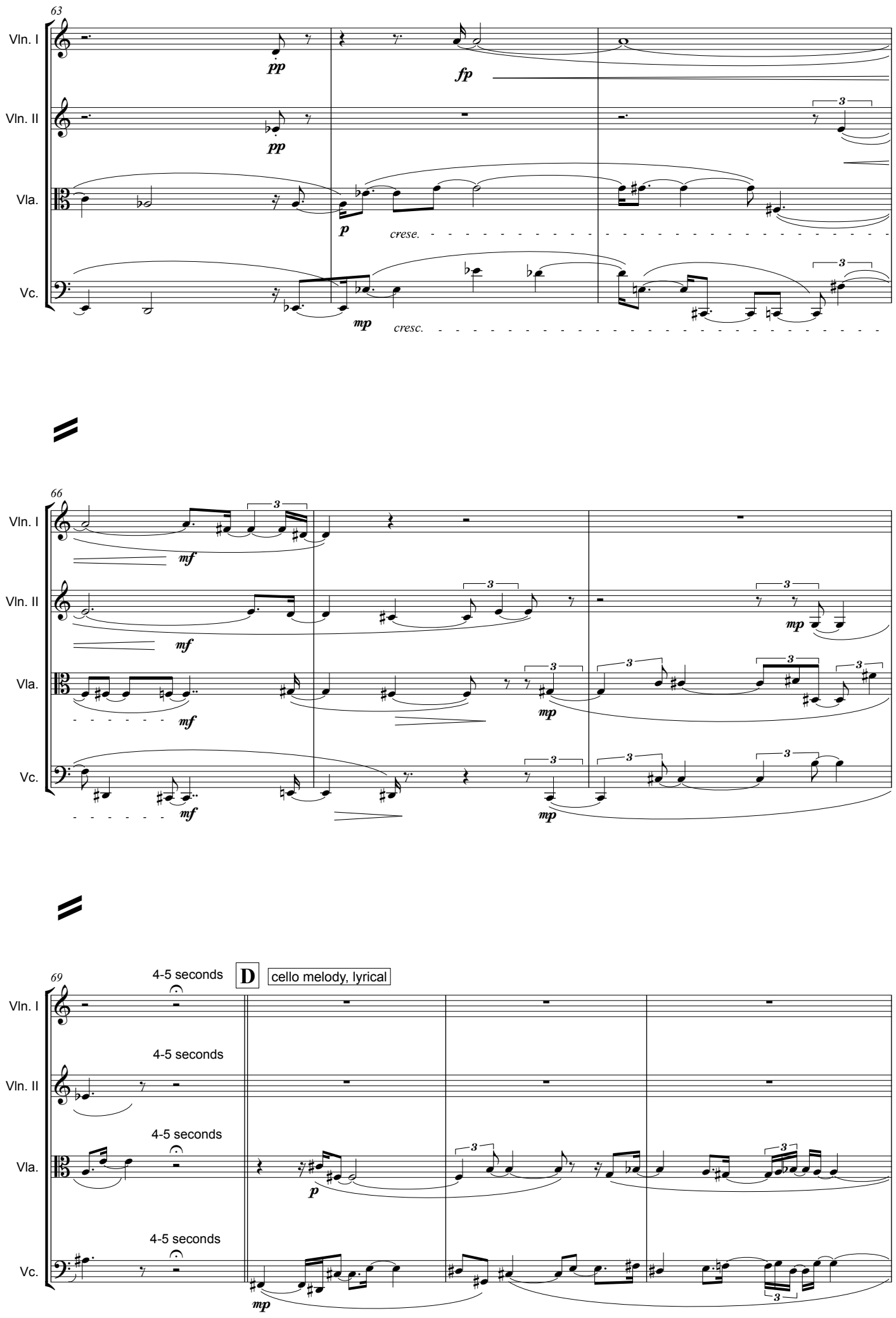

12
Vln. I
Vln. II
Vla.
Vc.
15
18

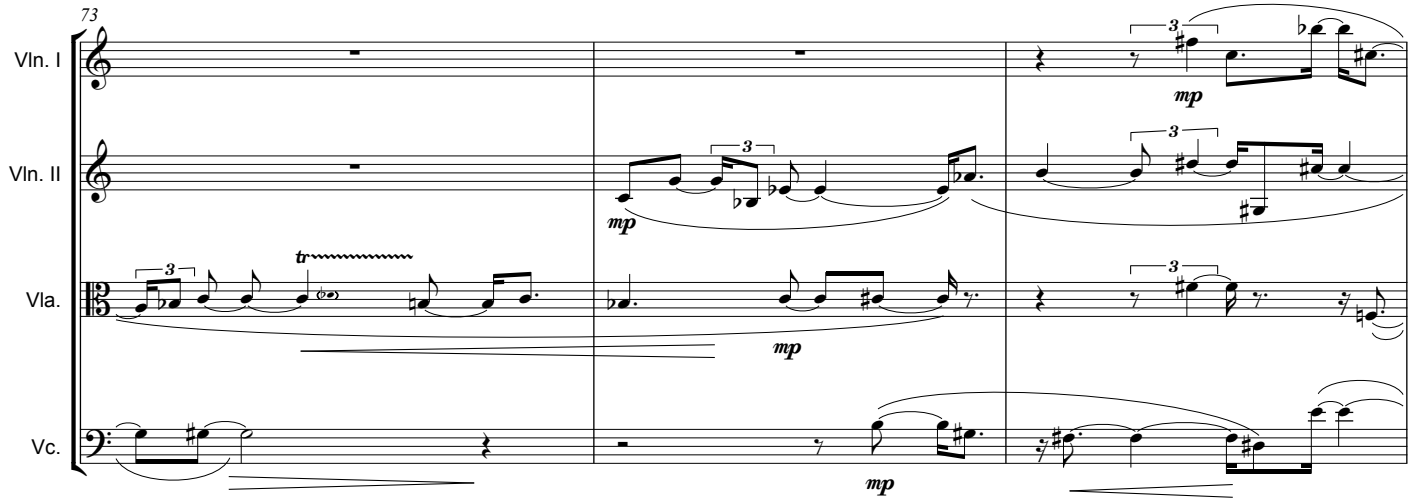

22
Vln. I
Vln. II
Vla.
Vc.
cresc.
A
more movement
26
30
pizz.

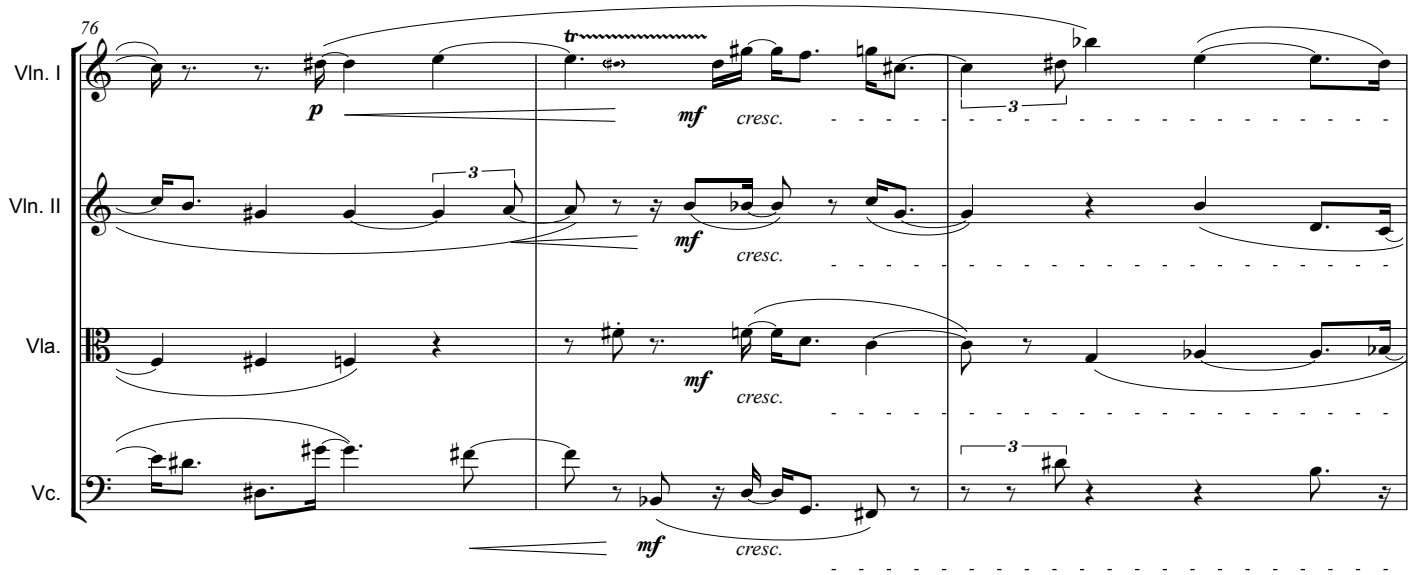

33
Vln. I
Vln. II
Vla.
Vc.
tr
p
mf
mp
arco
36
cresc.
39
f

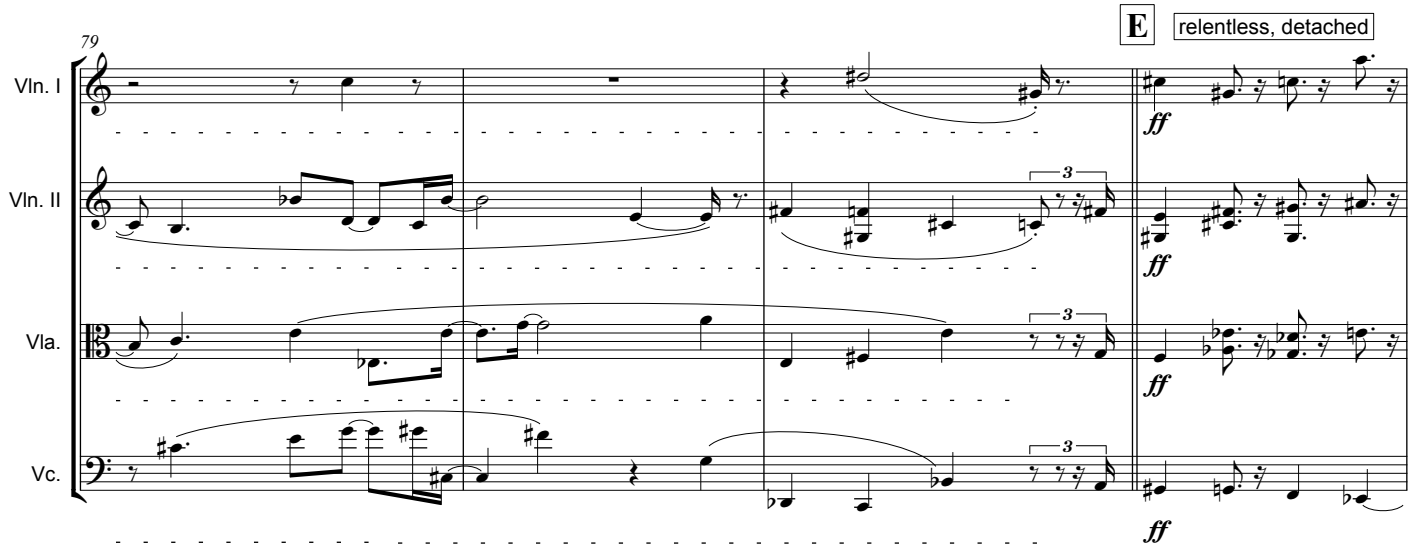

42
Vln. I
Vln. II
Vla.
Vc.
ff
B
45
f
49
mf

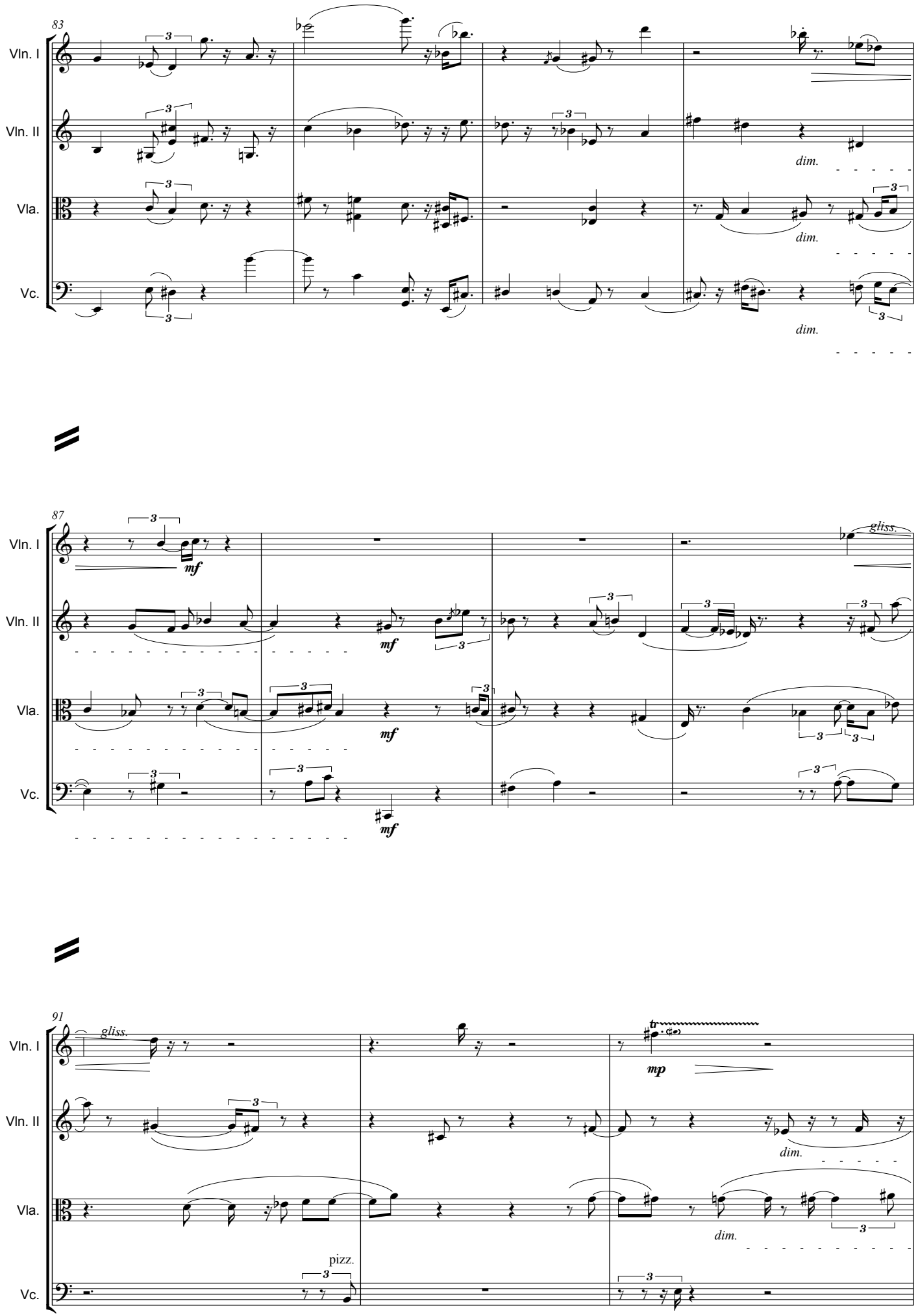

C
cello melody
52
Vln. I
Vln. II
Vla.
Vc.
dim.
55
59

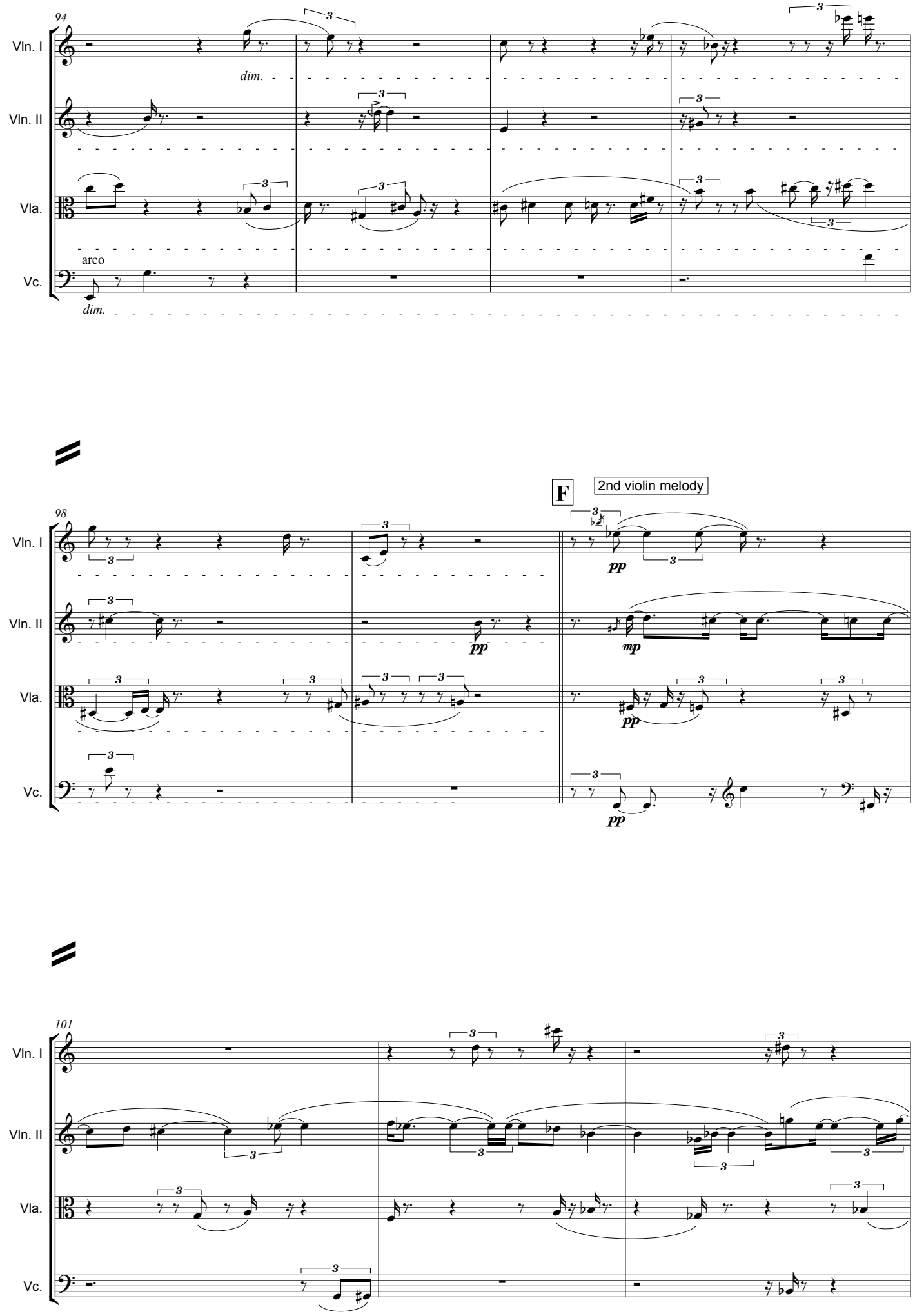

63
Vln. I
Vln. II
Vla.
Vc.
pp
pp
fp
p
crese.
mp
cresc.
3
66
mf
mf
mf
mp
mp
mp
69
4-5 seconds
4-5 seconds
4-5 seconds
4-5 seconds
D
cello melody, lyrical
p
mp

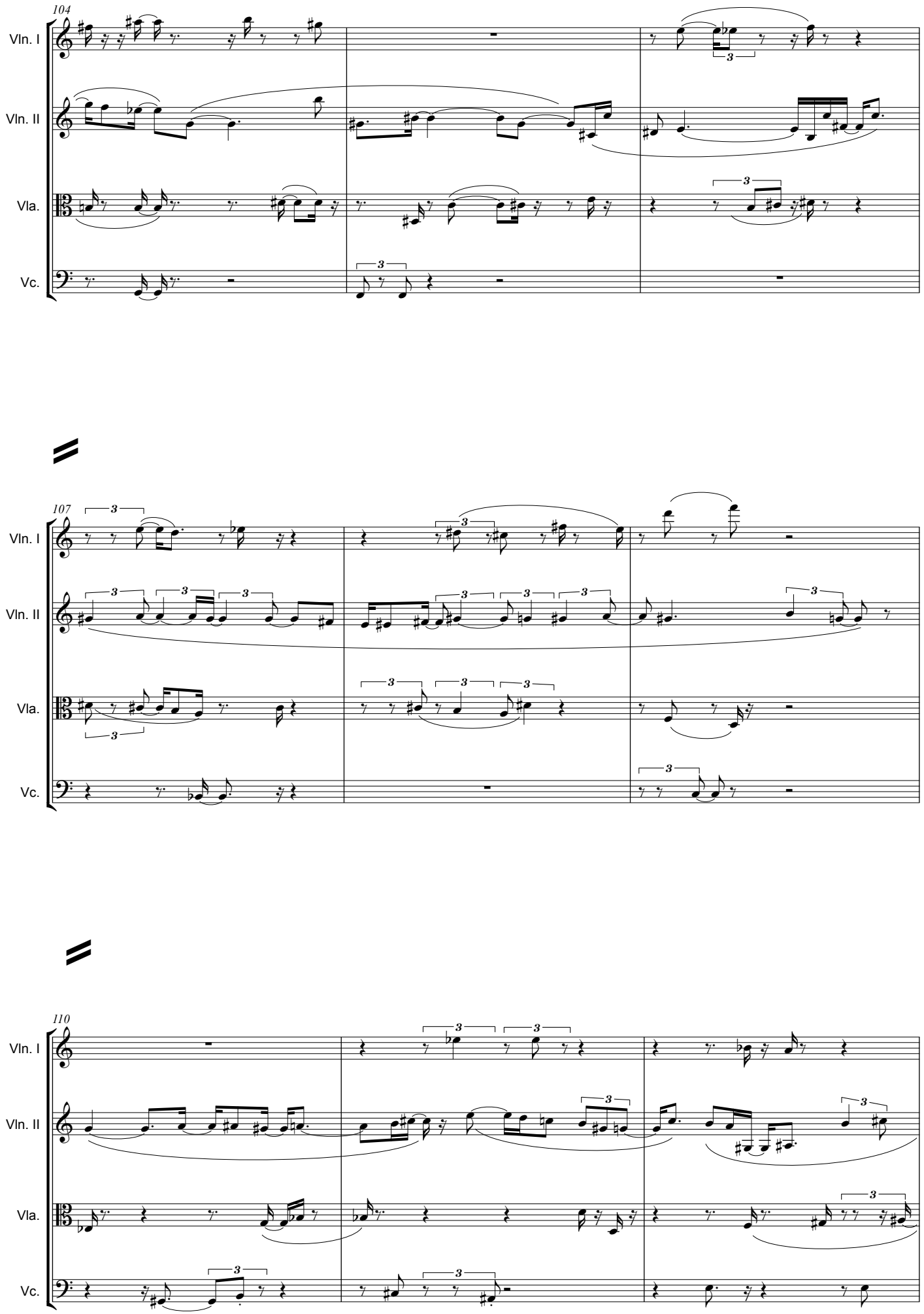

73
Vln. I
Vln. II
Vla.
Vc.
mp
tr

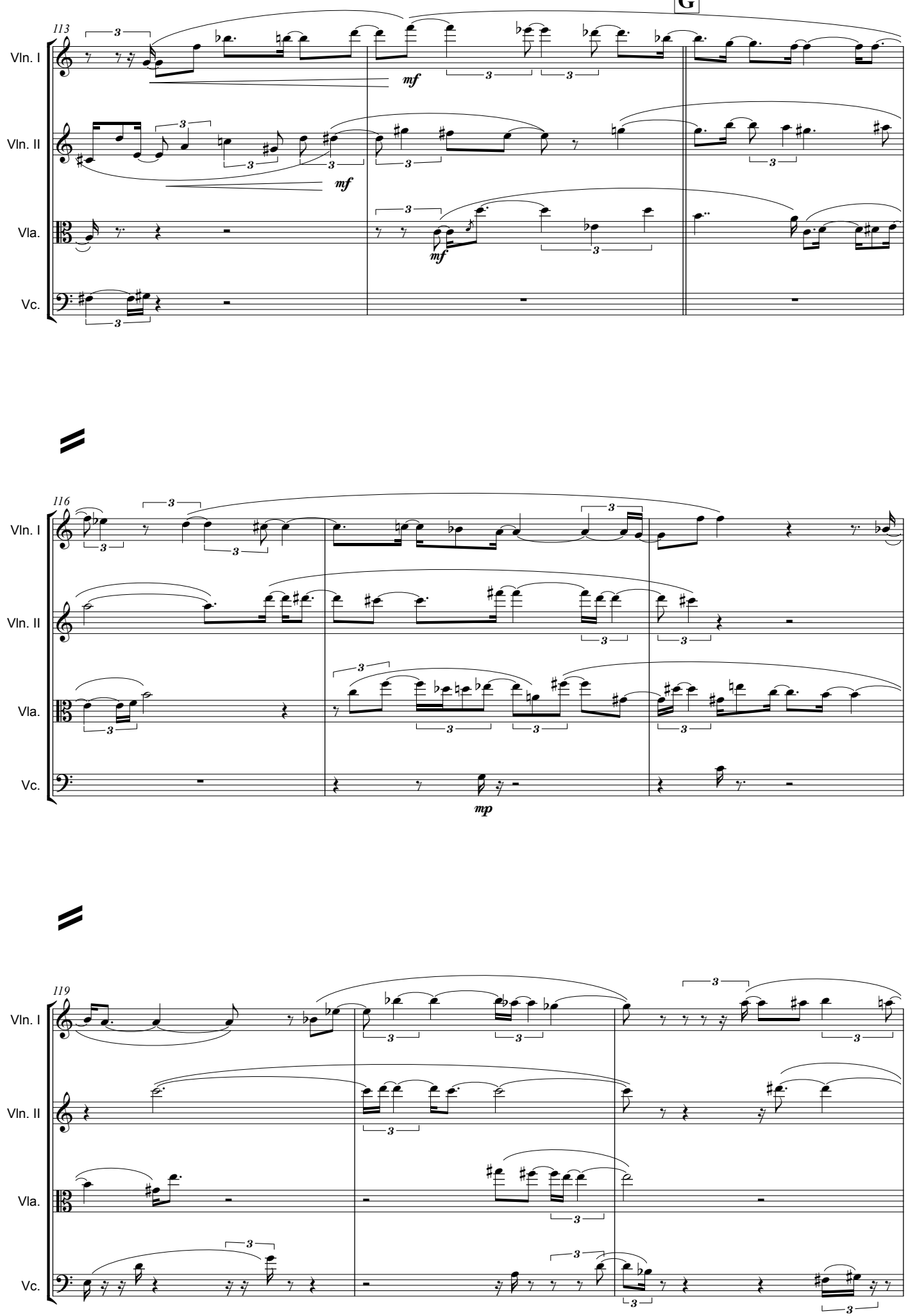

76
Vln. I
Vln. II
Vla.
Vc.
p
mf
cresc.
tr

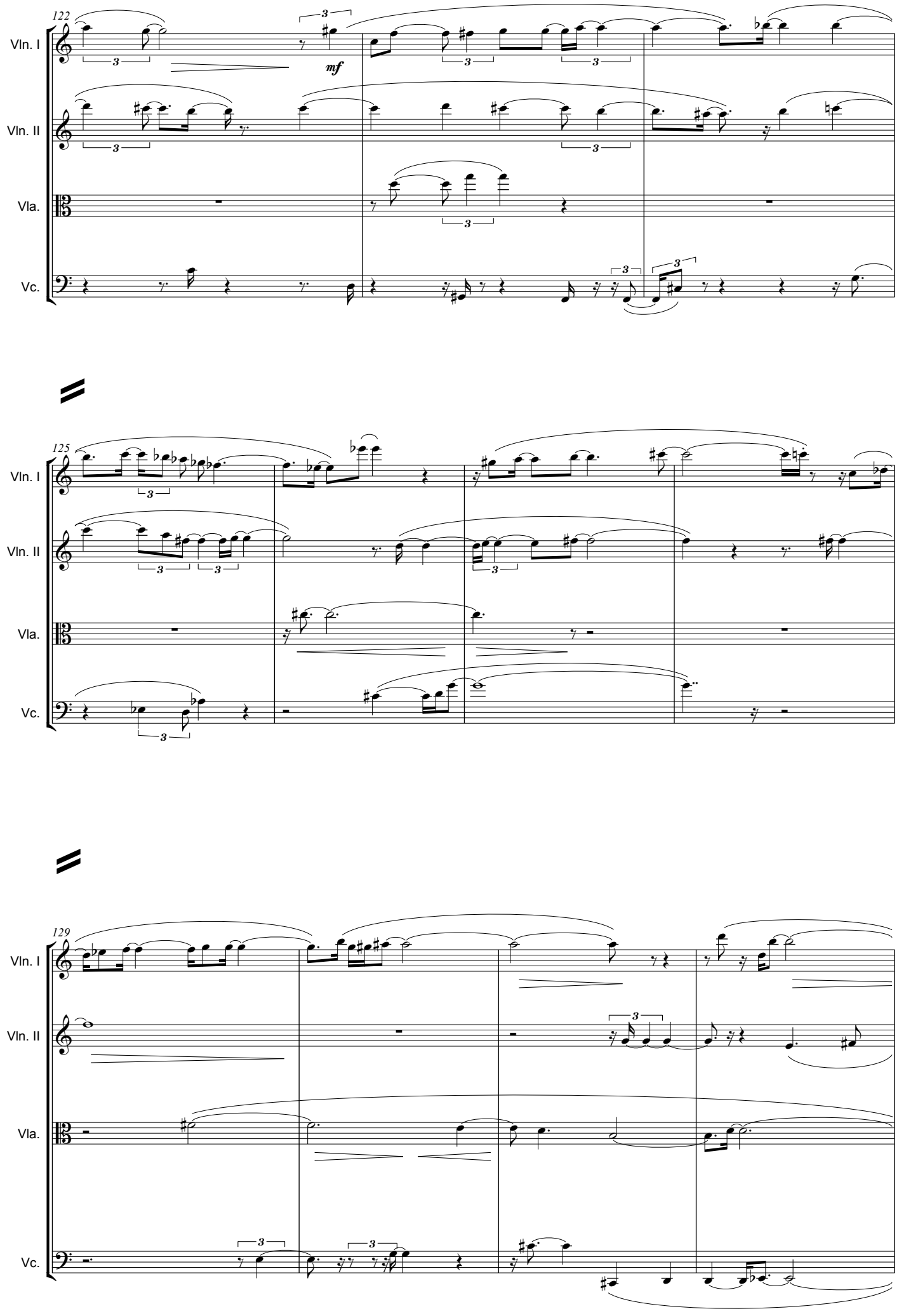

79
E
relentless, detached
Vln. I
Vln. II
Vla.
Vc.
ff

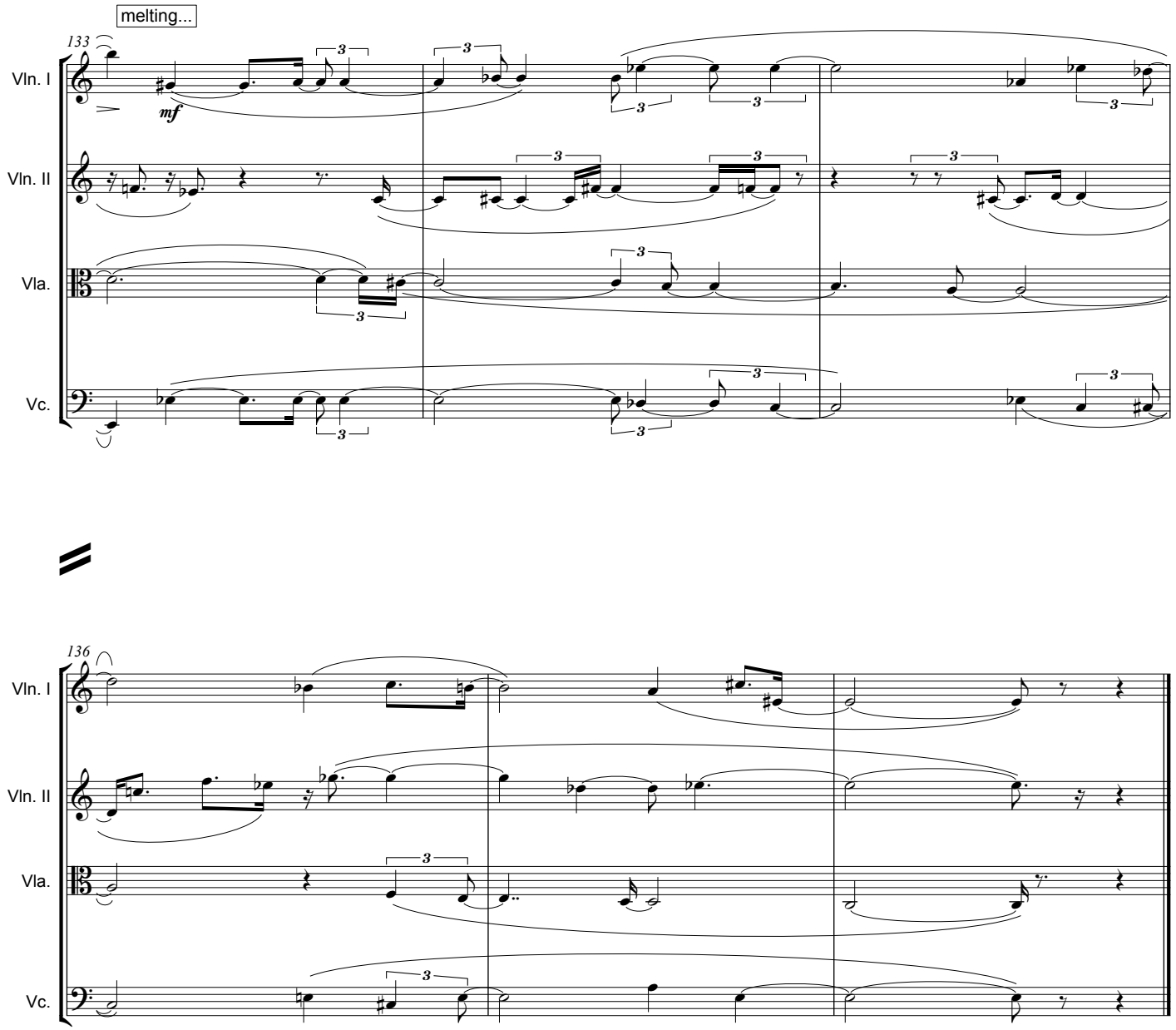

83
Vln. I
Vln. II
Vla.
Vc.
dim.
dim.
dim.
87
gliss.
mf
mf
mf
mf
91
gliss.
tr
mp
dim.
dim.
pizz.


94
Vln. I
Vln. II
Vla.
Vc.
dim.
arco
dim.
98
F
2nd violin melody
pp
mp
101


104
Vln. I
Vln. II
Vla.
Vc.
107
Vln. I
Vln. II
Vla.
Vc.
110
Vln. I
Vln. II
Vla.
Vc.


G
113
Vln. I
Vln. II
Vla.
Vc.
mf
mf
mf
116
Vln. I
Vln. II
Vla.
Vc.
mp
119
Vln. I
Vln. II
Vla.
Vc.


122
Vln. I
Vln. II
Vla.
Vc.
mf
125
Vln. I
Vln. II
Vla.
Vc.
129
Vln. I
Vln. II
Vla.
Vc.


melting...
133
Vln. I
Vln. II
Vla.
Vc.
mf
3

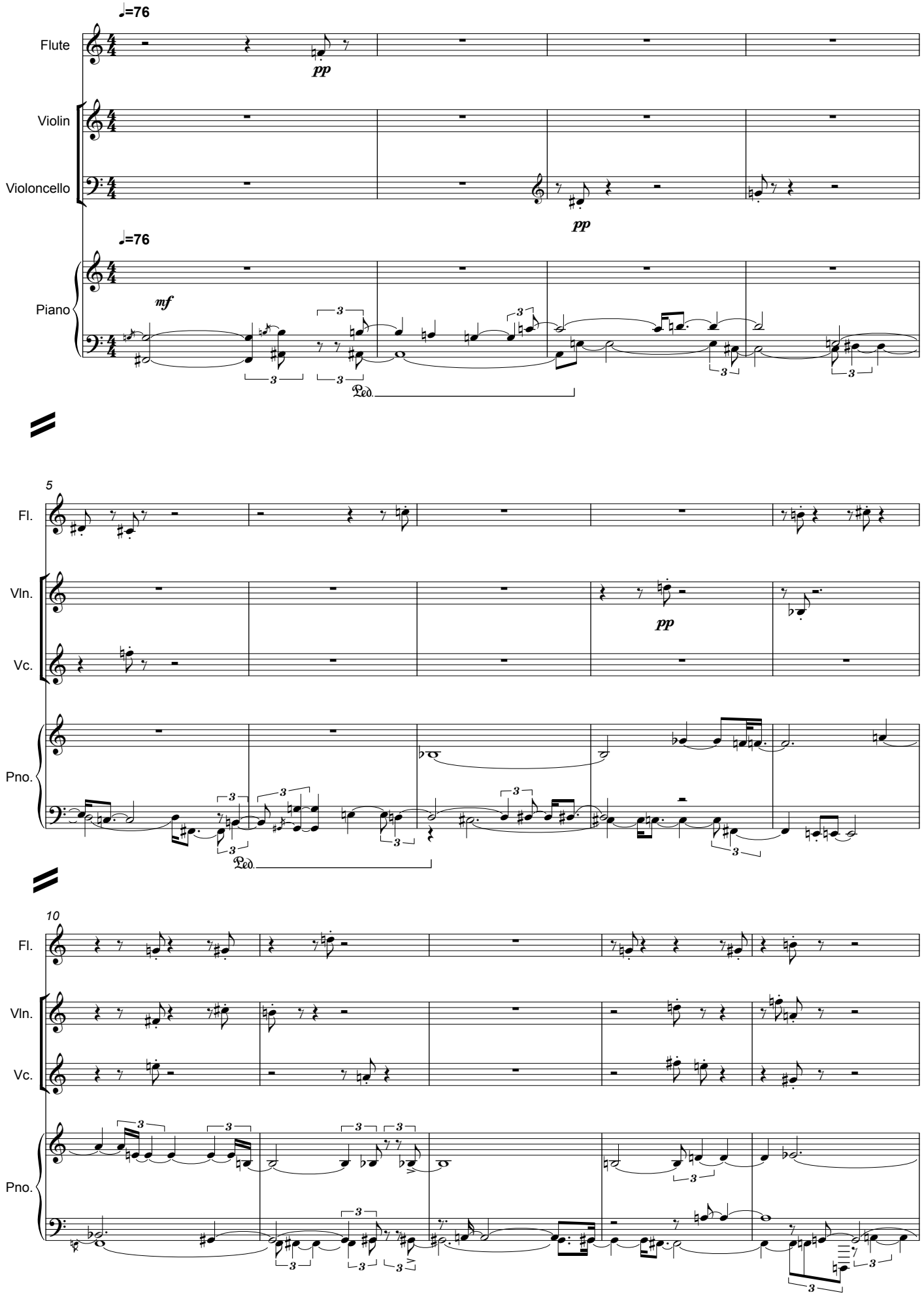
136
Vln. I
Vln. II
Vla.
Vc.
3

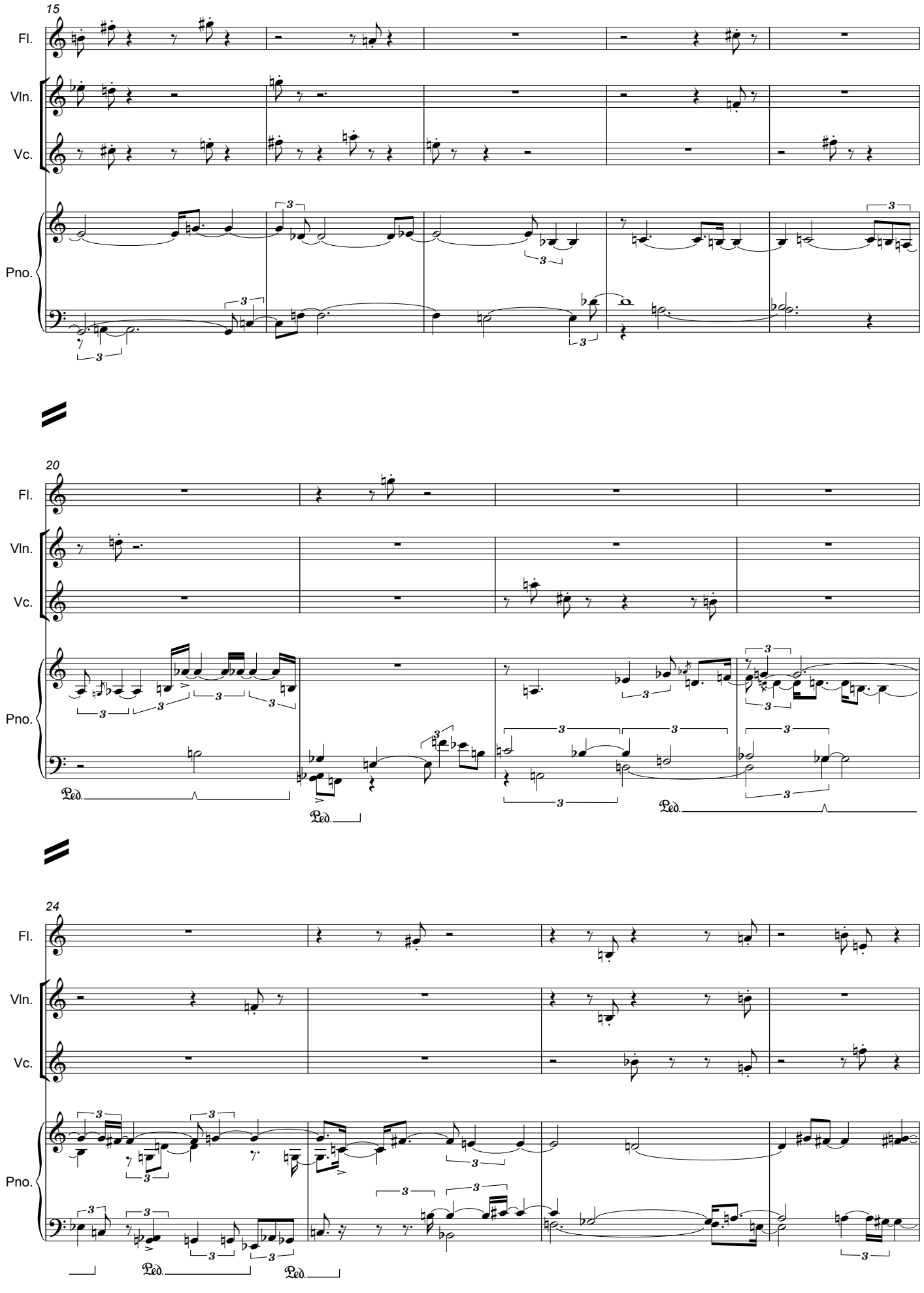
Leo Grant

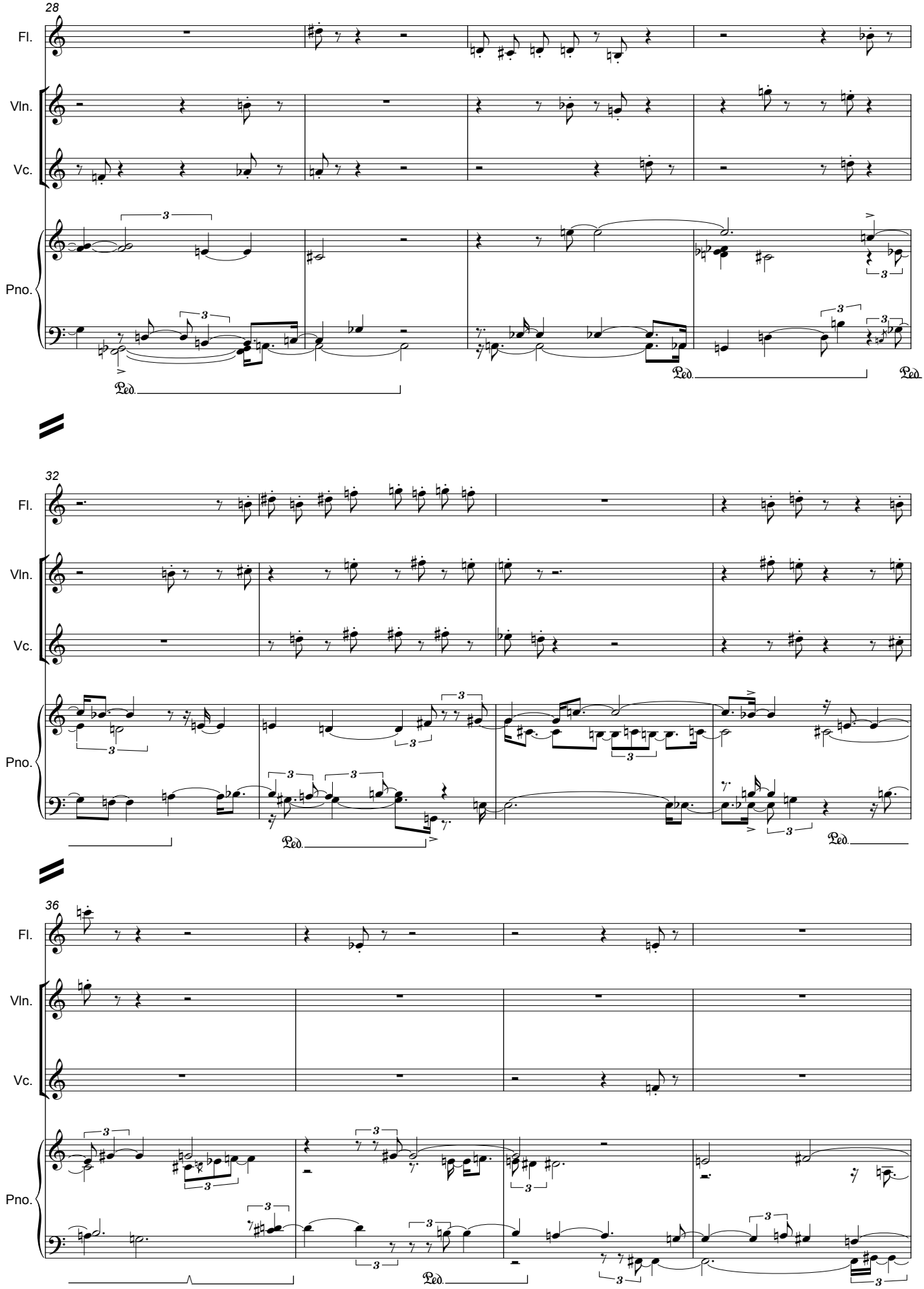
Untitled 1, Untitled A (2010)

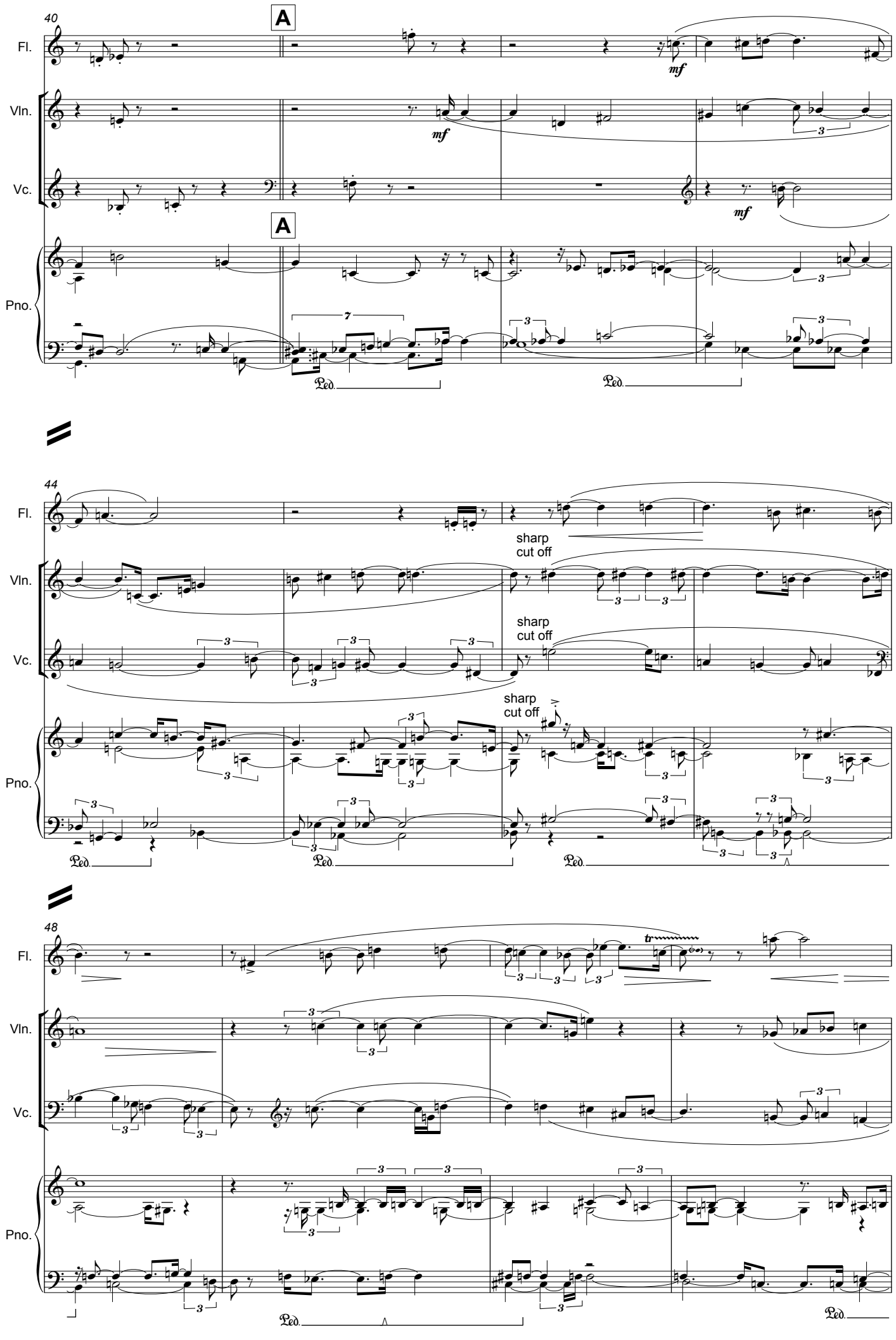
Instrumentation: Piano, Flute, Violin, Cello

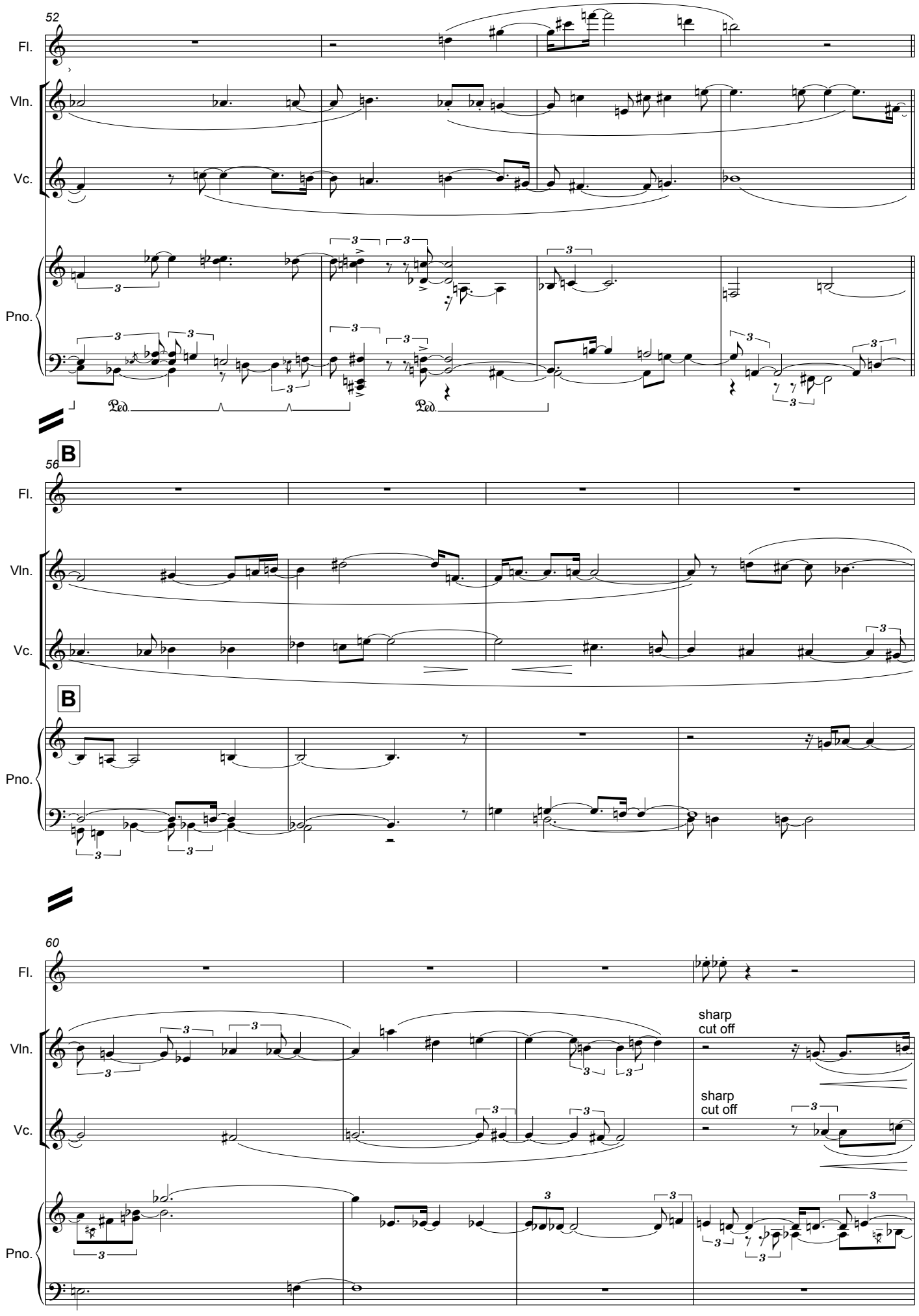
Duration: Approx. 5’40’’

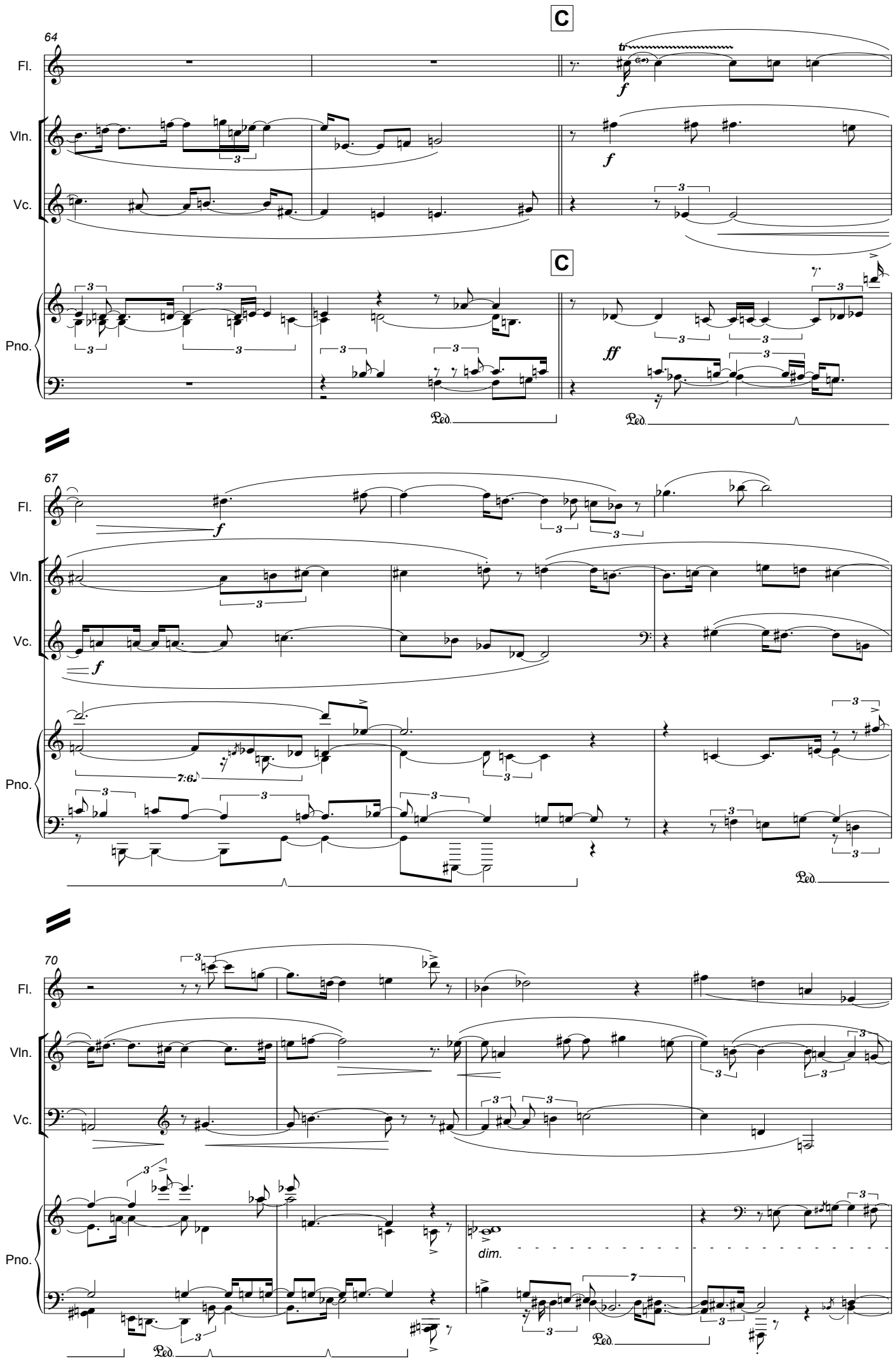

♩=76
Flute
Violin
Violoncello
♩=76
Piano
pp
pp
mf
Ped.
5
Fl.
Vln.
Vc.
Pno.
pp
Ped.
10
Fl.
Vln.
Vc.
Pno.

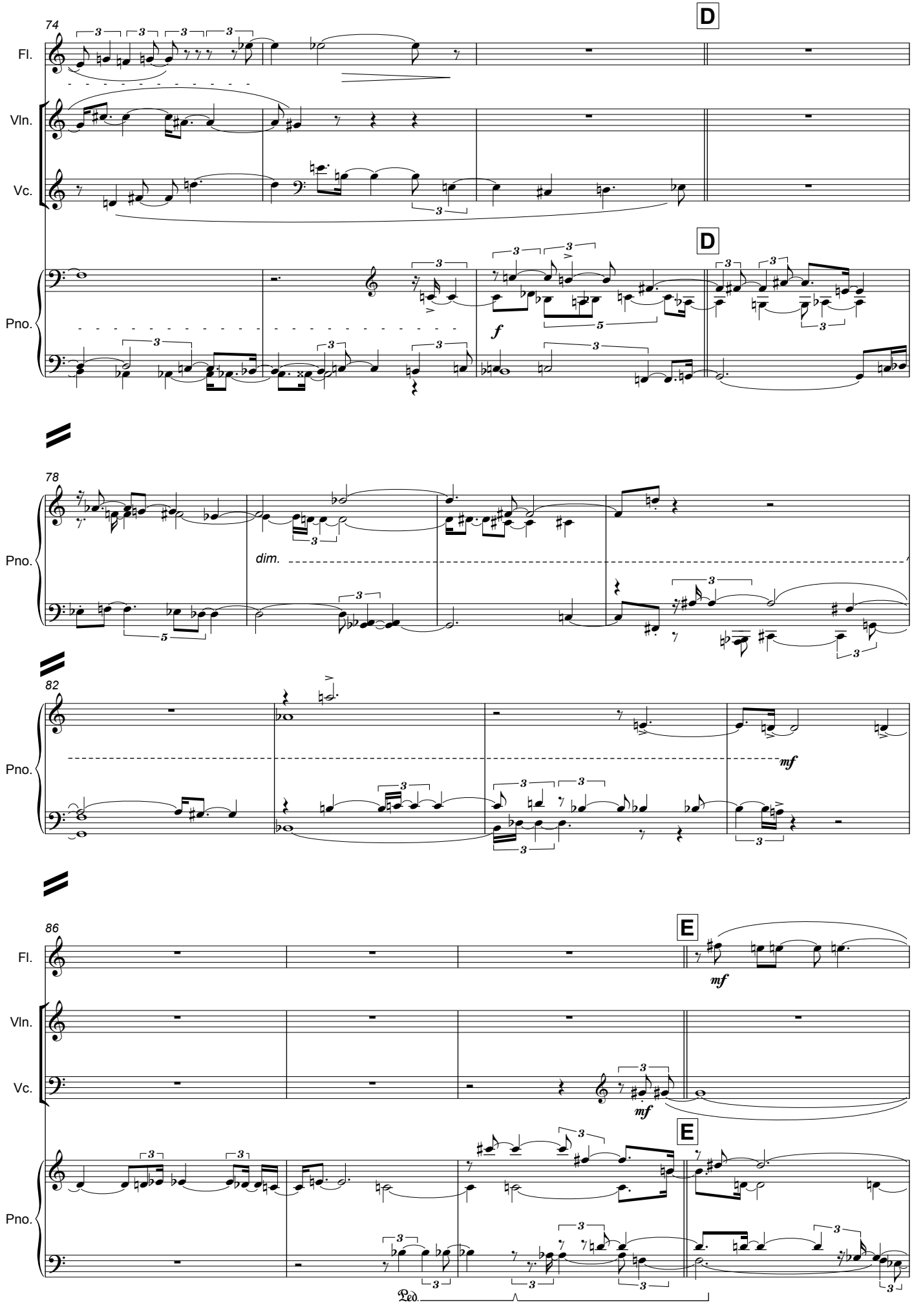

15
Fl.
Vln.
Vc.
Pno.
20
Fl.
Vln.
Vc.
Pno.
Ped.
Ped.
Ped.
24
Fl.
Vln.
Vc.
Pno.
Ped.
Ped.

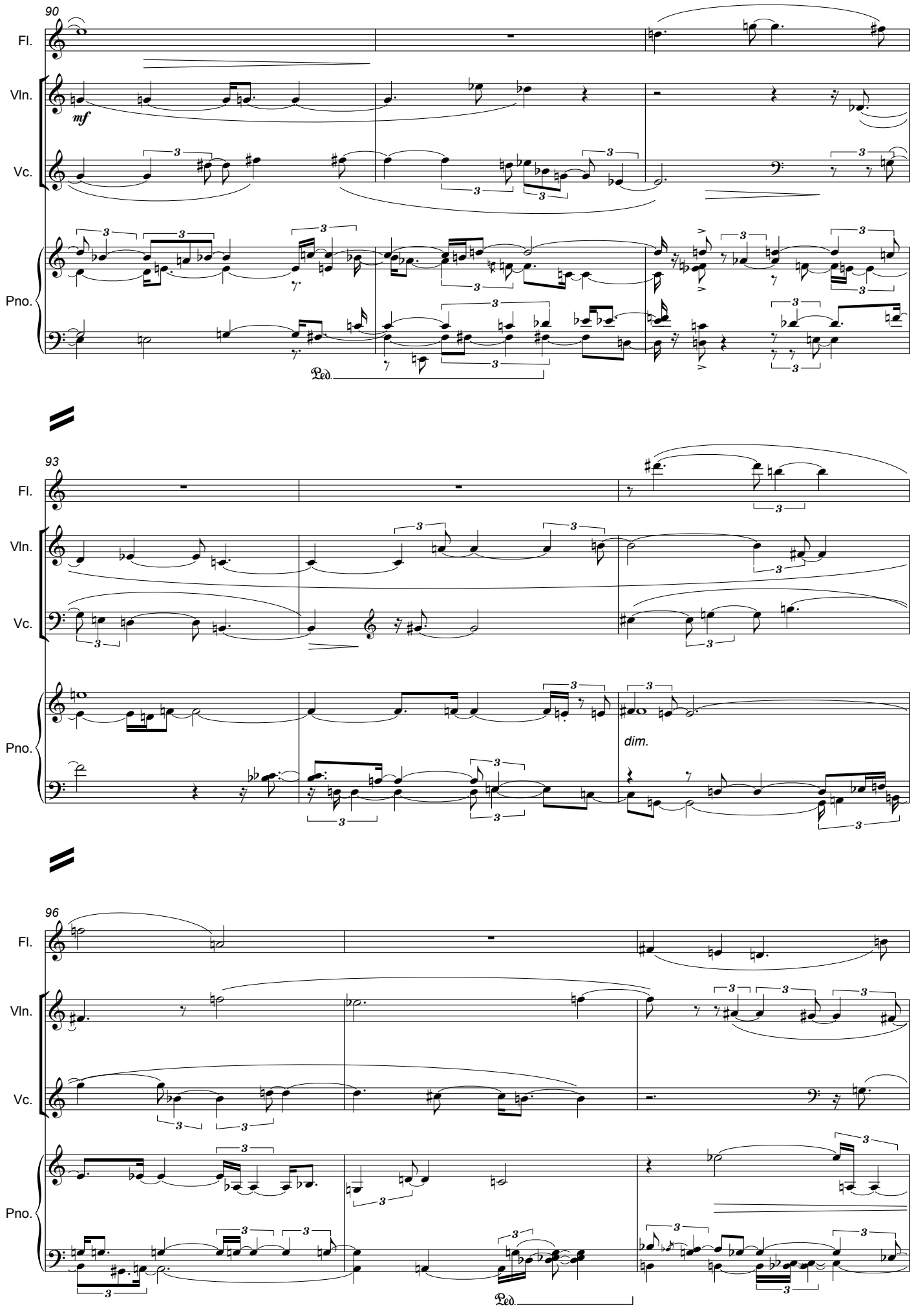

28
Fl.
Vln.
Vc.
Pno.
Ped.
Ped.
Ped.
32
Fl.
Vln.
Vc.
Pno.
Ped.
Ped.
36
Fl.
Vln.
Vc.
Pno.
Ped.

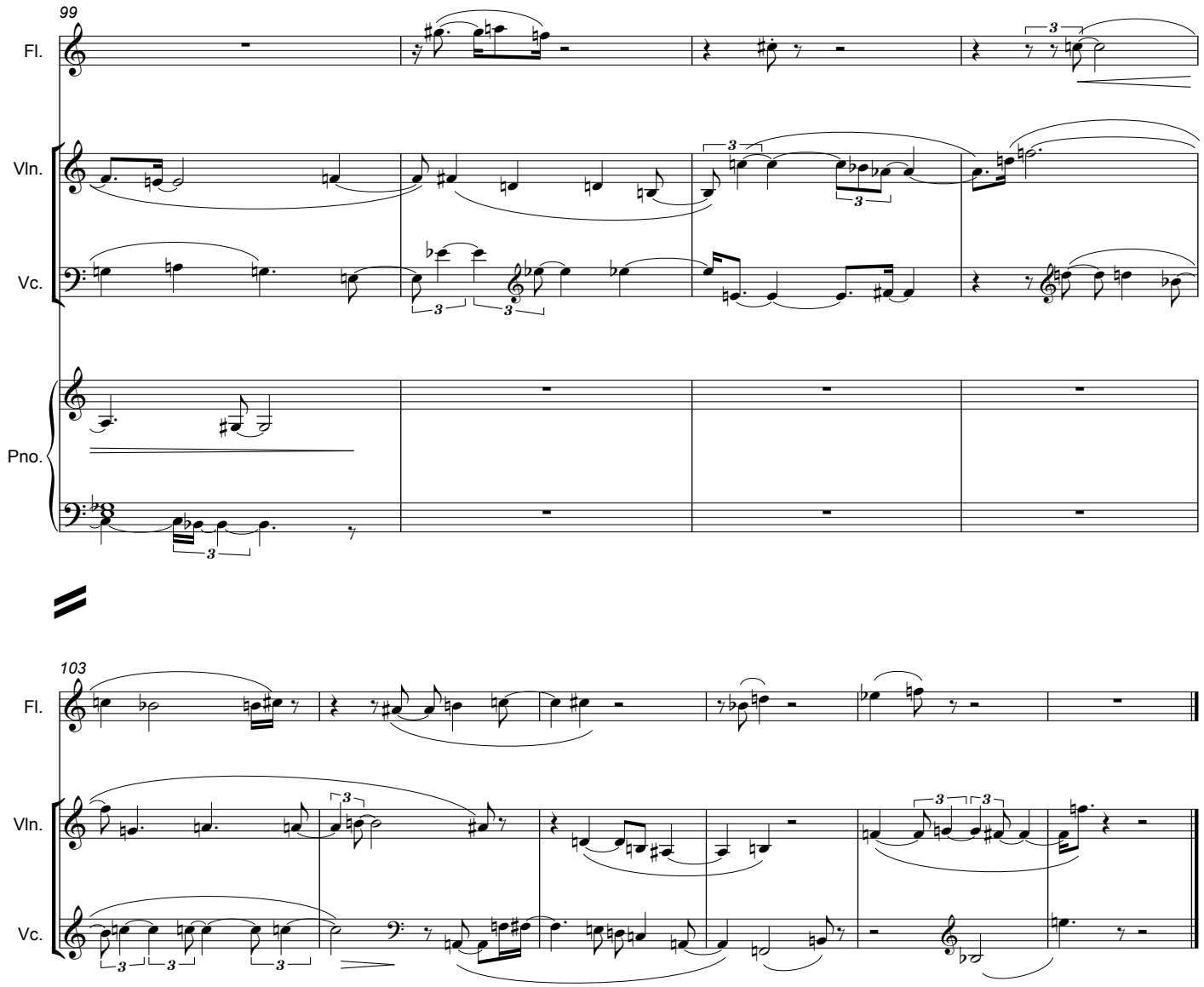

40
A
Fl.
Vln.
Vc.
Pno.
mf
Ped.
44
sharp
cut off
48
tr


52
Fl.
Vln.
Vc.
Pno.
Ped.
Ped.
56
B
Fl.
Vln.
Vc.
B
Pno.
60
Fl.
Vln.
sharp
cut off
Vc.
sharp
cut off
Pno.


C
64
Fl.
Vln.
Vc.
Pno.
f
ff
Ped.
67
7:6
70
dim.


74
D
Fl.
Vln.
Vc.
Pno.
f
78
dim.
82
mf
86
E
Fl.
mf
Vln.
Vc.
mf
E
Pno.
Ped.


90
Fl.
Vln.
mf
Vc.
Pno.
Ped.
93
Fl.
Vln.
Vc.
Pno.
dim.
96
Fl.
Vln.
Vc.
Pno.
Ped.


99
Fl.
Vln.
Vc.
Pno.

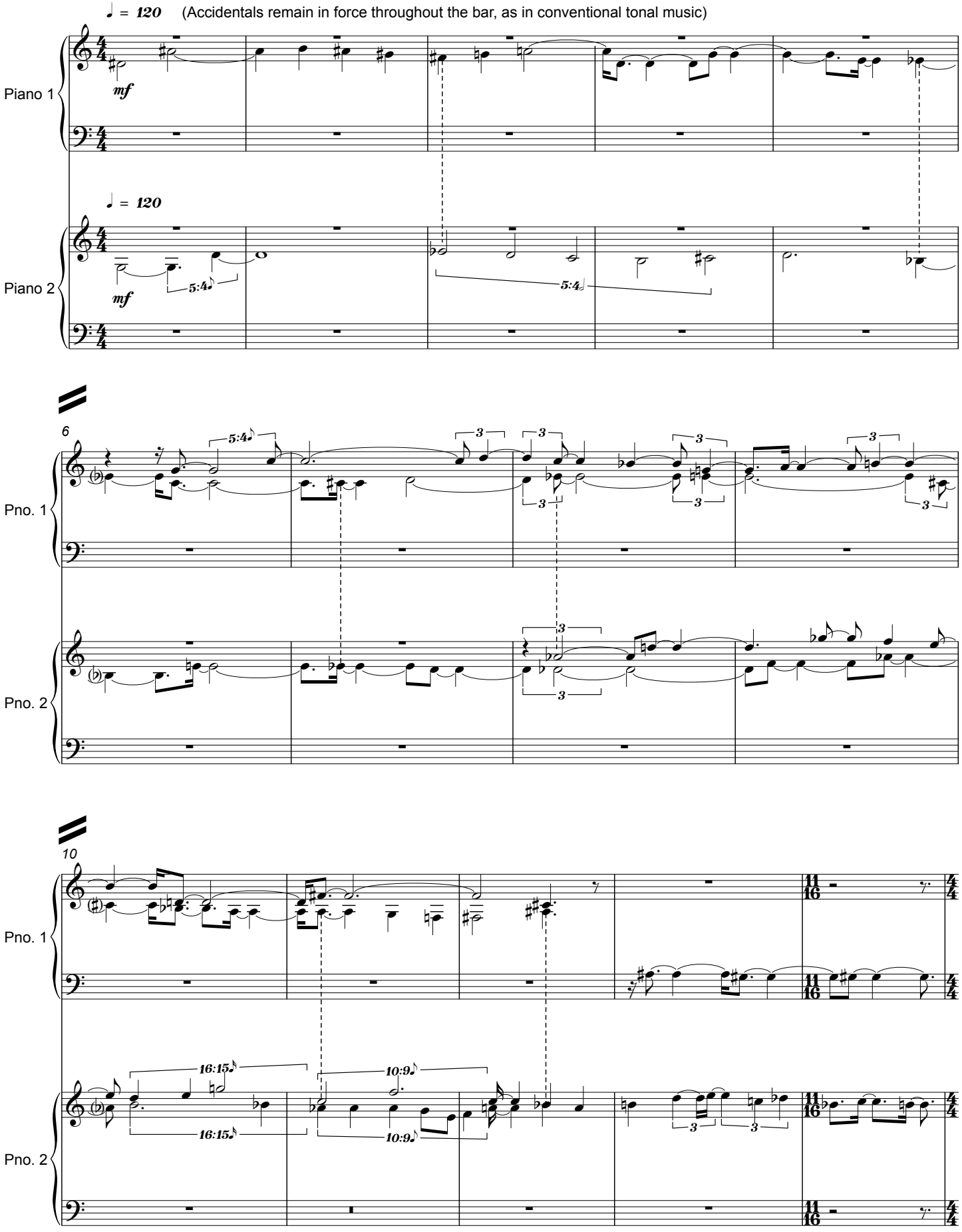
103
Fl.
Vln.
Vc.

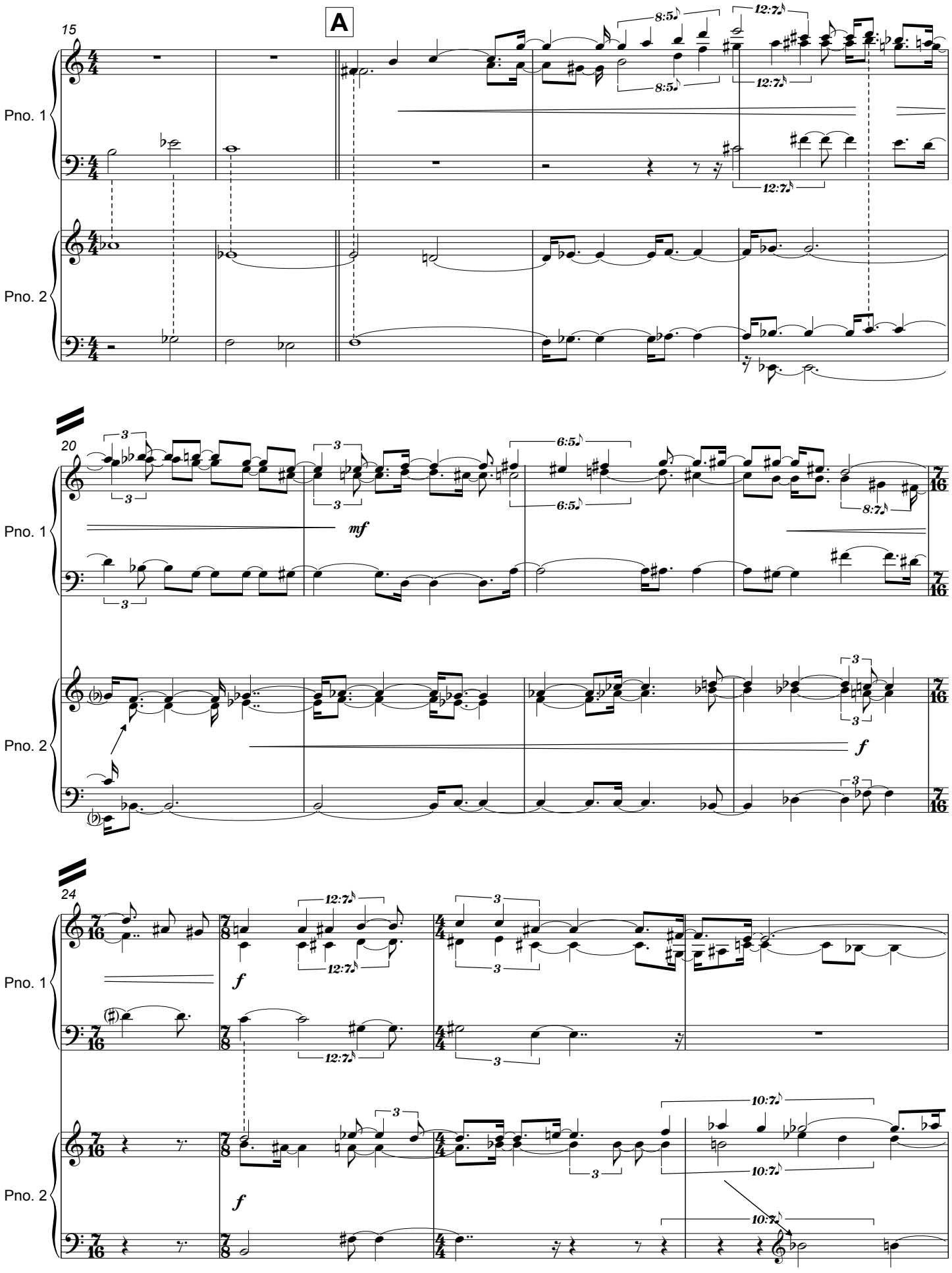
Leo Grant

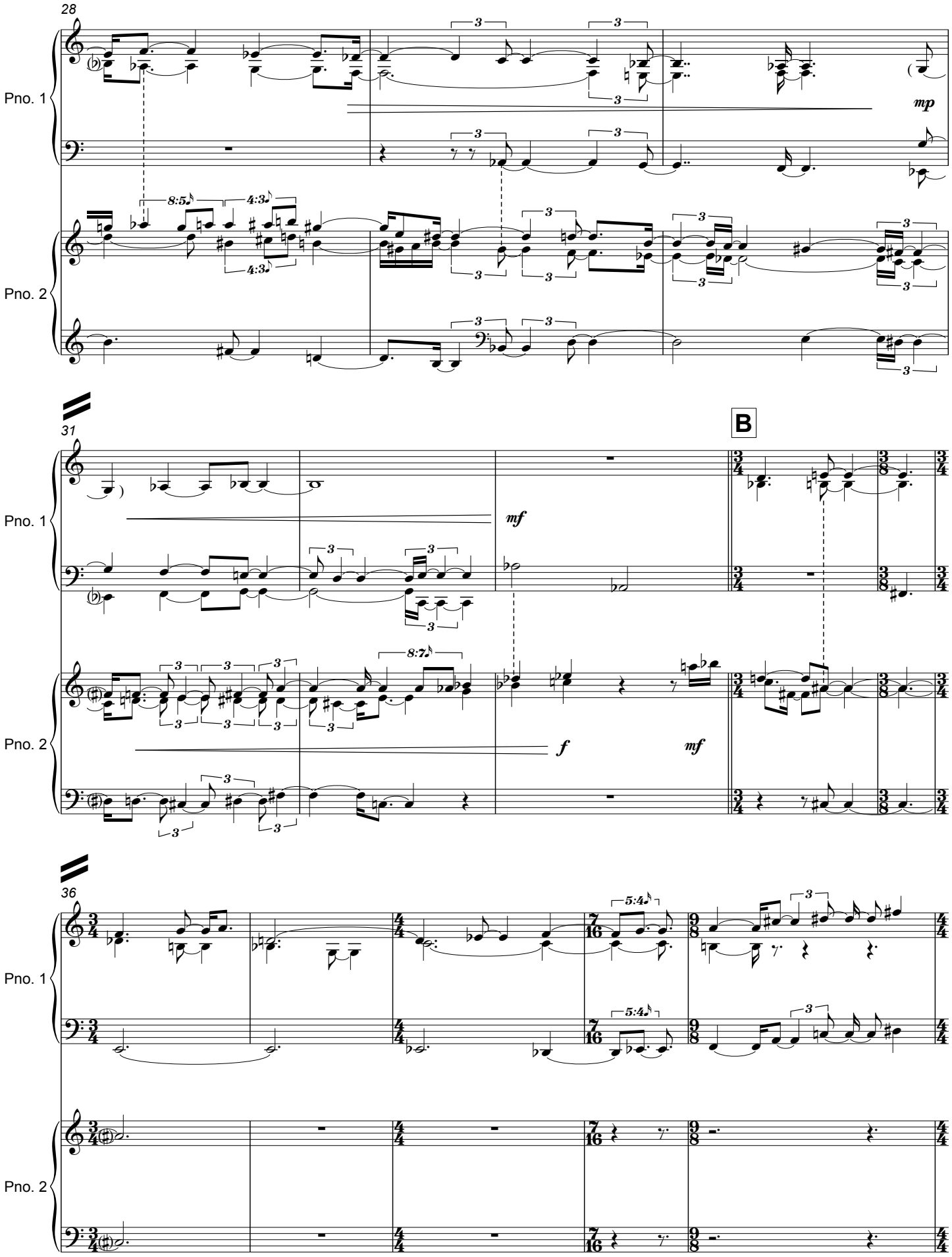
This Moving With Respect To That (2010)

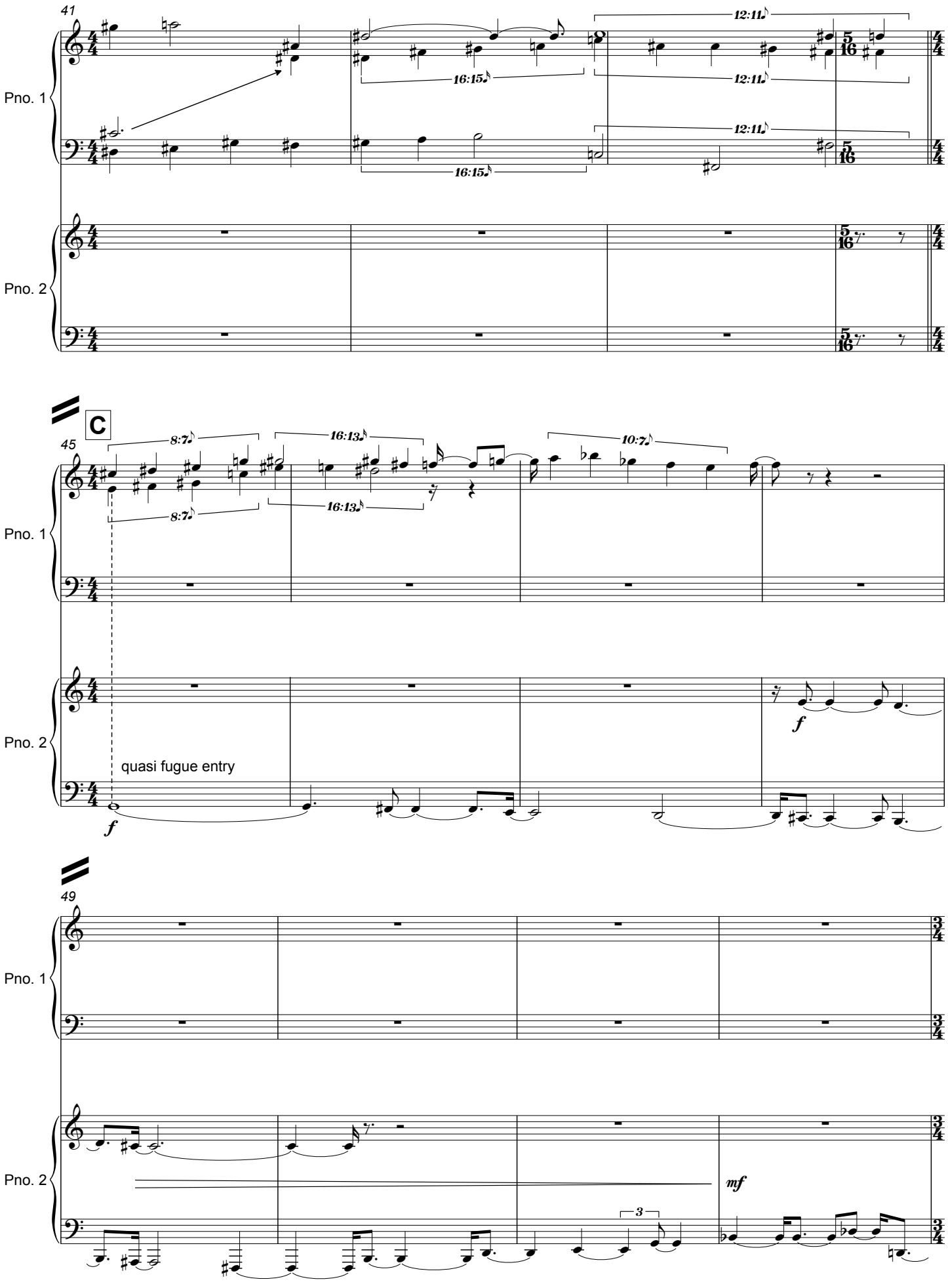
For Two Pianos

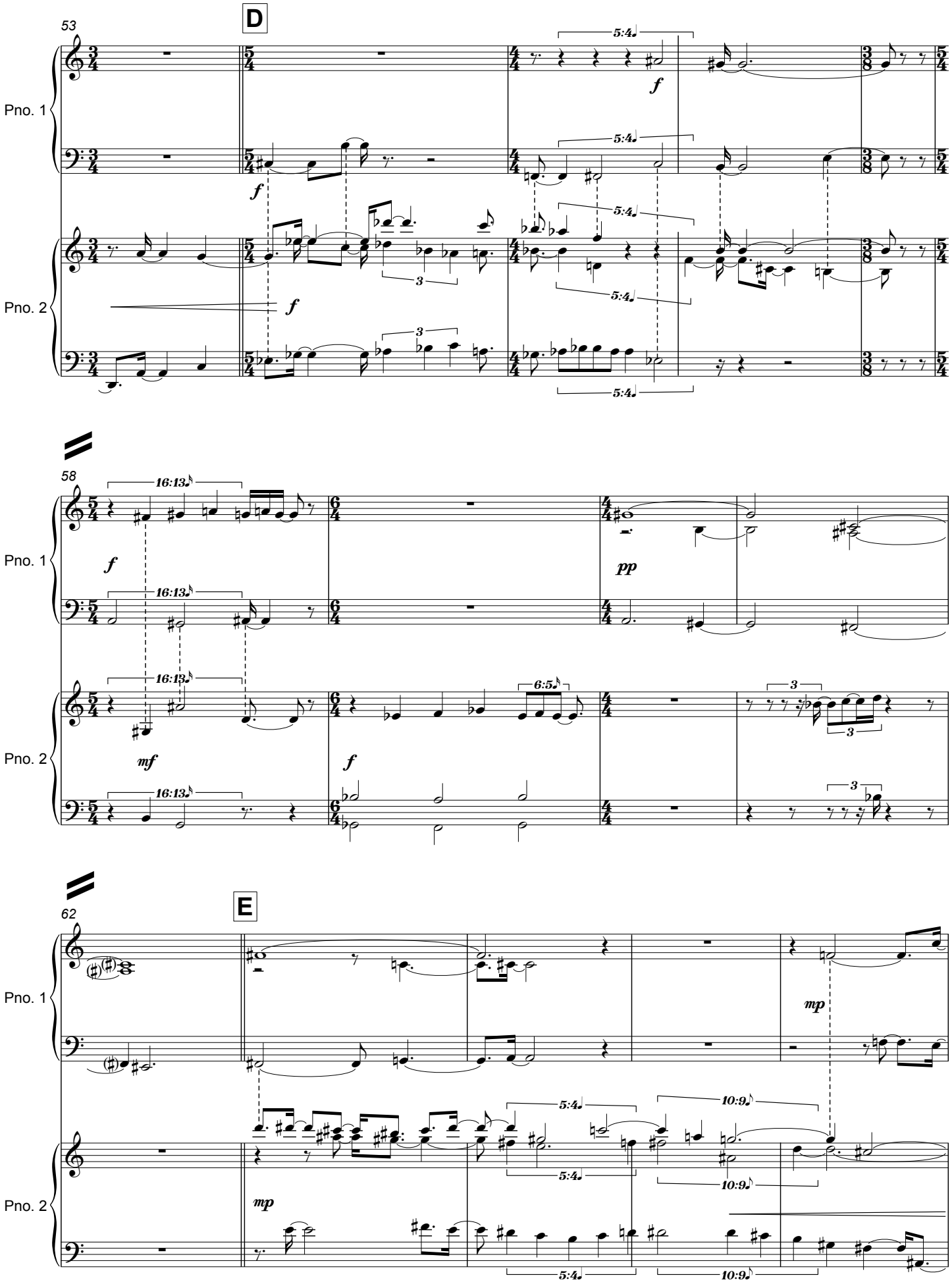
Duration: Approx. 4’30’’

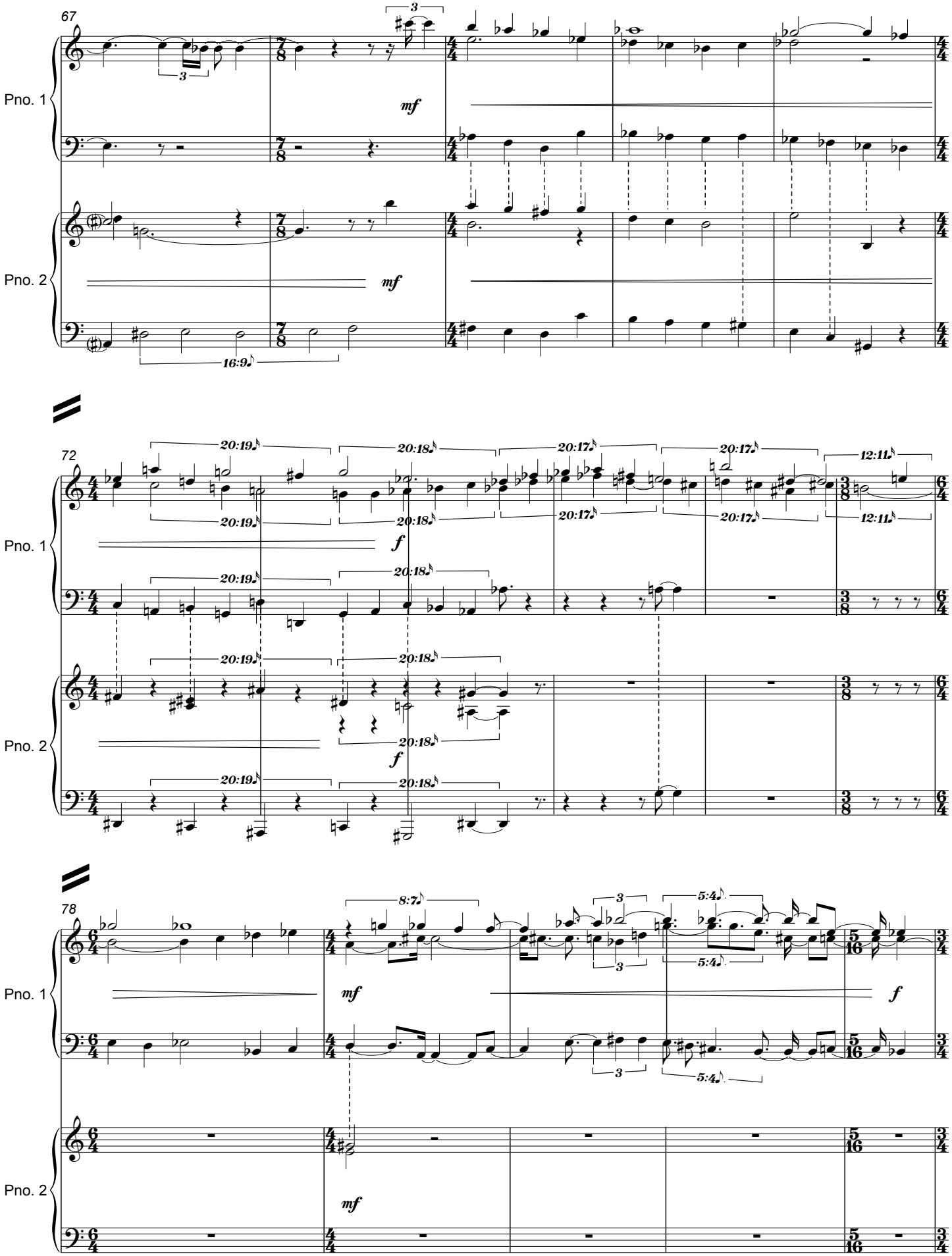

♩ = 120
(Accidentals remain in force throughout the bar, as in conventional tonal music)
Piano 1
mf
♩ = 120
Piano 2
mf
5:4
5:4
6
Pno. 1
Pno. 2
10
Pno. 1
Pno. 2
16:15
16:15
10:9
10:9

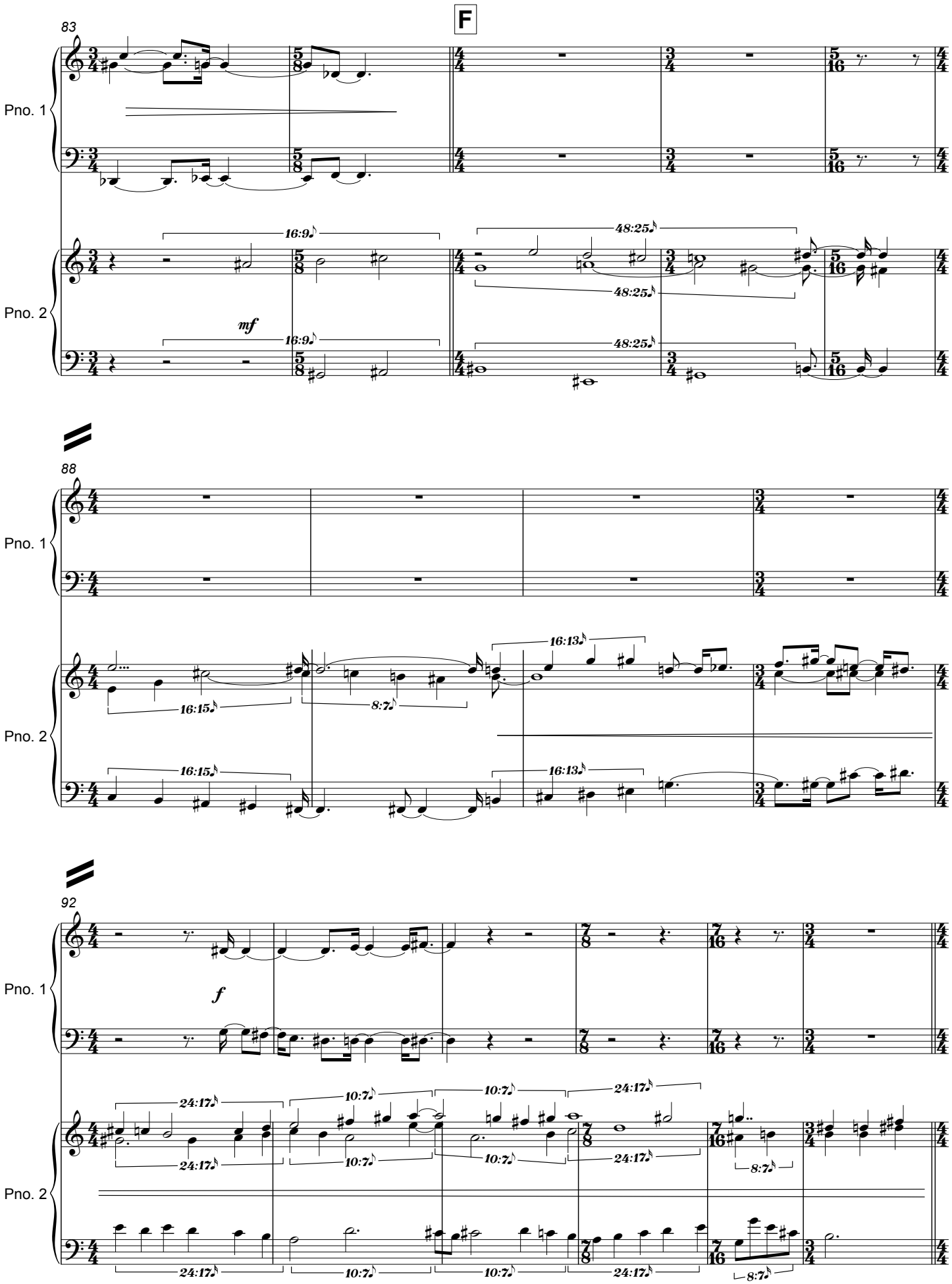

15
A
Pno. 1
Pno. 2
8:5
12:7
20
3
6:5
mf
8:7
7/16
24
f
10:7

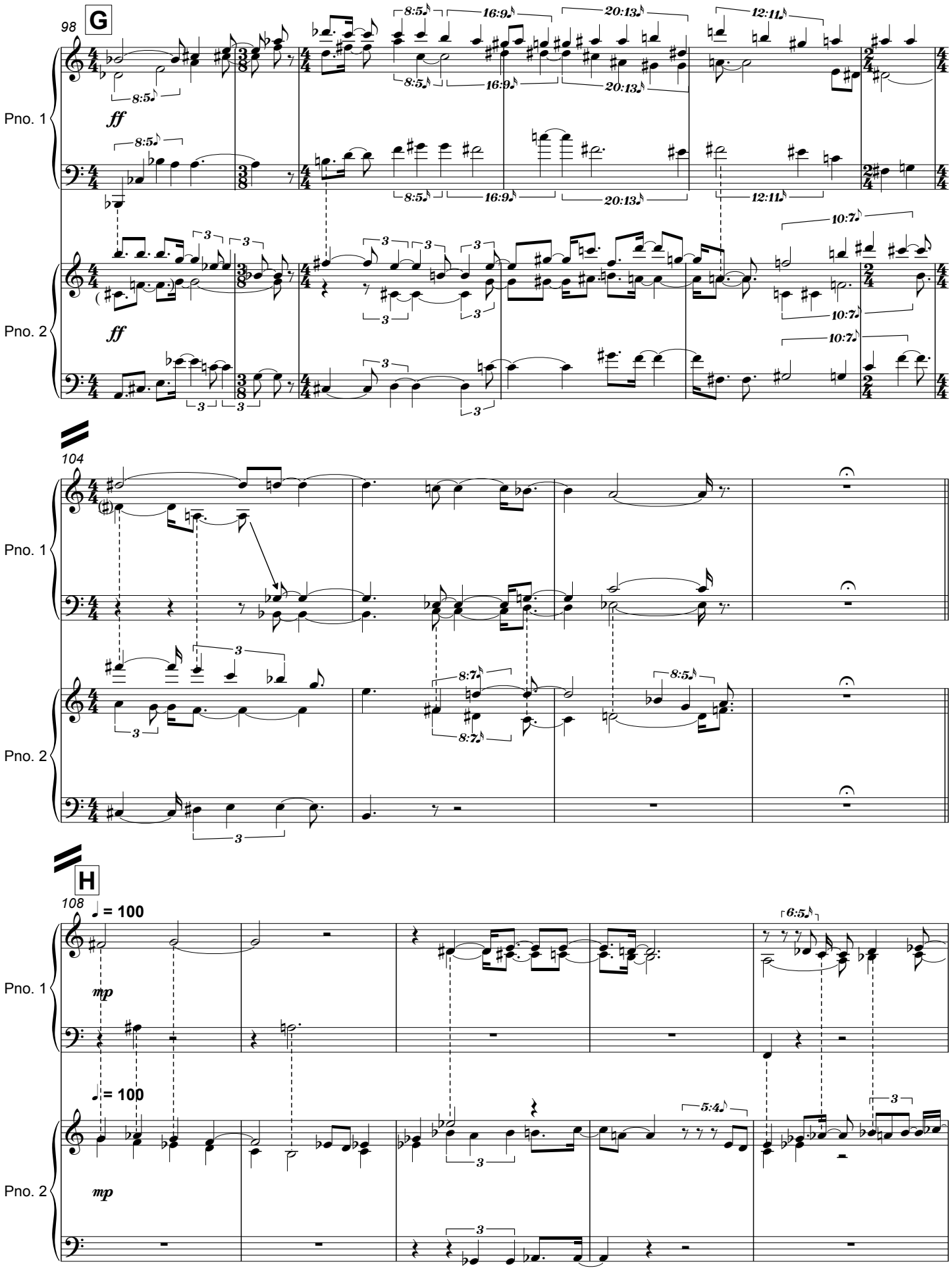

28
Pno. 1
Pno. 2
mp
8:5
4:3
4:3
31
B
mf
8:7
f
mf
36
5:4
5:4

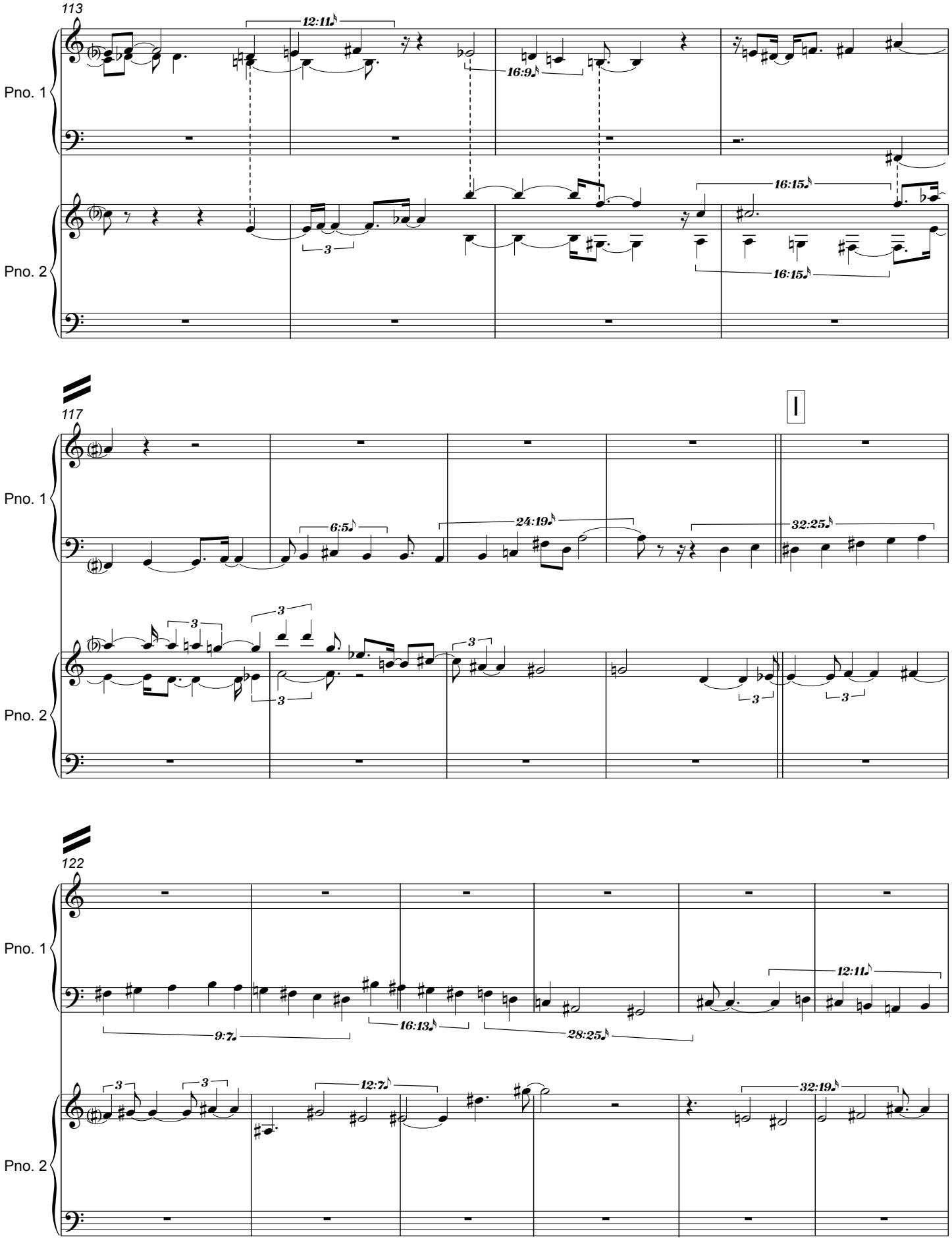

41
Pno. 1
Pno. 2
12:11
16:15
12:11
12:11
16:15
45
C
8:7
16:13
10:7
8:7
16:13
Pno. 1
Pno. 2
f
quasi fugue entry
f
49
Pno. 1
Pno. 2
mf
3

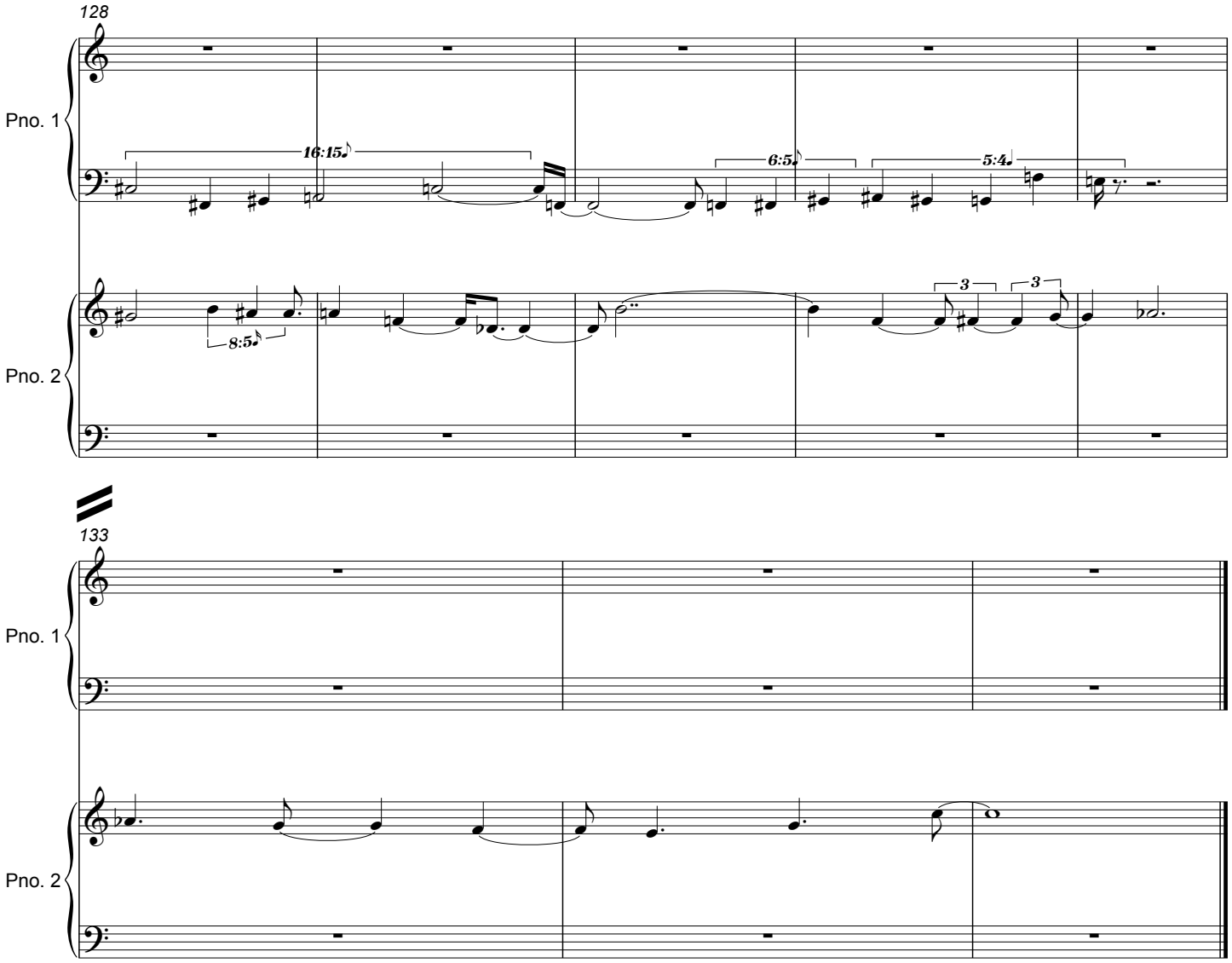

53
D
Pno. 1
Pno. 2
5:4
f
3
58
16:13
pp
mf
6:5
62
E
mp
10:9


67
Pno. 1
Pno. 2
mf
16:9
72
20:19
20:18
20:17
12:11
f
78
8:7
5:4
3


F
83
Pno. 1
Pno. 2
16:9
48:25
mf
88
16:15
8:7
16:13
92
f
24:17
10:7


98
G
Pno. 1
Pno. 2
ff
104
H
108
♩ = 100
mp


113
Pno. 1
Pno. 2
12:11
16:9
16:15
16:15
3
117
6:5
24:19
32:25
3
3
3
3
3
3
122
9:7
16:13
28:25
12:11
12:7
32:19
3
3


128
Pno. 1
16:15
6:5
5:4
Pno. 2
8:5
3
3
133
Pno. 1
Pno. 2

Appendix 1: Examples

CD Tracklisting

1. ***Quartut*** – superimposed source material (+ metronome)

2. ***Canpiom*** – superimposed source material (section A)

3. ***Canpiom*** – transcribed guitar material

4. ***Canpiom*** – edited version of track (3)

5. ***Quartut*** – tutti post-process material

6. ***Untitled 1, Untitled A*** – superimposed source material (+ metronome)

7. ***This Moving with Respect to That*** – source material, J.S Bach *Fugue No.8 in D sharp minor* (MIDI file)

8. ***This Moving with Respect to That*** – fugue 'warped'

9. ***This Moving with Respect to That*** – fugue 'warped' + 'matched'

10. **May Aufderheide** – ***Dusty Rag*** (MIDI file)

11. **Brandy** – ***Long Distance***

12. ***Toward a more American Style*** – *Dusty Rag* 'chopped'

13. ***Toward a more American Style*** – *Dusty Rag* 'chopped' + other rolls

14. ***Toward a more American Style*** – track 17 'rhythmically quantised'

Appendix 2: Experiments

CD Tracklisting

1. **Classical Charade**

Instrumentation: Solo Piano

Constructed from MIDI recordings of Beethoven Piano Sonatas

2. **Radiohead "Nude" Remix**

Instrumentation: Electronic collage

Constructed from the instrumental stems of the band Radiohead's track "Nude"

3. **Die Schone Mullerin Collage**

Instrumentation: Electronic collage

Constructed from Mark Padmore, Paul Lewis's recording of Die Schone Mullerin

4. **Angels**

Instrumentation: Electronic collage

Constructed from Andreas Scholl CD "Il Duello Amoroso: Italian Arias"

5. **"Learning Music" Collage**

Instrumentation: Electronic collage

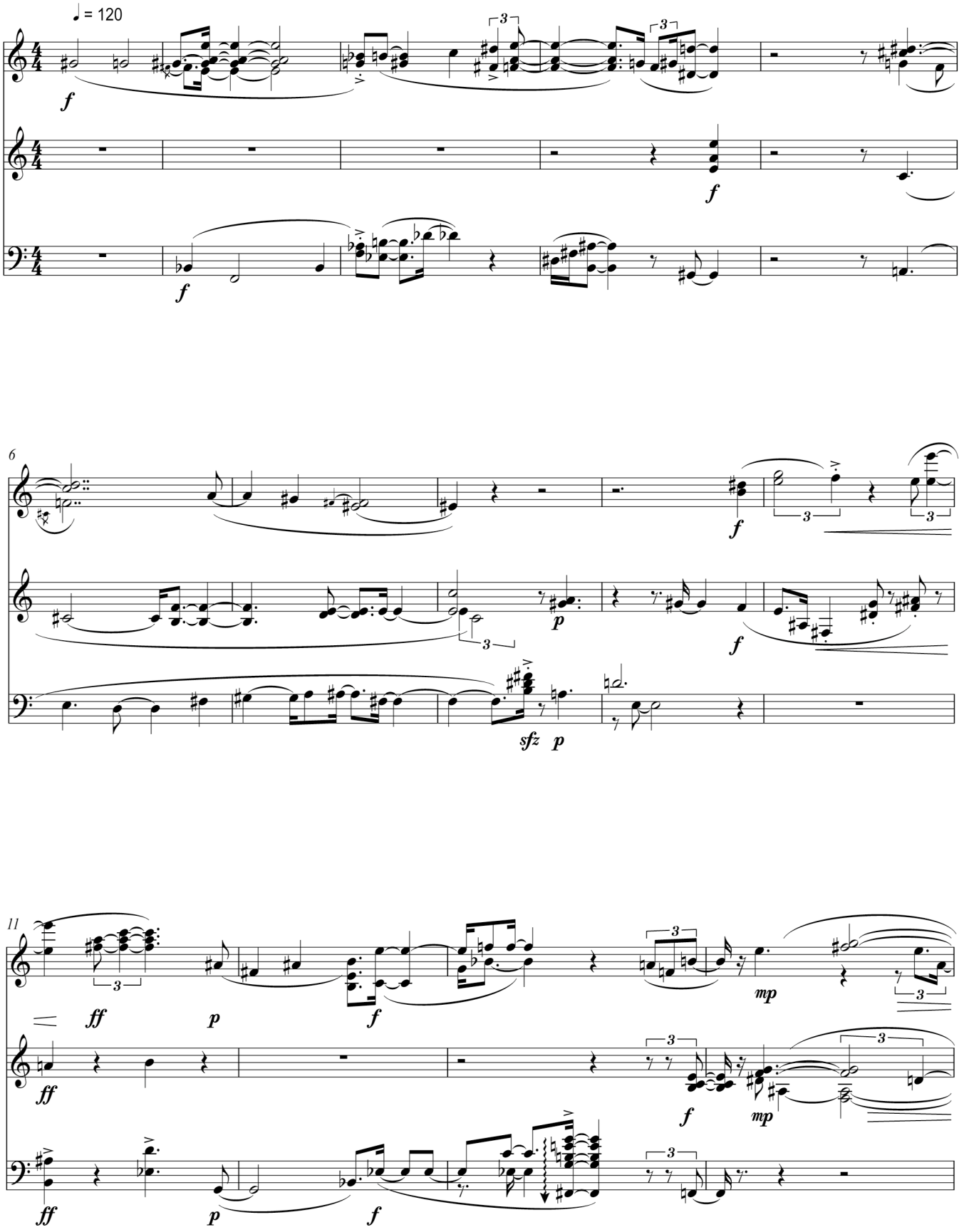
Constructed from stems of open-source band project "Learning Music"

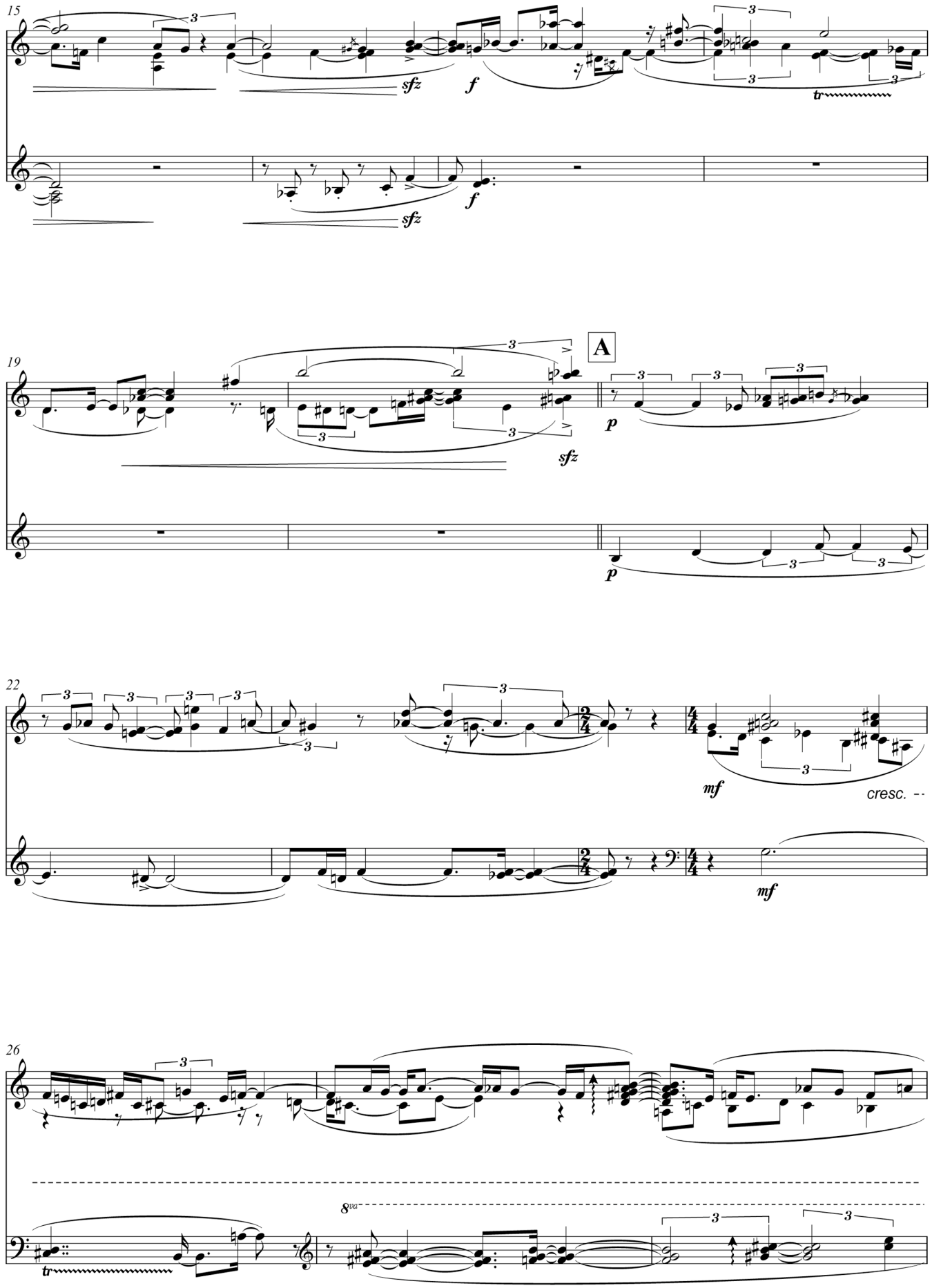
Leo Grant

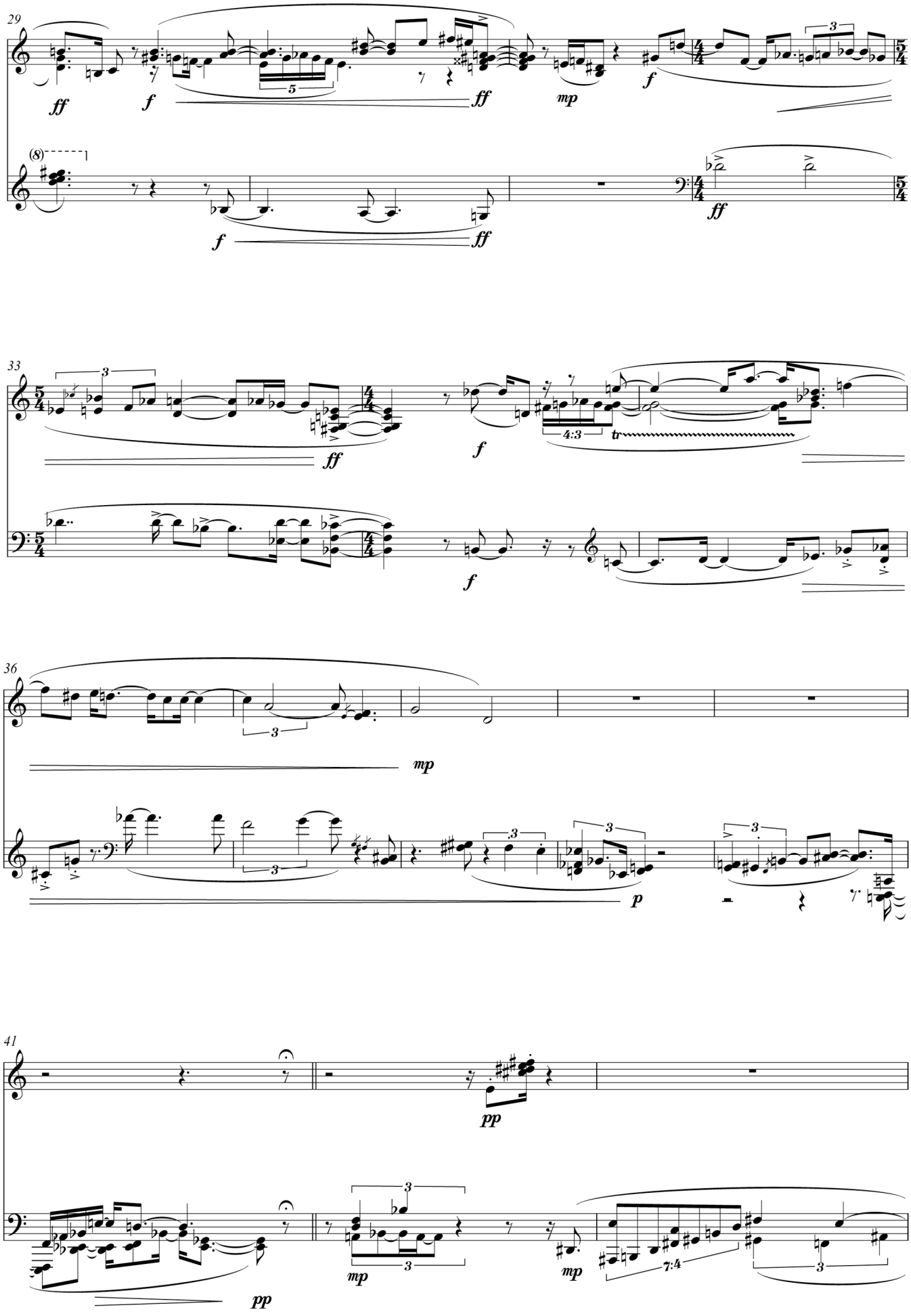
Classical Charade (2008)

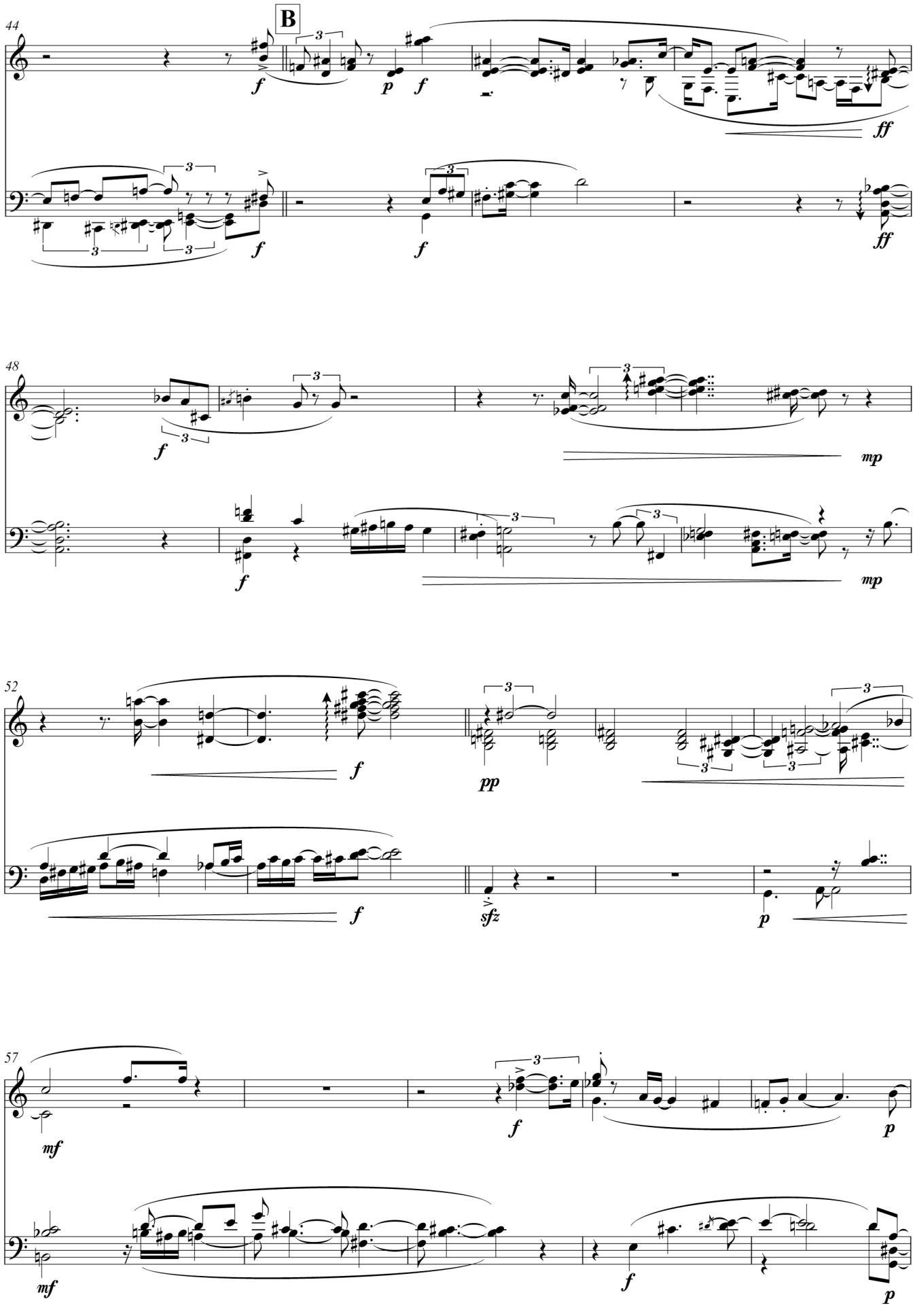
For Piano Solo

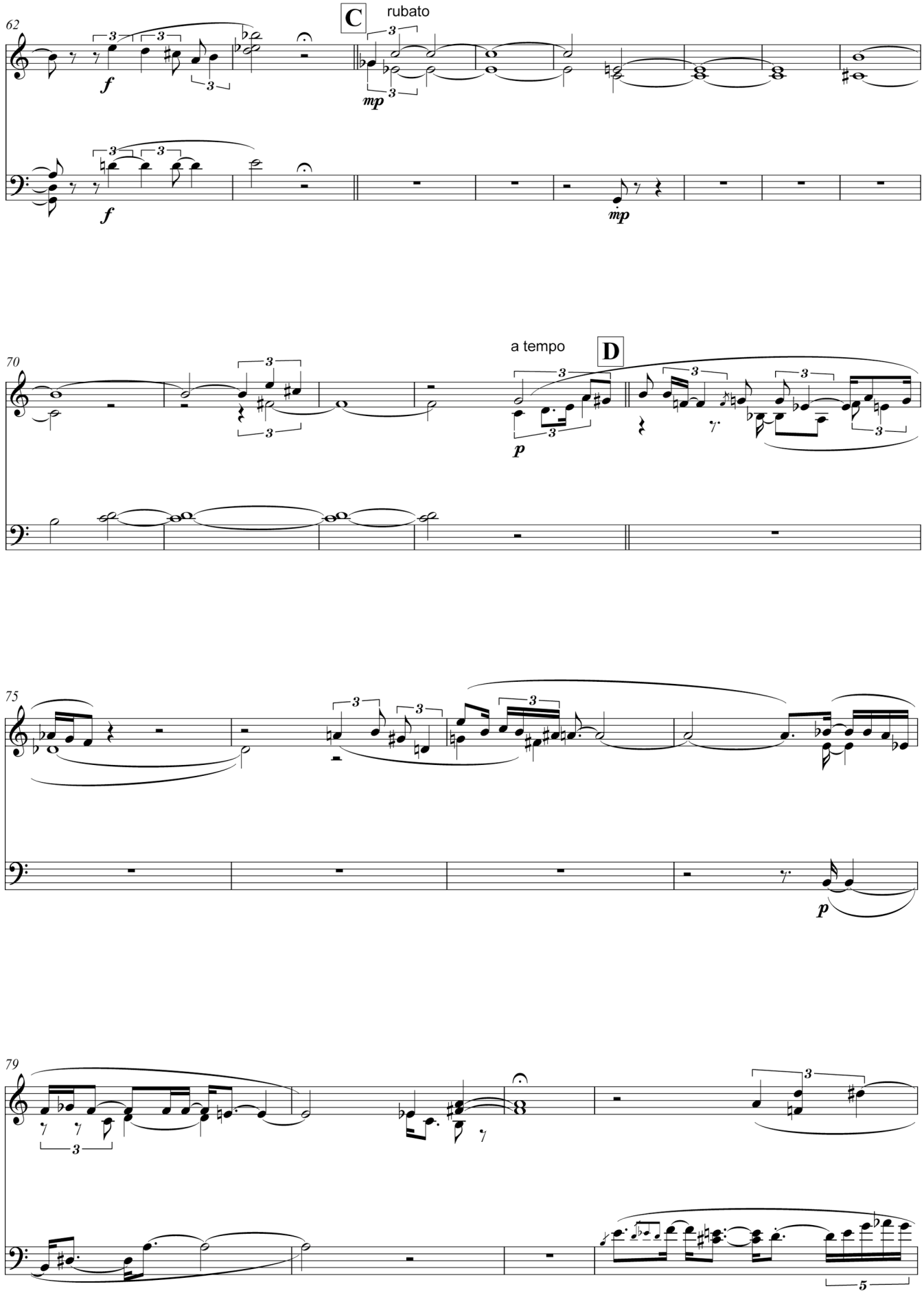
Duration: Approx. 4’00”

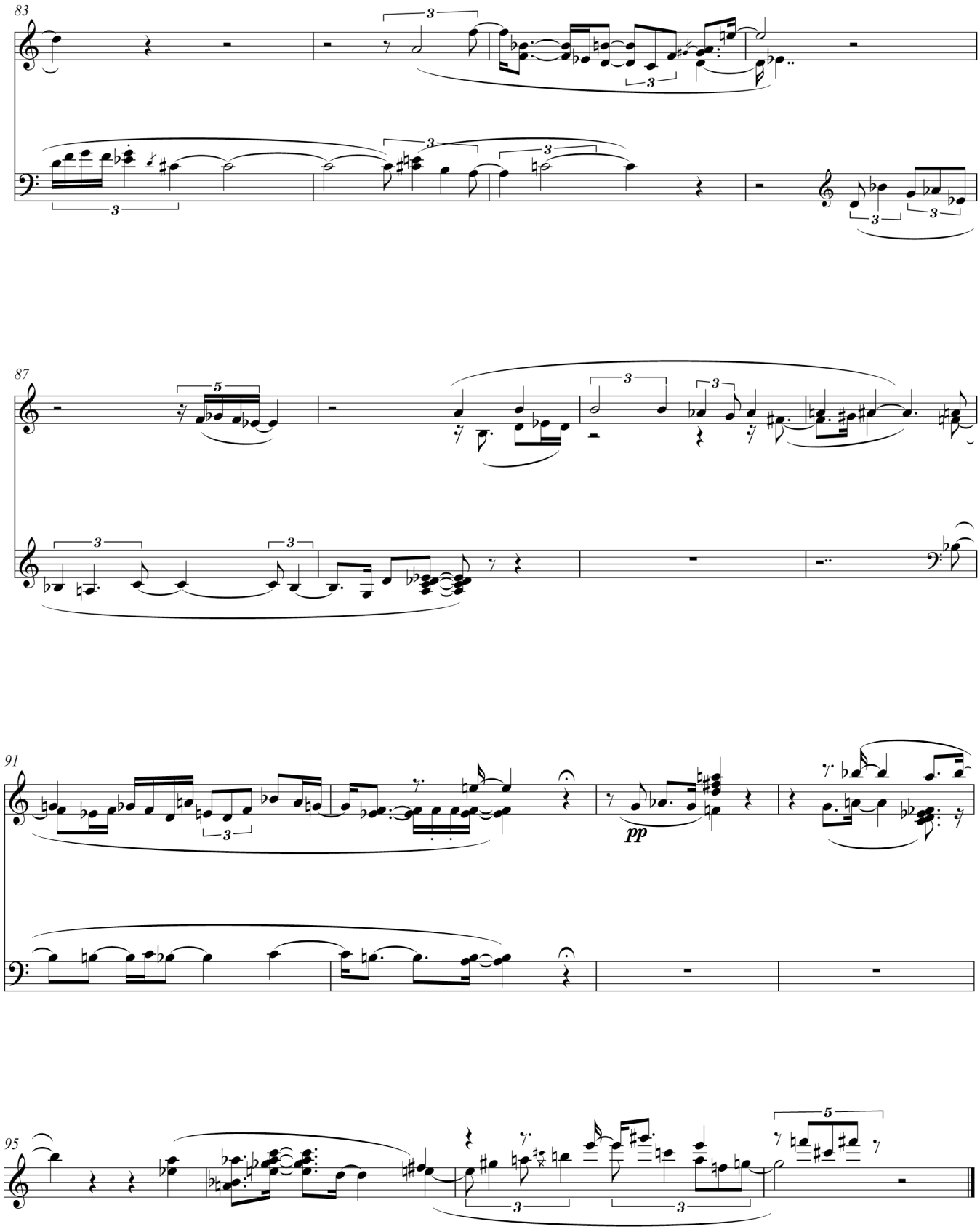

♩ = 120
f
f
f
6
f
p
f
sfz
p
11
ff
p
f
mp
ff
f
mp
ff
p
f


15
sfz
f
sfz
f
tr
19
A
sfz
p
p
22
mf
cresc. --
mf
26
tr
8va


29
ff
f
ff
mp
f
(8)
f
ff
ff
33
3
ff
f
4:3
tr
f
36
3
mp
3
p
41
pp
mp
3
mp
7:4
3
pp


44
B
f
p
f
ff
f
f
ff
48
f
mp
f
mp
52
f
pp
f
sfz
p
57
mf
f
p
mf
f
p


62
C
rubato
f
mp
f
mp
70
a tempo
D
p
75
p
79
5


83
87
91
pp
95

Appendix 3: The Invaderz

Biography

My PhD work has been informed by my previous experience of electronic dance music production. I am part of a production trio, *The Invaderz*, which has written and released over 30 tracks, including releases on Goldie's *Metalheadz* label, in addition to running our own independent label *Invaderz Transmissions*. (Complete discography listed at www.discogs.com/artist/Invaderz). Our music has been played regularly on BBC Radio 1 and 1xtra, and we have been featured guests on their Drum and Bass shows.

I have applied this experience to my PhD work not only by using computer sequencers and MIDI technology, but also by absorbing Jungle's rough and ready, collage-like aesthetic in my approach to music making, as detailed in the preceding commentary.

CD tracklisting

1. Revealed	Metalheadz (2001)
2. Orion	C.I.A Records (2001)
3. So Low	Invaderz Transmissions (2002)
4. You Bring Me	Soul:R (2007)
5. 32bit Jungle	Invaderz Transmissions (2008)
6. The Wizard – DJ Marky (Invaderz Remix)	Innerground (2009)
7. Jazz Club	Unreleased (2010)
8. Manifest-Latent	Unreleased (2011)

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