LISTENING EXPERIENCE AND MUSICAL CONSTRUCTION

Spectromorphological Analysis of Enfilade: Lamento-Cambiata

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LISTENING EXPERIENCE AND MUSICAL CONSTRUCTION

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This paper will present the analysis of the author's compositional work *Enfilade: Lamento-Cambiata*. The analysis consists of two levels. On the first level, formal outline, timbral discourse, pitch construction are examined in relation to the compositional and aesthetic motivations. The results of these examinations are then carried to the second level of the analysis, which is concerned with the perceptual evaluation of the sounding result. Both levels are informed by the recent research on auditive analysis and spectromorphological categorizations of timbre and gesture. In this respect, a detailed spectromorphological analysis of the piece is performed by applying the taxonomic approach of Lasse Thoresen's work on spectromorphology, as well as UST categorizations of *Laboratoire de musique et informatique de Marseille*. Finally, the relationship of spectromorphological units with the formal design is compared for the purpose of shedding light to the relationship between the musical structure and listening experience.
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I. INTRODUCTION

This paper brings together some of the outcomes of several projects that I have been working on during my doctoral studies. Even though this essay is written as a companion to the musical composition, *Enfilade: Lamento-Cambiata*, it also deals with the question of musical analysis based on the listening experience.

My experiences as a composer led me to interrogate the nature of creative process in music, specifically in composing. In this respect, each compositional project has been a new challenge for me to gain an understanding about the mental process of creating music. These observations made me realize that the act of composing actually involved a continuous decision-making process. This action is constantly present in the process of construction of musical ideas and arrangement of the musical materials in temporal domain. Even though the creative process itself can be based on a diversity of motivations, the end product of this activity is the sounding result itself. In order to arrive to desired sounding result, listening before the completion of the compositional project becomes a vital tool for the decision-making process. In this respect, composing involves different types of listening experiences, including the ones that could be obtained by the use of technology, by the use of instruments, and most importantly, by the use of imagination, or what is often referred as "inner ear".

Another essential concept for a composer and certainly for every creative artist is the relationship of content and form. It is also a concern of paramount importance for a composer in the decision-making process. Shorter musical ideas, phrases, phrase structures, or moments in a
musical composition are part of a work in its entirety. When the piece is performed, this larger temporality should suggest a consistent shape while the listener should be able to grasp the functioning of distinct portions of music within the frame of the whole form. Composer and music theorist Lasse Thoresen suggests that the musical form can be perceived by hearing the present musical events in relation to the whole. According to him, this is done by "the condensation of larger time segments and creating a simplified memory of the piece". If one goes further on this thought, then it could be claimed that composing involves a similar type of listening. In a way, a composer should listen to the musical material by constantly referring to the imaginary (and perhaps 'speculative') memory of the whole work. The momentary material could have a defining influence on the imaginary memory, as much as the definition of form could be influential on the material.

During the composition process of Enfilade: Lamento-Cambiata, I was occupied with these concepts and questions. In a way, the most challenging part was to establish a hierarchical order for the decision-making process. This seemed necessary in order to have a clear understanding of the whole form and functioning of the sonic material. Before writing this piece, I had been exposed to some of the studies on spectromorphological analysis. The idea of analyzing the sound behaviors and listeners' responses appeared to be a fascinating way of approaching musical structure. In other words, it promised a vision where the listening experience was the common ground for the composer, performer, as well as the listener. Being informed by these studies and developing an awareness of the sense of motion created by the sonic result helped me to organize the decision-making process. Therefore, this paper presents the analysis of Enfilade: Lamento-Cambiata, with spectromorphological emphasis.

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I.1 Methodology

Traditional methods of analysis certainly offer ways of understanding the workings of musical works. However, in combination with spectromorphological analysis, the results of these methods can be enriched and connected to the listening experience. In this respect, this paper is an attempt to combine two approaches. Chapter II is the section where the overall form and compositional motivations are explained. It is followed by Chapter III, where timbral vocabulary of the piece is examined. Additionally it introduces some of the key elements of spectromorphological approach. Chapter IV deals with the pitch organization and harmonic structure, and the relationship of pitch domain with timbre, rhythm and gesture. In Chapter V, rhythmic structures are examined from the point of view of spectromorphological approach. All these chapters lay the ground for the spectromorphological analysis of the piece, which is presented in Chapter VI. This analysis is based on the studies of Lasse Thoresen and the researchers of Laboratoire musique et informatique Marseille (MiM). Since 1990s, researchers of MiM have been developing a categorization of musical units based on the morphology and behavior of sound-objects. A complete list of these "temporal semiotic unite Unités sémiotiques temporelles (UST)" is given in the appendix.
II. COMPOSITIONAL AND AESTHETIC MOTIVATIONS

"If everything when it occupies an equal space is at rest, and if that which is in locomotion is always occupying such a space at any moment, the flying arrow is therefore motionless."
– Aristotle, Physics VI:9, 239b5

"Ma fin est mon commencement
Et mon commencement ma fin."
– Guillaume de Machaut

The title, Enfilade: Lamento-Cambiata, consists of three nouns, each one referring to a different property of the piece. Enfilade is a term borrowed from architecture and refers to a group of rooms whose doorways are in line with each other. This form of alignment can be found in the arrangement of rooms in museums and art galleries. The doors that are opening to each room of the suite are aligned with the doors of the connecting rooms along a single line. This provides a view through the entire suite of rooms. This view is called enfilade, and it can also function as a processional route. As the title of the piece, enfilade refers to the temporal unfolding of the music, where each section of the piece resolves to the next one. Metaphorically speaking, Enfilade stands for the processional route that a listener follows throughout the entire piece. There is an overall continuity among the sections that gives way to a linear and smooth type of narration.

Lamento is a commonly used term in different areas of music. It usually refers to the vocal pieces based on a mournful text. In Baroque operas, the lamento motif was widely used, especially as the ground bass. It is usually presented in the form of a descending tetrachord or hexachord, as it could be observed in the excerpts of Example 1.

Example 1: Lamento motifs from the literature

a) H. Purcell: from the last scene of *Dido and Aeneas*

![Lamento motif from Dido and Aeneas](image)

b) J. S. Bach: *Crucifixus* from B-minor Mass, BWV 232

![Crucifixus motif](image)

c) J. S. Bach: *Canon for 6 voices*, BWV 1087

![Canon for 6 voices](image)

Especially in the last section of "Enfilade: Lamento-Cambiata", this motif is presented in imitative polyphonic writing, as it is shown in Example 2.
Example 2: Lamento motif from the last section

The third term that appears in the title is *cambiata*. It refers to a specific type of use of non-harmonic notes in the practice of 16th century polyphonic style. In *cambiata*, an unaccented non-harmonic note is left by the leap of a descending 3rd interval. This leap is then resolved by an ascending 2nd. Example 3 presents the use of *cambiata* in Renaissance polyphonic compositions.

In *Enfilade*, the *lamento* motif is usually used in combination with *cambiata*. However, neither of these melodic motions is related to any harmonic structure. Example 4 presents a portion of the piece where this type of melodic construction is utilized.
**Example 3:** use of cambiata

a) G. P. da Palestrina: ending of *Agnus Dei I* from *Missa Brevis*

b) G. Du Fay: extract of *Kyrie* from *Missa Sancti Jacobi*

**Example 4:** Cambiata from Enfilade

A second meaning of the term *cambiata* is also a part of the metaphorical meaning of the title. According to the *Grove Encyclopedia of Music and Musicians*, the term is also used to refer to
the changing voice of an adolescent boy\textsuperscript{4}. In this respect, the term metaphorically refers to the timbral elements in the piece that are constantly in transition. The timbral discourse is presented in such a way that the listener is able to hear gradual transformations of noise elements into the pitched sounds and vice versa. On the other hand, the melodic elements are rarely heard as melodies. They are usually part of a larger texture, which is created by the interaction of multiple layers. Furthermore, the \textit{cambiata} and \textit{lamento} melodies are presented in various degrees of microtonal inflections. Therefore, these musical elements yield to a hybrid musical narrative that is not directly related to their origin (Renaissance or Baroque styles). Even though these elements have strong historical connotations, they serve to an extremely different musical context that is defined by microtonal pitch space and timbral variety of contemporary compositional practice.

\section*{II.1 The concept of "Paradox"}

In very general terms, paradox can be defined as an argument that produces an inconsistency, which is the result of a conflicting meaning in the argument itself. However, different studies show that paradoxes can have multiple forms and in each case they can have different characteristics. A common element in paradoxical situations is the notion of self-reference. This could manifest itself in the repetition of the patterns in different layers, or in a directionality that begins and ends with itself. The latter type is also called "strange loop". Typical examples of such self-referential paradoxes are found in the works of Dutch graphic artist M. C. Escher. One of these works, \textit{Drawing Hands} is presented in figure 1.

An important motivation for the creation and formation of *Enfilade* was the idea of creating a similar type of self-reference in a musical composition. This attempt was realized by utilizing two contradictory formal procedures together: "directional causality" and "variational repetition". Even though motivic development occurs at places, the nature of the musical discourse in *Enfilade* is not developmental but transformational. Since the motives in this piece do not function as thematic structures, the development is not present in classical sense. Nevertheless, the primary musical ideas are usually based on timbre, rhythm and textural formations. These ideas are always subject to certain processes, which are created by a series of changes in their presentation. In this respect, constant transformation of the musical material creates a quality of "causality" between the events and gives rise to a linear musical narrative. However, transformational processes reach certain states of recurrence which conflicts with the idea of constant transformation. In this respect, *Enfilade* is both through composed and repetitive. But the recurrences are "variational" as they do not present the repetition of the materials but the restatements of the earlier musical states.

**Figure 1:** *Drawing Hands* by M. C. Escher
III. AN OVERVIEW OF THE FORM

In this paper, the analysis of form is approached in multiple levels. As has been stated earlier, the auditive analysis based on the sense of motion will be dealt with the spectromorphological approach in the next chapter. Therefore, the present section of the paper aims to give a general explanation to the formal design of the piece by referring to the material content and transformations. This type of evaluation will be performed by defining the placement and interaction of three main formal processes: recurrence, variation, and contrast.

III.1 Large Scale Division

*Enfilade* consists of three main parts. Each part conveys a different musical transformation. The first part consists of a transformation in the sonic material, in that it is a progression from sounds that are mainly obtained with "extended techniques" to pitched sounds. Another characteristic of this part is gradually extending phrase structures. The second part presents a series of transformations in texture and rhythm as well as a gradual change from ambient time to pulsed time\(^5\). These transformations give rise to the generation of new figures that are based on the existing elements. The rate of change becomes faster in this part. The final part is generally stable but also presents a suggested directionality. This is mainly cause by the overall directionality in pitch space, as well as the melodic contour of the parts and the dynamic profile of the global sound. Additionally, because of the ambient quality of this part, as well as the recurrence of some elements from earlier sections, there is a sense of "return". Table 1 gives a

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\(^5\) "Ambient time" is created by very long sounds without the suggestion of any pulse. "Pulsed time" in this phrase refers to any type of rhythmic construction in which an regular or irregular pulsation could be traced. More detailed descriptions and classifications of temporal articulations will be given in Chapter VI.
large-scale division of the three-part form.

**Table 1: Division of the parts**

<table>
<thead>
<tr>
<th>1st Part</th>
<th>2nd Part</th>
<th>3rd Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm. 1 - 56</td>
<td>mm. 57 - 118</td>
<td>m. 119 - End</td>
</tr>
<tr>
<td>00'00&quot; - 04'06&quot;</td>
<td>04'07&quot; - 08'04&quot;</td>
<td>08'05 - 10'42&quot;</td>
</tr>
</tbody>
</table>

| Timbral transformation | Rhythmic and Textural transformation | Ambient time / Variational recurrence / Rather steady plateau with implied directionality |

**III.2 Sub-sections**

Each of these parts divides into smaller subsections. In order to gain a clear understanding of the form, it is necessary to examine the steps of the transitions, which were mentioned above. A detailed interrogation of the subsections will be performed in the chapter that is devoted to spectromorphological analysis. Instead, the following is a brief introduction to subdivisions of each of the three parts.

The first part consists of six sections. The first three of them establish the sound world of the piece, as well as presenting the starting state of the timbral transformation. The fourth section is the portion where the timbral transition from noise to pitched sounds takes place. The last two sections establish the arrival point of the transformational process and prepare for the second part of the larger form by approaching a rather stable state. Table 2 gives the subdivisions of the first part of *Enfilade*. 
Table 2: The subdivisions of the 1st part of the piece

<table>
<thead>
<tr>
<th>1st PART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
</tr>
<tr>
<td>mm. 1-8</td>
</tr>
<tr>
<td>0'00&quot; - 0'28&quot;</td>
</tr>
</tbody>
</table>

Exposition of sound material - the first musical sentence
Repose and re-iteration of movement
Establishing the timbral and rhythmic background
B. Cl. Solo - Transformation to the pitch domain and the arrival on fused chord
Establishing a new timbral area with new gestural elements
Progression towards the stability by presenting the first polyphonic texture

The second part is composed of two main sections, as shown in Table 3. The first section presents a very clear continuity. It consists of a transformational process in both texture and harmony through motivic development. On the other hand, the second section of this part consists of multiple steps. Throughout the second part of the piece the texture is built on repeated note figures and descending gestures predominate the movement. As new definitions of this texture are established, the rate of change becomes faster. Towards the end of the section, a mechanical type of polyrhythmic behavior becomes more prevalent. After a sudden cut of this movement, a similar type of behavior is heard in a different timbral environment, where the sounds are obtained by "extended playing techniques".

The last part of the large-scale division has two sections. The longer first section is a polyphonic texture based on imitations among the wind and percussion parts. These imitations are varied by augmentation and diminution of the rhythmic values in different levels. The overall descending motion arrives at a final state in mm. 142, where the "air" sounds take over. The second section marks the end of the piece with a timbral output that is similar to the beginning. The outline of the third part is given in Table 4.
Table 3: The subdivisions of the 2nd part of the piece

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<thead>
<tr>
<th>2nd PART</th>
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</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>Section 2</td>
<td></td>
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<tr>
<td>mm. 57 - 74</td>
<td>mm. 75 - 80</td>
<td>mm. 80 - 91</td>
<td>mm. 91 - 95</td>
<td>mm. 95 - 102</td>
<td>mm. 102 - 106</td>
<td>mm. 106 - 118</td>
</tr>
<tr>
<td>4'07&quot; - 5'47</td>
<td>5'48 - 6'02&quot;</td>
<td>6'02&quot; - 6'35</td>
<td>6'35&quot; - 6'47&quot;</td>
<td>6'48&quot; - 7'07&quot;</td>
<td>7'09&quot; - 7'18&quot;</td>
<td>7'26&quot; - 8'04&quot;</td>
</tr>
<tr>
<td>Transformation in rhythm and harmony</td>
<td>Tempo change - textural transformation</td>
<td>Repeated notes and descending figures</td>
<td>Further transformation in texture - pedals in high register</td>
<td>Re-definition of the texture with repeated notes</td>
<td>Mechanical pulsations</td>
<td>Activity transferred to a different timbral environment</td>
</tr>
</tbody>
</table>

Table 4: The subdivisions of the 3rd part of the piece

<table>
<thead>
<tr>
<th>3rd PART</th>
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<tbody>
<tr>
<td>Section 1</td>
<td>Section 2</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>mm. 119 - 142</td>
<td>mm. 142 - END</td>
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</tr>
<tr>
<td>8'05&quot; - 9'59&quot;</td>
<td>9'59&quot; - 10'42&quot;</td>
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<tr>
<td>Steady state: Imitative polyphony presented in ambient environment</td>
<td>Return of the sounds achieved by extended playing techniques: Closing.</td>
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</table>

III.3 Forces that define the form of the piece

Throughout the sections of *Enfilade*, there is usually a forward oriented directionality and it manifests itself in three forms:

1. Accelerating rhythms (in various sections of the piece)
2. Textural transformations created by accumulating figurations (especially in the second part)
3. Goal-oriented harmonic progressions (in first two parts of the piece)
At the same time, recurrence of patterns, phrases and textures function as form building elements. In addition, a feeling of discontinuity, created by moments of repose in m. 8, m. 105 and m. 118, becomes another recurrent element in the form. As was mentioned above, a sense of return is evident in the third part of the piece. Apart from the return to "air" sounds, a variation of lamento motif in combination with cambiata motion is the subject of the imitation in this section. However, this is certainly not a return in the "classical" sense as the recurrent elements are evolved further.

The coexistence of forward-oriented directionality and repetition presents a conflict in the definition of the form and therefore can be associated with the self-referential quality of a paradoxical statement.
IV. TIMBRAL CATEGORIES

This section deals with the categorization and functioning of the sonic elements in *Enfilade: Lamento-Cambiata*. This procedure plays a crucial role in laying the groundwork for the spectromorphological analysis of the music. For this purpose, the typo-morphological classifications of sounds offered by Lasse Thoresen will be applied to the sonic elements of the piece.

Before moving into the evaluation of the timbral vocabulary of the piece, a brief introduction to Thoresen's work is necessary. Lasse Thoresen's study is based on the typo-morphological classifications of sound objects in Pierre Schaeffer's *Traité des Objets Musicaux*. In his book, Schaeffer summarizes his categorizations in a diagram, namely *Tableau Récapitulatif de la Typologie*. In his 2007 article, entitled “Spectromorphological Analysis of Sound Objects”, Thoresen suggests a revised version of this diagram, which is given in Table 5. As Thoresen revises the Schaeffer's categorization in this table, he also replaces some of the Schaefferian terms with new ones. A specific type of sound-object could occupy each square in this table. The spectral characteristics are classified in the vertical level, while the category of energy articulation is ordered in the horizontal level.
### Table 5: Table of the typologies, suggested by Lasse Thoresen

<table>
<thead>
<tr>
<th>ENERGY ARTICULATION</th>
<th>Vacillating</th>
<th>Stratified</th>
<th>Sustained</th>
<th>Impulse</th>
<th>Iterated</th>
<th>Composite</th>
<th>Accumulated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOUND SPECTRUM</strong></td>
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<tr>
<td><strong>STABLE</strong></td>
<td>Pitched</td>
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<tr>
<td></td>
<td>Dystonic</td>
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<td></td>
<td>Complex</td>
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<td>(unpitched)</td>
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<tr>
<td><strong>VARIABLE</strong></td>
<td>Pitched</td>
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<td>Dystonic</td>
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<td>(unpitched)</td>
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</table>

The categorization in the "sound spectrum" level is classified in two main parts; stable and variable. "Stable" ones are the sounds showing stability in their temporal evolution. The "variable" ones, on the other hand, presents variation in the profile of the sound. Sound objects with glissandos and/or sounds with spectrally evolving profile enter to this category. Both of "stable" and "variable" sounds are subdivided into three subcategories; pitched, dystonic, and complex (unpitched). The "pitched" sounds are the ones presenting a clearly perceivable pitch or fundamental. The rather ambiguous sounds with a spectrum that is formed by a mixture of pitched elements and clusters of formants are called "Dystonic". According to Thoresen, the sounds of gongs, triangles and bells fit the examples of this category. The remaining sound type, "complex", does not have any perceivable fundamental tone. Examples for such category can be the sounds of drums, air sounds, and the unpitched consonants of speech.

The criterion of the energy articulation in Table 5 is also divided to two main categories. In the middle of the table, impulse type of articulation (i.e., articulation with short thrusts of energy) takes place. Towards the left of the diagram, the sound objects are prolonged and sustained. The
"stratified" objects presented towards the left side of the table are composed of multiple sustained sounds (or partials of sounds) that are in motion. The "vacillating articulation consists of similar type of multi-layered sounds with a continuous energy and with an unpredictably diverse evolution in each layer. According to Thoresen, the creaking of a door, or over-pressured bowing on a string instrument fit to this category₈.

Towards the right side of the diagram, the sound objects become prolonged by re-iteration. This prolongation could manifest itself as tremolando if the frequency of the reiteration is very small. Accumulated types are the ones that show a very fast and unpredictable trajectory of reiterations. The composite sounds show a mixture of different durations, which might or might not suggest a specific rhythmic pattern. This type of sounds can have internal polyrhythmic structure.

Timbral considerations had a paramount importance in the creation process of Enfilade. Therefore the resulting sound world presents diversity in timbral vocabulary. It travels through a wide sound palette, ranging from different types of dystonic sounds via pitched sounds towards the stratified type of combinations.

In the process of applying Thoresen's categorization to the timbral discourse in Enfilade, the considerations of his categorization is elaborated with the considerations of the study of UST⁹. This type of elaboration became a necessity in order to accommodate the compositional platform of Enfilade. In such a synthesis, Thoresen's typologies are taken not only as momentary sonic statements, but also as prolonged sonic events. In order to illuminate the typologies in Enfilade,

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₈ Thoresen 2007.
₉ Unités Sémiotiques Temporelles
the analysis of sound material is approached from two dimensions. The first dimension is the constituent of the global sound result and is concerned with the type of every individual sound that is part of the mixture of sounds. The second dimension is the mixture itself and the resulting sound is treated as an object.

The first part of the piece introduces the sounds produced by extended playing techniques. A widely used term for such sounds would be "noise". However, this term seems to be too general for defining the nature of sounds. As was presented in Table 5 with a detailed categorization used in spectromorphological approach, these sounds could be classified either as dystonic or "complex" according to the degree of projection of a fundamental tone. Usually, the extended playing techniques executed in string instruments give rise to dystonic type of sounds. The examples for this type could be heard in the beginning of the piece. The sounds obtained by blowing air into the wind instruments are the ones fit to the category of complex sounds. However, the mixture of string and wind sounds could be classified as dystonic in their mixture, as it is heard in the very beginning of Enfilade.

As was stated before, the first part of the piece introduces a transition from dystonic sound world towards the pitched sounds. There is a chord at m. 32 that could be perceived as a single timbral entity that marks the arrival of this transitional process. The structure of this chord shares the characteristics of a "distorted spectral chord." Each note in this chord is perceived as a part of overall timbre. The fundamental note is D-flat and the chord is approximated into the quartertone frame. The Bass Clarinet in its re-iterative and sustained version presented the
fundamental note of this chord earlier in the piece. The latter representation is introduced as a multiphonic, which fits to the category of dystonic sounds.

As the piece moves into the pitch domain, the harmonies are treated in the same way as the chord in m. 32. In other words, the harmony serves to the projection of the sonic profile that is created by the combination of pitches and figurations in each part. Therefore, different chord structures project different types of spectral brightness for the overall sound. At the same time, they are part of the harmonic progressions that are covered in the following chapter.

Impulse sounds, produced by the key-clicks in wind instruments, as well as string pizzicatos, have an important role in *Enfilade*. Drum and woodblock sounds could be added to this category as well. In the first part of the piece, these sounds are placed sparsely, but they gradually become elements of a rhythmic formulation.

Reiterated sounds and sustained sounds show different degrees of intensification throughout the piece. "Tremolo" playing is used in different speeds. They sometimes could be perceived as granulation of a sustained sound-object as in the portion of music between mm. 38 and 41. In some other parts they could be heard as reiterations. The bass drum writing between in rehearsal number A3 or the string parts between mm. 78 and 82 could be given as examples of this behavior. Furthermore, reiterations by accelerating or decelerating rhythms are among the main materials of the piece.10

10 Further inquiries into the timbral elements of *Enfilade* are made in Chapter VIII. Spectromorphological Analysis.
V. HARMONY AND PITCH ORGANIZATION

In the construction and organization of harmonic material of Enfilade, timbral and textural considerations played an important role. As was stated previously, the harmonies are part of the intention of creating a global sound image.

During the timbral transformation of the opening part, the first pitches occur in the lower register. A detuned double bass note is introduced on in bar 3. Because of the extremely low frequency of this pitch, the listener cannot perceive any note. Similarly, trombone and horn pitches in rehearsal number A4 are extremely low. These sounds merge with the dystonic quality of the global sound. The first perceivable pitch is introduced by bass clarinet in m. 20. Multiphonics in this passage emphasizes the 5th partial of low D-flat and functions as a pivot between pitched and dystonic sounds. The partial is then picked up by flute and viola. As the lowest string of the double bass is gradually tuned up, other pitches of the first chord make their entrances. The chord is revealed gradually, starting from the lower and middle register.

As it could be observed in the Example 5, the intervallic structure of this chord does not quite reflect the intervallic proportions of overtone series. This is due to the fact that the harmonic partials are distorted with the addition of alien pitches. Thus the resulting sound is rather inharmonic. However, a closer examination reveals the existence of some of the harmonic partials of D-flat fundamental, as it is presented in Example 6.
Example 5: mm. 29 - 32 - the formation of the first chord

Example 6: Chord members that belong to the harmonic spectrum of D-flat

This content is distorted by stretched duplications of the fundamental, as shown in Example 7.
Example 7: Partials of D-flat spectrum along with the stretched doublings of the fundamental

At the same time there are the octave duplications of B-flat, as given in Example 8.

Example 8: with the addition of the duplications of B-flat

Therefore, there is a collusion that is created by the existence of two fundamental pitches: D-flat and B-flat. There are two reasons for this. The first reason is that low B-flat was heard in m. 24 as an additional element to the bass clarinet multiphonics. The pitch was then sustained and became a part of the accumulating resonance. At the same time, spectral relationship between these two pitches creates an internal dissonance in the overall sound. The fifth harmonic of D-flat and the sixth harmonic of B-flat coincide in the equal temperament system (F4); however they are approximately 14 cents apart in just intonation. Therefore, supporting the D-flat
multiphonic with very softly played low B-flat enriches the dystonic quality of overall sound between mm. 24 - 32. This leads to the second reason: the "dystonic" quality of the transition is maintained by amplifying the existence of B-flat with octave duplications.

Similarly, E natural is a residue from the earlier portion of the music as it was played as a low note in horn. Combined with G and A, these notes intensify the distortion by implying a compressed spectrum. Example 9 presents this chord in its totality.

**Example 9:** The chord in its totality

The first pitch of the trumpet melody is “C(5) quarter-sharp” and it implies a compression in the spectral content of fundamental D-flat. Furthermore, it is the initiator of the trumpet line, which is the first melodic statement of the piece. The line is continuous and follows a descending contour. The rhythmic and intervallic structure is formed in such a way that it gives an impression of not being able to stay on its own pitch center, yet being pulled down to the region of the fundamental. In other words, the decelerating rhythms in combination with expanding intervallic structure of two note figures suggest a gradual loss in energy.
A closer look to the intervallic structure in mm. 34 -39 reveals a gradual expansion in descending profile of the melody.

Example 10: Trumpet line, mm. 32-39

Example 11: Intervallic structure of the trumpet line

In this example, the slurs below the staff show the intervals in each dyad. At the same time, the stems above the staff indicate the intervallic relationship between the first notes of each dyad. This example already shows the shift in the projection of intervals in temporal domain: after the first two notes of m. 34, the gradual intervallic expansion is transferred to the level that is concerned with the grouping of dyads. The resulting effect gives a sense of energy loss, as the
beginning of each dyad is lower than the previous pattern. This is also supported with the gradual augmentation of the rhythmic values that emphasizes the feeling of energy loss.

The next harmonic identity is revealed in its complete form on the downbeat of m. 46. The fundamental of this chord is E-natural. In contrast to the previous chord, this one does not include any microtones; therefore spectral information is only roughly delivered. However, because of different dynamic profiles of the each note, the resulting sound is similar to the first chord.

As it could be observed in the following example, the structure of this chord is similar to the previous one. Pitches that belong to the harmonic spectra of E-natural are notated as whole notes. The second fundamental tone is D-flat and along with its overtones, it is notated as empty note heads. Other pitches that are alien to both groups are notated with black note heads.

**Example 12: Chord in m. 46**
The arrival to this chord initiates the linear motions of individual parts. Its sonic character is prolonged until m. 55, while the texture is constructed polyphonically. There are numerous vertical formations between these points that give rise to different harmonic combinations. However, the perceptible result is dominated by the texture. The voice leading of the parts reveals an interpolation between two chords with an intermediary chord heard in m. 52. After this point, the texture clears out and the harmony resolves to the chord in m. 55. Example 13 presents these three chords.

The arrival chord gives the sense of a harmonic cadence. This is caused by its longer duration in harmonic rhythm as well as its comparatively consonant structure. Another important characteristic in this interpolation is the contrary motion between low and high ends of the chords. This emphasizes the directionality of the harmonic relationship that is provided by the melodic movement of each instrumental part in the polyphonic texture. Example 13 presents a reductive version of this harmonic interpolation.

**Example 13:** Three chords occurring in mm. 46, 52, and 55
In this contrapuntal passage, the horizontal construction of the pitches has been the primary factor in the determination of pitch material. The melodic structure in high woodwind parts presents the *lamento* and cambiata *motions* in combination, as it could be observed in the flute part, shown in Example 14.

**Example 14:** Flute part, mm. 46 - 49

The oboe and clarinet parts imitate the contour of this melody. However, the imitations are not exact and they are subject to variations. One of the techniques for variation used here is the rhythmical augmentation. There are also subtle differences in the contour of the parts. But one aspect is maintained in each part: as the note values become longer, the intervals become wider. There is not a strictly proportional symmetry in intervallic structure but the shape of each line reflects the similar motion. The following example presents the pitch material with their rhythmic grouping, separated with the bar lines. The values given in numbers show the intervals between each dyad in quartertone grid. Number 4 as the denominator stands for four quartertones in a whole-tone space.
Example 15: Imitative counterpoint mm. 46 - 52

As the lower parts move in the same manner, they create a contrary motion against the high wind part. The contrary motion is also at play in string parts, as it could be observed in Example 16.

Example 16: score fragment - string parts between mm. 46 and 52
The music between mm. 55 and 74 can be divided into three plans: foreground, middle-ground, and background. The foreground consists of imitative figurations in high woodwinds. The middle ground is formed by the piano and vibraphone figurations. Bassoon, brass instruments and strings provide the background. They present a harmonic progression that is goal-oriented. The most important content of the progression takes place in the brass section and the target of this progression is B-natural. As the following fragment shows, the most prevalent harmonic intervals are minor and major seconds.

**Example 17: Brass fragment - mm. 55 - 74**

The texture in this fragment is heterophonic and the higher rhythmic activity after m. 69 supports the intensifying harmonic tension. The melodic writing in each part aims to reach B-natural.
However, a reductive version of this fragment reveals the logic behind the choice of pitches. In this version, ornamental pitches are omitted and salient harmonic formations are given as chords.

**Example 18:** Brass chords between mm. 62 and 70

![Example 18: Brass chords between mm. 62 and 70](image)

As the above example demonstrates, harmonic motion is created by ascending and compacting clusters. In combination with bassoon and strings, one can see that the same principle applies to the whole background structure. The following example summarizes each chord formation between mm. 66 and 72.

**Example 19:** Reduction of harmonies between mm. 66 and 72

![Example 19: Reduction of harmonies between mm. 66 and 72](image)

At the same time, the woodwind figurations continue to re-emphasize the tonal gravity of B-natural with their descending motions:
Therefore, the gravity towards B-natural defines the directionality of the pitch material in each part. After the arrival of this "focal" pitch, the motivic development in woodwinds continues with rapidly descending figurations. In a way, these parts present elaborated statements of the \textit{lamento} motif between mm. 75 and 79. Each part plays a different collection of pitches but when they are combined, the woodwind section covers each note in the chromatic scale.
The above passage leads to the next harmonic statement in m. 80 where the arrival pitches of the woodwind lines are picked up by the piano. At the same time, a new gestural identity is introduced by the reiteration of the chord.

**Example 22: Piano chord on m. 80**

![Example 22](image)

This chord is also reiterated by the wind instruments. The piano part prolongs the sonority of the chord by transposing it down chromatically. The doublings in the wind instruments also follow the same path but their descent is delayed. In other words, the wind instruments play the identical pitch aggregates as the piano, but in a different rhythm, slower in speed than the piano part. This difference in rhythmic profile gives rise to a sounding result similar to the "delay" effect. The delay in harmony is given in the following reductive scoring, where the bar numbers appear on top of the staff.

The wind parts do not play the complete version of each chord. In Example 23, the empty note-heads represent the omitted members of the wind chords. The omission happens towards the end of bar 83. Slightly after the omission, high woodwinds and percussion parts introduce another texture. Not only does it provide a different rhythmic layer, but also it enriches the harmonic content of the ongoing process by extending the activity to a higher register, as it is represented in Example 24.
Example 23: mm. 80-88

Example 24: m. 84 - high woodwinds and percussions chord
The intervallic structure of this chord is related to the chord in m. 80. In fact, the oboe and clarinet parts stop playing the reiteration of the chord in original pitch level in m. 83. Along with the flute, marimba and vibraphone, they reiterate the missing members of the transposed chord in the next bar, in higher register. This register shift is shown in the following example. The E-flat in the marimba part is an additional note that supports the tritone identity of the chord.

Example 25: The register shift

![Example 25: The register shift](image)

The harmonic descent supports the directionality of the rhythmic and gestural content of this section. At m. 94 a new harmonic structure overlaps with the previous progression. It is basically a chord that provides the pitch material for a hocketing type of texture and consists of the repetition of trichords in string instruments. Each of them plays at a different speed. At the same time the low notes of the brass instruments and bassoon show decelerating rhythmic profiles. The pitch collection of every part is included in the following example.

Example 26: The harmony in m. 95

![Example 26: The harmony in m. 95](image)
A close attention to the pitch collection in this chord reveals that its sonic character is dominated by the perfect fifths. Specifically, two sets of stacked fifths are combined to create the chord, as shown in the hollow note-heads. The polyrhythmic nature of the texture helps to bring out the minor second, minor ninth and major seventh relationships between the parts. This relationship is then carried on to the piano and brass parts in mm. 102 – 104, as shown in Example 27.

**Example 27:** score fragment between mm. 102-104

The last part of the piece (from m. 119 until the end) introduces a multilayered and polyphonic texture that is similar to the end of the first part (between mm. 46 and 55). The polyphonic texture is created by the imitation and takes place in woodwind, brass and percussion parts. During this process, another layer created by the gliding harmonics in the strings provide an
ambient and slowly moving background. The harmonic formations that come out in this layer first appear as clusters but then they gradually become independently moving lines. This is a result of the gradually thinning texture, where the instruments stop playing one by one. The melodic motion in these parts mimic the woodwind figures that mainly consist of intervals of seconds and thirds. But this relationship is blurred with the glissandos between each note, as well as with their extremely long durations.

Harmonic formations in this passage are the result of the imitative writing. In the construction of each line, the characteristic descending motion of *lamento* motif is used in combination with cambiata notes. Even though the interval of the leap that is introduced by the latter idiom varies from one instance to another, the *lamento* motif progresses adjacently. Some of the cambiata notes are not completed. The following example gives the first phrase of the flute.

**Example 28**: Flute line between mm. 119 and 121

The second segment of this phrase consists of a descending three-note motif, as opposed to the first segment that has four notes. As this type of internal variation is used in every phrase, it becomes an important characteristic of the melodic shape that is imitated by the other parts. The descending quality is also present between the segments as each new one is lower than its preceding segment. The following example is the totality of the flute line that takes place between mm. 119 and 139.
Example 29: Flute line between mm. 119 – 139

There are four phrases in the flute part. The motivic transformation throughout these phrases is obtained by the addition and/or omission of the number of pitches in each segment. In contrast to the first three phrases, the last phrase is a continuous descending line and has four segments. The intervallic structure between the first notes of each segment provides a perceivable continuity and smoothness in the gradual descent between phrases. The following example shows a reductive representation where each line represents a phrase and the segments are separated by dashed bar lines. The empty note-heads are to show the intervallic relationship between their first notes of these segments.
Example 30: Reductive representation of the pitch structure of the flute line (mm. 119 - 139)

It is also important to note that the first note of each phrase forms a melody containing the inverted version *cambiata*, which gives to the overall structure a flowing sonority.

Example 31: The first pitches of each phrase abstracted

The other parts reflect the overall structure of the flute line. Consequently, the polyphonic texture is obtained by means of imitation. However, each part starts to play and continue at a different pitch level. At the same time, every part plays in different speed. Therefore the resulting texture is very close to canon in augmentation and diminution. The motivic transformations lead to slightly different intervallic structures in each line. However, there are recurrent segments sharing the exact same intervallic structure.
Example 32: Recurrent segments throughout the parts

Flute: mm. 122 - 124

Trumpet: mm. 119 - 126

Trumpet: mm. 129 - 131

Bassoon: mm. 128 - 131

These recurrent moments balance the variety of motivic transformations. However, these transformations are carried out in order to maintain a global harmonic quality in this extended passage. This consideration has already been present, as early as the trumpet line heard between mm. 32 and 39, where the intervals gradually become larger as the overall line descends. This principle is applied to the transpositions of the flute line in the last part of the piece. As the other instruments make their entrances in lower pitch levels, their intervallic structure becomes slightly larger. This proportional transposition yields to a variety of pitch combinations by preserving the melodic integrity.

Example 33: Proportional Transposition

Flute: mm. 122 - 124

Bass Clarinet: mm. 131 - 132
During this portion of the music, two percussionists play pitched pipes and vibraphone. The pitched pipes are tuned to the frequencies that coincide to the certain pitches that could be found in 24-step equal temperament division of the octave. Since the timbral quality of the pipes is close to vibraphone, the instrumental combination gives rise to a sound that could be perceived as a "quarter-tone vibraphone". Moreover, synchronized chords played in two instruments could be associated with the sound of "cowbells" as a result of the inharmonicity in their mixture.

For practical reasons, the first percussion part is notated as a transposed part in this section. However, the example below represents a reductive transcription of the actual sonic result, that comes out of the mixture of two percussion parts. As it could be clearly observed, the melodic contour here is similar to the contours of other instruments. Again, the segments are separated with bar lines.

**Example 34:** The transcription of the percussion section between mm. 120 and 135

![Musical notation example]

From this example, it can be deduced that the combination of notes played by two percussion instruments creates one line, representing another reflection of the original flute melody.
The pitch organization in *Enfilade* presents a number of procedures that serve the sonic character of the piece. The "spectral chords" can be taken as an idiom as they establish a harmonic area in the first part of the piece. They are rich in terms of their intervallic content and they occupy a wide space in register. Most of the "tutti" chords share the properties with these chords and they signify important points in the form. Examples for such structures are found in the beginning of the second part of the piece (m. 55), as well as the opening of the third part (m. 119). The second idiom is the interval of tritone and it is derived from the content of the spectral chords. Many chords in the piece have prevalent tritone sonorities but they do not serve a spectral agenda.

Another very commonly used procedure is the juxtaposition of two dyads or trichords that are separated by major 7th or minor ninth. This idiom could be found in the construction of spectral chords (m. 46) as well as other places (m. 119). But perhaps the most defining idiom for the sonic character of the piece is the notion of proportional transposition that was presented above. This technique helps listeners to focus on a melodic shape while suggesting a tendency of further descent. Potentially, such a technique could be used in the ascending sonic contour. In *Enfilade*, however, it is used as a tool to articulate the generally descending contour of the piece.
VI. RHYTHMIC CONCERNS

The rhythmic vocabulary in *Enfilade* presents a variety of behaviors and plays an important role in defining the structure and flow of the music. Rhythmic elements in this piece also have determining functions in the composition of the gestural content. The gestural behavior and its influence in overall form will be discussed in the following chapter. This portion of the paper aims to lay the groundwork for such discussion by examining the rhythmic discourse in terms of its construction and perception.

The variety of the rhythmic elements is the product of a decision-making process that is concerned with temporal articulation and the perceptual result. In this respect, some of the spectromorphological studies are found to be helpful for explaining the temporal considerations.

For the purpose of categorization of sound objects and their behaviors, the spectromorphological approach deals with the unfolding of these objects over the course of time. This type of consideration leads to a further investigation, which is about duration. Different objects occupy different lengths because of their structural content. Therefore, they suggest different temporal environments. In his study of the categorization of sound objects, Lasse Thoressen suggests four types of velocity and duration. These are listed as:

1. Gesture time
2. Ambient time
3. Flutter time
4. Ripple time
As Thoresen points out\textsuperscript{11}, "gesture time" is a temporal environment where strings of sounds, with shorter durations present a formal entity, usually called as "gesture". "Ambient time" on the other hand is created by very long sounds, whose profiles usually show very slow evolution in their predominating sustaining part. This type of temporal articulation usually lacks a regular pulsation or any reference point. In "flutter time", the group of sounds follows each other so rapidly that they show an inclination to blend and merge. The last type of temporal articulation, "ripple time", stands for the intermediate region between "Flutter time", and "Gesture time". Fast iterations of sounds are discernible as opposed to the ones in "Flutter time".

Examples for both "flutter time" and "ripple time" can be found in different reiterated note groups in \textit{Enfilade}. But the most commonly used types are the gesture and ambient articulations. Especially in the first and the last part of the piece, the long values of notes provide a continuous and transforming background.

Bass clarinet figurations in m. 20 fit to the description of "gesture time". Between m. 20 and m.29 there are three phrases (first phrase in mm. 20-24, second phrase in mm. 25-27, and the third one in mm. 28-29). Each phrase starts with a group of impulses. The group is then followed by a long sustain that reaches to the multiphonic content with a crescendo. This structure is preserved but each phrase gets longer by the addition of the impulse type of iterations.

\textsuperscript{11} Thoresen 2007.
Evidently, in the sounding result of this example, the double attacks in the gestural groups can be perceived as a single impulse, rather than two impulses following each other. The plurality of impulse types supports the feeling of unsteadiness in this passage. More importantly, such a feeling is actually caused by the rhythmic patterns that are not regular.

The question of regularity and its degree is intimately related to the question of predictability. In his article "Tempus ex Machina: A composer's reflections on musical time", Gerard Grisey presents a continuum of rhythmic complexity, by categorizing different rhythmic situations. In his categorization, the "periodic" rhythms suggest the maximum predictability and they belong to

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the category on the extreme end of the continuum, labeled as "orderliness". The continuum progresses towards the other extreme end where rhythmic situations suggest a "rhythmic silence". He calls this category as "smooth time" where there is no suggestion of any hierarchy of durations, or any perceptible division of the time. The progression from order to this order (periodic to smooth time) covers continuous-dynamic, discontinuous dynamic and statistical times. The following table gives the definitions of these comparative categories.

**Table 6: Continuum of rhythmic complexity suggested by Gerard Grisey**

<table>
<thead>
<tr>
<th>Category</th>
<th>Predictability Level</th>
<th>Complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Periodic</td>
<td>maximum predictability</td>
<td>ORDER</td>
</tr>
<tr>
<td>2. Continuous-dynamic</td>
<td>average predictability</td>
<td></td>
</tr>
<tr>
<td>continuous acceleration</td>
<td>continuous deceleration</td>
<td></td>
</tr>
<tr>
<td>3. Discontinuous-dynamic</td>
<td>slight predictability</td>
<td></td>
</tr>
<tr>
<td>accel./decel. by stages</td>
<td>statistical accel. or decel.</td>
<td></td>
</tr>
<tr>
<td>4. Statistical</td>
<td>zero predictability</td>
<td></td>
</tr>
<tr>
<td>- complete redvision</td>
<td>- unpredicability of durations</td>
<td></td>
</tr>
<tr>
<td>- maximum discontinuity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Smooth</td>
<td>rhythmic silence</td>
<td>DISORDER</td>
</tr>
</tbody>
</table>

In the above list, different degrees of irregularity can be found by referring to the starting point of the continuum, which is called as “periodic” as it presents the maximum predictability. The ideal example for the periodic time would be a pulse that creates the repetitions of a beat in equal time intervals.

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In this respect, the bass clarinet passage in the above example presents unequal time intervals between the impulses, therefore suggests a certain degree of irregularity. However, this is contrasted by another layer of rhythmic activity in cello part.

**Example 36: Cello part mm. 22-24**

![Example 36: Cello part mm. 22-24](image)

Even though the cello part presents a regular rhythmic profile, it is presented in an environment where there is a plurality of behaviors in rhythmic formations. Throughout the first part, accelerations, decelerations, irregular pulses are presented over an ambient articulation of time maintained by long sustains of sound.

In order to gain a deeper understanding about the degrees of irregularity, one could look at the aural experience outside of music. In his *Guide to sonic objects*, Michel Chion proposes a generalization of sound sources with three types of behaviors that is based on the type of pulsations they present in their structure. According to Chion, the mechanical sounds progress in a regular pulse with predictable durations\(^\text{14}\). In a way these sounds fit Grisey's category of "periodic rhythmic profile". On the other hand, Chion claims that the ones presenting a quasi-irregular pulse can be found in the "sounds produced by the living organisms\(^\text{15}\)". He refers to


\[\text{Chion 1983.}\]
this type of pulsations as “oblique”. As a result of orderly nature of its phrase structure, the bass clarinet line suggests an oblique pulsation, rather than a completely irregular one. This is mainly caused by the existing predictability in the phrase structure in combination with the lack of regular pulsation in the rhythmic patterns.

According to Chion, the sounds in nature generally present a plurality of pulses and therefore suggest irregularity. Even though there are regular and oblique pulsations in different strands of music, the overall rhythmic plurality, the first part of *Enfilade* presents this type of irregularity that is close to Chion's description.

Another manifestation of "oblique pulsations" is found in the second section of the piece. As it is presented in the following example, cello and contrabass starts to play impulse type of attacks that are produced by pizzicato plucking in m. 75. The passage is initiated with irregular rhythms, where short phrases suggest the "gesture-time" in Thoresen's terms. The pitch material is generally composed of major ninths, tritones and major sevenths. As the passage goes on, the rhythms start to suggest a degree of regularity. Throughout the end of m. 83, two instruments settle in their periodic pulsation rates but since their combination is polyrhythmic, the sounding result suggests an "oblique pulsation". Here, the pitch material becomes fixed and two parts create a pedal point in the rhythmic and harmonic sense.
Between m.106 and m.112, oblique pulsations are distributed throughout the ensemble and presented with impulse type of sounds with "dystonic" quality. This activity could be observed in the portion of the score given in Example 38.

The repeated note figurations occur very often in *Enfilade*. They are among the examples of different degrees of regularity because of the periodicity that they present. The trumpet entrances in m. 32 and m. 44, for example, start with repeated note figures and follow a continuous-dynamic profile in Grisey's terms.
Example 38: mm. 106 - 112
In the use of repeated note figurations, their transitional quality was always considered. Such a quality owes its existence to the reiterated pitches at certain instances, as they could be perceived not as a rhythmic event, but the "granulation" of a sustained sound. The above example occurs in a texture composed of sustained sounds with an ambient articulation of the temporal domain. Even though it can be perceived as a granulated sustain at first hearing, it gains a continuous momentum in rhythm. The accelerating pulsation of the figure creates a contrast with the sustained sounds. Therefore, depending on their velocity and the context in which they are presented, repeated note figurations can be perceived either as granulated sustains or as rhythmic elements. In the composition of *Enfilade* this transitional property plays an important role. Additionally, two commonly used examples of "granulated sustains" are the use of flutter tonguing and tremolandos that are used in various places in the piece.

**Example 39:** Trumpet line in m. 44

![Example 39](image)

Another type of utilization of the repeated note figurations takes place in the second part of the piece, more specifically between m. 80 and m. 91. As was stated earlier, the section is built on the repetition and transposition of the piano chord in m. 80. The chord is prolonged by reiteration. However, the ensemble and piano have different rates of deceleration. This passage is representative of a transformation in the perception of repeated notes: in the beginning they are heard as granularity in the sustained harmony but as the durations of the notes get longer, each
attack is heard distinctly.

Grisey categorizes accelerations and decelerations as "continuous-dynamic" rhythmic behaviors and emphasizes their suggestive nature. In this respect, they create a sense of "prediction" and a change in the perception of musical time. He states that;

"Psychologically the acceleration of durations reinforces the progressive blurring or fading of sounds that takes place in our memory: the longest events memorized are also the earliest. Through acceleration the present is made more dense, the arrow of time at full speed, and the listener is literally propelled toward something which he does not yet know. The arrow of his own biological time and that of musical time added together, cause a complete loss of memory."

In this respect, accelerations suggest a goal-oriented directionality. According to him, deceleration pulls the listener backwards as "slowing down induces a sort of expectancy in the void of present". Therefore, deceleration can be defined as a directionality that is backward oriented.

In the line of the same thought, Lasse Thoresen calls these rhythmic profiles as tendential pulses. Therefore, in this paper, the same term will be used to refer to accelerations and decelerations. The trumpet entrances presented in Example 10 and Example 39 suggest a momentary intensification and dissolution of the energy by means of pulsation. A similar example can be found in the first phrase of the piece, where the same rhythmic idea is heard in string parts.

Decelerating rhythms are also used as a tool of elimination of the elements from the ongoing texture. The example below is a fragment from the second part of the piece and shows how the

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16 Grisey 1983.
17 Ibid.
brass instruments make their exit with decelerations and gradually giving more space for the rhythmic activity on the piano and string parts.

Example 40: Elimination of brass pulsations

It is probably evident at this point that the metric references in the piece are not instantly
perceivable on the musical surface. Instead, the rhythmic groupings in different speeds create their own reference points. The string parts in the above example present such situation. As a natural consequence of this, the sounding result is polyphony of rhythms. A similar type of polyphony is present in the closing part of the piece with the imitation of the flute line in different speeds, between mm. 119 and 141. This extract also points towards a parallelism between the rhythm and pitch organization. Tendential construction appears to be a common notion in both domains. As was stated in the previous chapter, the intervals get wider as the melodic line descends. The sounding result emphasizes the sense of distancing from the original pitch area, and starts to imply a gravity point in the lower range. Even though the intervallic structure is not drastically different, larger intervals are heard more often with longer durations.
VII. SPECTROMORPHOLOGICAL ANALYSIS

This chapter presents a detailed spectromorphological analysis of *Enfilade*. As was stated earlier, such an analysis is based on two studies, UST by MiM\(^{18}\), and auditive analysis work of Lasse Thoresen.

Thoresen's three articles deal with the application of Pierre Schaeffer's typo-morphologies to a rigorous analysis of sound material, form and musical semantics\(^ {19}\). Some of the essential concepts from these articles have been already presented in earlier chapters along with the terminology suggested by Thoresen. In the following pages they will be used in combination with the concepts and terms suggested by MiM. As both studies originate from the work of Pierre Schaeffer, they make use of the same notions such as "energy articulation", spectral content, and so forth. However, they have slightly different approach in defining the morphologies.

VII. I: Temporal Semiotic Units - A study by MiM

"*Temporal Semiotic Units - Unités sémiotiques temporelles*" (UST) are descriptions of sonic figures that are based on the definition of their evolution over time. In describing each unit, researchers of MiM consistently focus on the duration and behavior of the sonic content. As opposed to Thoresen's work, these descriptions do not offer much information about the spectral

\(^{18}\) *Unités sémiotiques Temporelles* is an ongoing research project performed by the researchers of Laboratoire de musique et informatique de Marseille.

\(^{19}\) Over the course of twenty years, Thoresen worked on the realization of auditive analysis of music. Three articles by him published in *Organised Sound* focused on the application of the concept of listening intentions and developing a systematic methodology of analysis based on Schaeffer's typomorphologies.
content of the units. However, the behavioral focus of this study brings out the potential connection between the morphology of smaller-scale sound objects and larger-scale gestural formations. Therefore, the study of UST makes it possible to connect the smaller scale structures to the larger scale form. Additionally, these descriptions include some metaphorical associations with the physical experiences of momentum and visual perception of motion. Therefore, the study of UST is used in combination with the key elements of Thoresen's rigorous study of spectromorphology.

Table 7: Two Groups of Temporal Semiotic Units

<table>
<thead>
<tr>
<th>Temporal Semiotic Units (UST)</th>
<th>non-time-bound USTs</th>
<th>time-bound USTs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heaviness</td>
<td>Falling</td>
<td></td>
</tr>
<tr>
<td>Obsessional</td>
<td>Contracted-sustained</td>
<td></td>
</tr>
<tr>
<td>By Waves</td>
<td>Impetus</td>
<td></td>
</tr>
<tr>
<td>Progressing/Advancing</td>
<td>Stretch</td>
<td></td>
</tr>
<tr>
<td>Rotating</td>
<td>Slowing-down/Break</td>
<td></td>
</tr>
<tr>
<td>Intention to start a momentum</td>
<td>Suspension-Freeze</td>
<td></td>
</tr>
<tr>
<td>Lack of directionality by the divergence of</td>
<td>Tumbling (stopping</td>
<td></td>
</tr>
<tr>
<td>information</td>
<td>by the natural</td>
<td></td>
</tr>
<tr>
<td></td>
<td>decrease of energy</td>
<td></td>
</tr>
<tr>
<td>Stationary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inexhaustible Trajectory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of directionality by the excess of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspended</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The USTs are classified in two groups: non-time-bound and time-bound. The first group includes twelve units. These units are usually found in long stretches of musical situations. On the other hand, the second group consists of seven units that can only exist within a specific time
frame. Table 7 above gives the list of all USTs from both groups.

The behavior of the UST called "by waves - *par vagues*" could be observed in most of the sections of *Enfilade: Lamento-Cambiata*. This unit is composed of the multiple repetitions of a sound object or a sound formation consisting multiple objects. The most characteristic property of this unit is the energy articulation of the motif that is repeated. The repeated element should present what the researchers of MiM call as “delta form”. This form is a sound formation where the energy first grows then decays\(^{20}\). In traditional terms, this formation is very close to the notion of dynamic "swell'. The "delta" form can manifest itself both in dynamics (cresc./dimin.) and rhythmic formations (accelerations and decelerations) as well as in all other parameters of sound. Therefore, the delta behavior is transferable among different domains, as well as different temporalities. This is mostly true for many of the behaviors that could be find in UST definitions. As it is evident in the following analysis, the sound elements can function as a part of the global sound formation as well as the global sound combination itself.

**VI. 2: The first part**

The portion of the music between mm. 1 and 8 can be perceived as a single unit or a single musical phrase in traditional terms. In the first half of the phrase, the continuous increase in dynamic profile reaches a point that is articulated by a mallet attack on the resonance board of the piano. Continuous reiterations in the string instruments are supported by intensification in the dynamic dimension of overall sound. Such crescendo is obtained by the "air" sounds in the

wind instruments in mm. 2 and 3. It is especially this second intensification that makes the listener perceive the ongoing iterations as parts of a whole unit. After the piano accent, the resulting sound starts to give an impression of dissolution, with the decelerating pulsation in the strings with gradually decreasing dynamics.

The energy intensification of the first phrase shows the profile of the "delta" form. A smaller scale "delta" formation can be found at the very beginning of the phrase. The piece opens with an initial attack in the strings that is immediately echoed by keyclicks in the wind instruments. Right after this initial attack, a smaller sound-object in acceleration is heard, giving momentum to the overall sound. These accelerated pulsations are played by the piano and presented with a decaying dynamic profile. The first "delta" form is created with this smaller scale combination.

Therefore, the prevailing UST, "by waves", is introduced in multiple temporalities in the first phrase of the piece, where the continuity of sound is obtained by "air" sounds and reiterated energy articulation in the string instruments. Example 41 presents this structure.
Example 41: mm. 1-8

Enfilade: Lamento / Cambiata

for Argento Chamber Ensemble

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Rehearsal number A2\textsuperscript{21} (m. 8) introduces a long fermata for the duration of twelve seconds. According to Thoresen's categorization, the sonic result of this fermata could be classified as a "sound-event" or "sound-object" with "no dynamic profile". Such a labeling might yield to a consideration that this "hold" could be interpreted as a "pause" or a "repose" moment. However, a closer listening to the sound event can reveal further information. In fact, this moment of "repose" serves as the articulation of the core elements of musical structure in multiple ways. It consists of a mixture of the sounds that are produced by detuned double bass and softly rubbed bass drum, and subtly reflects the behavior of "by waves". In the resulting sound, the periodic cycles of percussionist's circular hand movements are audible, but it is not traceable in the notation.

Therefore, the resulting sound shows a "very low dynamic profile" as opposed to "no dynamic profile". The event presents itself in "ambient time" which is described by Thoresen as:

"(...) In these objects, the aural comprehension of the relationship between more than two objects is difficult. Because, they cross beyond the retention/protention (memory/anticipation) limits of immediate perception.\textsuperscript{22a}

The sound-event between A1 and A2 is a dynamic one. Since "by waves" is prominent throughout the opening part of the piece, the moment of repose at A2 could be perceived as a part of this ongoing behavior. In this respect, A2 creates a temporal space where the listener is tuned to focus on the minute changes in the dynamic dimension. Additionally, this moment sets the minimum dynamic level for the piece and it emphasizes the ambient quality of the music. It is also important to remember that "ambient time" is one of the multiple qualities of "by waves".

\textsuperscript{21} When referring to a specific location on the score, the rehearsal numbers and/or measure numbers will be used.

\textsuperscript{22a} Thoresen (2007)
Rehearsal number A3 (m. 10) marks the peak point of another dynamic swell (delta form). The articulation of this peak is prepared by intensification in the overall mass of sound that is created by the air blows in wind instruments that is similar to the one in m. 3. This time, the accent is first introduced by the string pizzicati, and then echoed by the keyclicks in woodwinds (similar to the opening bar of the piece).

Apart from these events, there is also a considerable change in the profile of the sound-objects. Until this moment (A3), listeners were exposed to reiterated sound accumulations with tendential rhythmic patterns, such as in the string parts between A1 and A2. Additionally, the sustained sounds were presented by the wind instruments with the "air" blows and the long note held by the detuned double bass. With the articulation of the second middle-scale "delta", at rehearsal number (A3), the sustained sound of the first violin is added to the overall mass. As a result of this addition, the overall sound gains spectral brightness according to Thoresen's terminology. This certainly marks a new step in the unfolding of the piece. Starting at rehearsal number A4, the additional sustained sounds are introduced in the following order:

- m. 13: Horn, playing the lowest note of the instrument.
- m. 17: Trombone, playing the lowest note of the instrument.
- m. 18 "Air" sounds in trumpet.

Horn plays the lowest note of the instrument with fast oscillations and alternates between this behavior and the air blows. These alternations present another variation of "delta" form as each unit is resolved to "air" sound with decaying sound profile. Similarly, trumpet air sounds are
colored by using random fingerings at places. These colorings are essentially a replication of the piano figure that first appeared on bar 1, and repeated in m. 15, and m. 19. As trumpet and piano reiterations occur separately, the listener now starts to perceive a polyphonic presentation of the figure. In traditional terms, this representation could be related to the idea of "imitation".

Because of their dynamic profile, the reiterated figures occur as a part of the "delta" form. The imitative representation of this figure thus is perceived as a variation. Similarly, another variation of the "delta" form could be observed in the accumulation of "air" blows in the trumpet and trombone parts. The addition of trumpet part to the ongoing air sounds in trombone creates an orchestrated crescendo, thus giving rise to a dynamic "delta" form. This could be observed between m. 13 and m. 25 on the score.

It is a notable feature in the notation that the bass drum performs the "ripple effect" with constantly changing tendential rhythms. This is realized by gradual alternations between accelerations and decelerations throughout the given space. By doing so, the bass drum part also isolates a feature of the "delta" form and presents it as a continuous background while its dynamic profile stays at the minimum level until m. 19. In combination with the "ripple-effect" in bass drum, all of the reiterated articulations add a further granulation in the sustained sound mass of the ensemble.

The rhythmic movement in the bass drum part gradually slows down until bar 18 and individual impulses become audible. With the short and intense crescendo in bar 19, it switches to another behavior and the overall rhythmic structure starts to follow somewhat regular pulsations. This
regularity is then transferred to the cello pizzicato (with imperceptible pitch content). At the same time, the entrance of bass clarinet marks the moment of appearance of perceptible pitch. In this way, the transformation from dystonic sound towards pitched sound becomes rather clear.

The regular pulsation of the cello part is prepared by the bass drum part with the division of the bar into five equal beats. However, the bass drum part articulates this rhythmic division with a tendential profile as its rhythm approaches the periodicity of cello part with slight acceleration on the articulation of quarter-note quintuplets. On the other hand, cello pizzicato disappears with gradual deceleration in bars 27 and 28. If the rhythmic transformation of these parts is taken as a whole unit, one could see another "delta" form, with extended "sustain" part, which presents regularity in the pulsation.

**Example 42:** The rhythmic "delta" form in the bass drum and cello parts between mm. 19 and 28

Similarly, the first violin part presents another rhythmic "delta" between bars 25 and 28.

**Example 43:** The first violin part between mm. 25 and 28
In contrast with the ongoing regularity of cello pulsations and tendential rhythms of the violin part, the bass clarinet part demonstrates an oblique rhythmic profile. This is also supported by the irregularities in the dynamic dimension as well as the plurality of timbres. When this part is taken as a single unit, it shows the characteristics of the UST called "Lordeur - Heaviness". Rapid repetitions on low D-flat and arrival of the crescendos on multiphonic sustains constitute a form that is repeated irregularly. Moreover, the continuity of the line is rather slow and each irregularly placed accent renews the kinetic energy of its rendering²³.

The bass drum and cello parts as well as the bass clarinet gestures consist of short-lived sounds. These impulses start to occur in other parts and blend with each other throughout the whole section. In this way, the density of the texture gradually increases. The listener has already been familiarized with these types of impulses as the indicator of the peak points in bars 1 and 10. However, throughout the section between A5 and B1, the impulses are presented as abstracted from the delta forms. In a way, the textural transformation dissects the elements of "delta" form while presenting the energy articulation of the same form in the other strands of the polyphony.

Introduction of pitched sounds actually takes place in m. 3 in the double bass part, then in m. 13 in the horn, and in m. 17 in the trombone parts. The lowest notes of the aforementioned instruments are heard but since they are in extremely low registers, it is hard to distinguish their pitches. Besides, they are surrounded by rather complex sounds like bass drum rubbing, and wind and string sounds with imperceptible pitch. Therefore, they blend with the overall sonic complexity. However, the multiphonic in the bass clarinet part stands out from its surroundings with its higher dynamic level. Therefore, it introduces the notion of pitch in a much clearer way.

²³ For more detailed information about each UST, reader is referred to Appendix I.
What is heard in this multiphonic is a combination of low D-flat and its 5th harmonic. The latter pitch is then taken over by flute and viola as a resonating residue. In this way, the flute and viola add a clearly heard pitch content to an ongoing mixture of sustained sounds.

The transformation throughout the section between the opening of the piece and rehearsal number B1 could then be summarized by labeling two ongoing processes; as the concentration on pitch content becomes apparent with the introduction of the low D-flat and its spectral content, a gradual accumulation and dissolution in the rhythmic dimension takes place. The last reiterated figures between mm. 27 and 30 presents the arrival point of this transformation.

The behavior of the UST "Par Vagues - By Waves" becomes much more apparent during the following section of the piece. As the transformation process reaches to the point where the global sound mostly consists of sustained pitches, four consecutive "delta" formations follow each other. The first one of these formations takes place between mm. 31 and 36, with the extension of the trumpet line until m. 39.

Especially in bars 31 and 32, the listener is exposed to a dynamic swell with extensive range (from ppp to f). However, the swell has multiple peak points that are distributed differently throughout different instrumental groups. Bar 32 marks the ultimate arrival of the transformation from complex sounds to the unification of the sustained notes in one harmony that is constructed with spectral considerations. The harmonic content has already been discussed in the Chapter IV. But, it should be noted that the chord in m. 32 could be interpreted as an augmented version of the preceding bass clarinet multiphonics.
Example 44: mm. 31 and 32
The first melodic idea occurs in the trumpet part. Its timing emphasizes the goal of the transformation as the directionality of earlier sections becomes clear with the arrival of this new element in the composition. The trumpet melody also maintains a common property with the elements that were presented earlier in the piece. Its beginning consists of reiterations of a note on which a rhythmic acceleration is supported with a gradual increase in dynamic. Therefore, the melody can be perceived as another variation of the delta form, whose decay starts with the gradual descent in pitch and decelerations in rhythm. The decaying part of this delta is extended.

The extension of the "delta" in trumpet line also functions as an extension of the decaying part of the tutti swell, whose accent points are articulated in bars 32 and 33. The resonance of the tutti chord is held in the string instruments.

VI. 2.1: Overlapping swells - Between B1 and B3

Between rehearsal number B1 and B3, there are three swells in "delta" heard in succession. The first swell has been described above. During the extension of the trumpet phrase, the string instruments introduce another delta form, by reiterating their respective pitches. The shorter delta form manifests itself in the rhythmic and dynamic domains. The gradual change in bowing position towards "Extreme Sul Ponticello" adds a considerable amount of brightness is added to the resulting sound.
Example 45: Between mm. 38 and 43

As could be observed in above example, piano figurations also stay as the residue from the accent in m. 32, during the string swell.

The third swell overlaps with the ending of the second one in m. 43. This new delta is initiated by the crescendo in double bass and horn, and then it is presented with a new harmonic identity in the next bar.
Example 46: The third swell in mm. 43-47
The structure of the tutti chord in this swell is similar to the one in the rehearsal number B1. Additionally, a smaller delta is heard in the trumpet that is very similar to the one in m. 32. Another similarity with the earlier tutti swell could be observed in the displaced peaks in both chords. These similarities help the listener to relate two events to each other and preserve the continuity of the compositional narration. In this respect, the swell at rehearsal number B2 can be recognized as a variation of the one at B1. However, there is an important difference between the two: the second swell (in B2) does not follow a gradual decay in the dynamic domain. After the peak point, the textural behavior changes suddenly. Starting at m. 46, there is a considerable loss in dynamic - a sudden drop to pianissimo. Therefore, the continuity of the delta idea is transferred from one domain (dynamic) to another (pitch). However, this sudden shift yields to a perceptible discontinuity, especially as the crescendo in m. 45 in woodwinds is not balanced with a decrescendo in order to maintain a dynamic swell. The extended decaying part is another important characteristic of this musical passage.

This ambiguity calls for a reconsideration of the labeling of the musical behavior between B2 and B3. Even though the overall behavior of the music between A1 and B3 could be categorized as "by waves", the section in question shows the characteristics of the UST "Contracté-étendu / Contracted-stretched". This unit consists of an interrupted compression followed by a stretched state. During the first of its two successive phases, it presents a sense of growth, which is interrupted by the second phase where energy is maintained in a globally unified way. The most essential difference between "by waves" and "contracted-stretched" is found in their temporal definitions. “By waves” is a non-time-bound unit, therefore could be found in rather longer musical statements. "Contracted-stretched" is a time-bound unit and

24 Hautbois (2013)
usually occurs in smaller portions of music. Therefore, even though the overall behavior in the subjected portion of music could be labeled as "by waves", the smaller portion between B2 and B3 could be labeled as "contracted-stretched". Both behaviors share the common quality of having an accumulation of energy in their beginnings.

The string texture functions as the resonating body of the section between mm. 46 and 55. While the wind parts follow their descending lines, the string writing provides a background with a multilayered texture. This quality of the texture has been present since the beginning of the piece as an inherent property of the ambient sound world. Especially the string writing in this passage acts like "stratified objects", which is a term used both by Schaeffer and Thoresen in order to refer to moving sound layers with continuous sustains.

Descending lines of the woodwind instruments also serve to a harmonic progression that is based on contrary motion. As these motions are exhausted in m. 55, the harmonic arrival gives a sense of a cadence. From this point on, harmony becomes stable especially with the repeated occurrences of pitches; "B" and D-sharp". The closure of the section is not only the end result of the harmonic progression; it is also achieved by the filtration of layers from the polyphonic texture. This type of morphology in texture creates a decaying profile, which also functions as the second part of the delta form, as it has been mentioned above.
Example 47: mm. 46-55
VI.3: The second part

The musical flow between rehearsal numbers B3 and C1 presents an ambient type of temporal articulation. This is the result of a rather slow rate of change and slow temporal progression, especially between mm. 55 and 68. More importantly, there is not any sense of clear pulsation or metric grouping in this section.

As opposed to the earlier sections of the music, delta form is not present in this part. Instead, there is a melodic cell in repetition in the woodwind instruments. The flow of music also shows a globally stable profile where the salient objects are distributed rather sparsely. As a result of this, the sounding result gives an impression of floating objects over a sustained background. All these aspects fit the description of UST called "stationnaire - stationary". The figurations in woodwinds are complemented by the "floating" behavior of the piano and vibraphone parts, whose contours consist of leaps beyond the octave. Time intervals between the notes played by these instruments are even larger. Therefore, the general behavior of these parts is perceived differently than the woodwinds. Additionally, due to the timbral difference between the instruments, one tends to hear this complementary relationship as two different strands of music. Thus, one is able to speak of a polyphony of two units: "stationary" in woodwinds and "floating" in the piano and vibraphone.

The ambient nature of this section is also the result of continuous sustained notes in string and brass instruments. They provide a gradually evolving background for the activity of the other parts. However, it is not only the background that is subject to this evolution as the repetitions of
the two-note melodic cell in woodwinds are elaborated gradually. Simultaneously, there is an ongoing build-up in the texture towards complexity. This evolutionary process starts to be perceived rather clearly between bars 69 and 74. It is achieved by the combination of the transformation of the melodic cell and the accumulation of the sustained notes in the brass instruments. At the same time, the floating character of the piano and vibraphone transforms into a rather active behavior. This strand of music is later joined by the crotales in bar 72. Therefore, the textural transformation is also supported by changes in the timbral domain.

All these aspects point to the existence of a directionality throughout this passage, even though the music shows a stable behavior until bar 68. As the rate of change gets faster, the behavior of musical discourse gradually gains intensity in the rhythmic structure and in the overall sounding result. This aspect also supports the salience of the "stationary" behavior, whose description in MiM's study also points out a progressive and/or evolutionary process in the unit.

The ultimate change achieved by this process arrives with the rehearsal number C1. The aforementioned transformation can be described as a "condensation" process of the woodwind figures. Throughout the passage the duration of the two-note motif stays almost same as in its first appearance, but new pitches are added to its repetitions. Consequently, the elaboration process produces faster figurations and calls for a tempo change at the rehearsal number C1.
Example 48: Motivic development (condensation process) in Woodwind lines, mm. 61-70

In *Enfilade*, the section between C1 and m. 95 reflects the characteristics of the unit called "Trajectoire Inexorable - Inexhaustible Trajectory". This UST is classified as a non-time-bound unit; therefore it can extend throughout a large musical section. The unit occurs in three phases during this portion of the piece. In each phase, a continuous descending motion is present. Between mm. 74 and 80, it manifests itself as fast downward runs with 32nd notes. The second phase takes place between mm. 80 and 91, where the speed of the overall descent slows down and the rhythmic profile shows flexibility in each part. It is in this particular phase that the pitch structure gives rise to a harmonic identity within which the descent is redefined. The third phase consists of downward runs with 16th-note sextuplets in brass and bassoon. It should also be noted that the "forward directionality" of the overall momentum is obtained by multiple layers of activity.
The unit, *Inexhaustible Trajectory*, refers to a movement whose ending or arrival is expected but it continues endlessly\(^25\). A very typical example for such behavior would be the "Shepard-tone" effect where the continuous descent is maintained by adding the higher partials to the sound mass and continuously occupying the range of the descend with the same spectral content\(^26\).

The gestures that give the impression of endless momentum are first heard in woodwinds in bar 75. The texture accumulates until m. 77 as higher pitches are added to the beginning of each descending run in woodwind parts. As each instrument starts each run in different points of the meter, the range of activity stays continuously occupied. The addition of the piano in m. 77, as well as the horn and trumpet in m. 78, increases the mass of the descent, pushing the trajectory towards the second phase.

Rehearsal number C2 marks a change in the velocity of the descent, as the repeated notes in different speeds take over the global activity. The piano chord in bar 80 consists of the last pitches of the previous descending runs. This chord is also played by the wind instruments with repeated 16th notes. As the chord is transposed down, the duration of the notes becomes longer. However, the rhythmic trajectory of the wind parts is different than the one followed by the piano. Therefore, the transposition of the chord is heard in different places. This process creates a multilayered texture where the descent is heard in delay within the overall sounding result. Because of the delay effect, the range of the descent stays occupied. As it could be observed in the score, the textural complexity is obtained by this polyrhythmic activity.

\(^{25}\) Hautbois (2013)

\(^{26}\) The "shepard-tone effect" could have an ascending version as well. In this case, lower partials are added to support the occupancy of the spectral range.
Between mm. 91 and 94, bassoon and brass instruments continue this idea in a much faster pacing - in the level of 16th note sextuplets. The melodic movement in individual parts does not maintain the earlier chordal structure anymore. At the end of the passage, these instruments start to reiterate their arrival pitches. The decelerating rhythmic profile of each instrument serves to the transition to the next section.

VI.3.1: Other strands of music between C1 and C4

The continuity is also obtained by the strand of music in the lower strings, between mm. 78 and 93. It functions as a rhythmic pedal and it is transferred to the percussion instruments in m. 92. The rhythmic combinations coming out of the horn and trombone reiterations in mm. 94 and 95 presents a similar behavior. This rhythm-based strand adds a somewhat "regular" periodicity to the overall flow. This quasi-regularity is then distributed to the whole ensemble in the next section.

Another process is presented in the high string parts between C1 and C3. The sustained notes heard in these parts between B3 and C1 evolve into the reiterated note figures at mm. 75-79. In measure 84, the reiterated notes take over the “descent” element, which is now executed with short glissandi. The string writing then morphs into legato playing of the descending chromatic runs in bar 89, which stabilizes on trills at C3. Strings leave this strand with the downward glissando of the trills. Here it should be noted that trills act as a distortion of the sustained notes. A similar behavior could be traced in the interpretation of the string writing at bar 84, where a continuous glissando is "granulated" by the rapid bow-strokes.
The following example gives the phases of evolution of high-string parts that is explained in above paragraph.

Example 49: Evolution of the high-string Parts between B4 and C3

Another very important component in this multilayered section is heard in high woodwinds between bars 86 and 95. Because of its sustained nature, this strand can easily be distinguished from the rest of the layers. The clarinet, flute, and oboe parts between mm. 86 and 90 form an overlapped accumulation of dynamic swells, which has been an important element in the vocabulary of the piece. This accumulation provides intensification in the overall sounding result by adding a quality of forward-oriented directionality. This is certainly related to the ongoing momentum in the other strands of music. After hearing the behavior of "inexhaustible
trajectory", the listener might tend to perceive the intensifying dynamics of the high woodwinds as an addition to the directionality of the music.

An anticipation of the dynamically shaped sustained sounds in this passage first appears in high string parts in m. 83. The brief crescendo introduced by these parts is a goal-oriented one, whose attainment occurs in bar 84 with decelerating repeated notes in the high woodwinds.

The oboe's entrance in m. 90 coincides with the peak point of flute's crescendo. After this point, two instruments reiterate their attacks with a decaying dynamic profile by articulating different periodicities. The independent rhythmic nature of these instruments gives rise to such combinations that these attacks could be perceived as the parts of one whole sound. In other words, the sounds of flute and oboe between mm. 90 and 95 creates a continuous sustain whose timbre is the result of the mixture of both. This is caused by two factors. The first factor is that two sounds share a similar spectral content, as they are harmonically related. The second factor is the articulation of the sustained sounds: both the flute note and oboe multiphonics are played with flutter-tongue technique. Therefore, the sounding result could be interpreted as a chord/timbre with fast granularity caused by flutter playing.

Another important aspect of this snippet is that these repeated attacks function as the decaying part of the delta form, whose intensifying part is formed by the accumulations in the flute and clarinet parts between mm. 86 and 90. In this respect, the activity high woodwind parts between mm. 86 and 95 can be interpreted as one large delta form, with its peak point heard in m. 90. The decaying part between mm. 90 and 95 first prepares, then accompanies the descending runs
in lower winds between mm. 92 and 94.

After all these observations, it becomes clear that there is a multilayered gestural structure between C1 and m. 95. In this section, overall energy is continuously renewed by accumulating dynamics and uninterrupted rhythmic activity. The last portion of this section (between mm. 90 and 95) presents a decaying profile, not only because of the dynamics of sustained woodwind flutters, but also due to the filtering out of the instruments.

The rate of change gets faster after m. 95, where the trajectory of the musical flow stabilizes itself on the arrival notes of the descending runs of brass instruments. At the same time the rest of the ensemble gains an ongoing regularity in pacing that is established by the reiteration of a number of figurations in different speeds. Two violins and viola play groups of short impulses as *pizzicato*, while the piano part maintains a pedal-type of pulsation with quarter-note septuplets. These repeating rhythmic patterns in each part follow a quasi-regular pulse, therefore causing a mechanical type of behavior to come out in overall texture. Inside of this polyrhythmic web, the brass and bassoon impulses follow decelerating rhythmic profiles. Use of these rhythms also serves to filter the ongoing musical activity and opens space for the new one. Consequently, the ascending *pizzicato* notes of the lower strings overlap with this elimination and prepare for the next dynamic intensification. The directionality reaches its peak in m. 102, where the mechanical activity is transferred to the higher register of the ensemble. This new phase is also composed of repeated short units with quasi-regular pulsations. The polyrhythmic nature of the mechanical behavior is still present.
The rise introduced by the vibraphone consists of an accelerating rhythmic profile and a crescendo. Its peak marks the beginning of a new plateau where the music is mainly composed of the repeated asymmetrical cycles as it was in the previous section. Thus, the gestural content between mm. 95 and 105 reflects a rather obsessional behavior with insistent repetitions. There is also an impression of "difficulty to progress" as the motives are interrupted. The decaying profile of the motives suggest a directionality which cannot reach beyond the temporal boundaries of these short-lived motives. Therefore, the sudden cut of the energy creates an opposition with the directionality of the motives.

The repeated note figures appear with tendential rhythms at the earlier stages of the piece. The gestures in C4 bring a new definition to these figurations by presenting them without accelerating or decelerating rhythms. The regularity in these figures evokes a rather mechanic feeling. Especially in the latter section, the overall result presents the mechanical fixedness of a "loop". The listener can certainly perceive the repetition of the cells but cannot exactly pinpoint their borders. This is mainly caused by the difference in the speeds and periodicities of each layer.

This mechanical movement is suddenly cut at bar 105, which drops the activity to the softest dynamic zone. The only audible sound is the bass drum rubbing that lasts for 7 seconds, until the next event. When it is connected with the earlier sections, this cut adds another element to the series of changes. Acceleration in the rate of change arrives at a contrasting moment with this dynamic shift.

27 "Difficulty to progress" is a proposed translation of the name of UST, "Qui veut démarrer". It is a non-time-bound unit in two phases. The shorter first phase presents an energy articulation that is forward oriented while the second phase marks an opposition with the first one. It is a unit that is usually introduced by repetition. MIM (2008)
The sound of the rubbed bass drum also invites the listener to make a clear connection with the earlier sections of piece, especially with the moment of repose at rehearsal number A2. The behavior of the sonic result at A2 was labeled as "by waves". The reoccurrence of the same object provides a fragmentation of this behavior in the context of other behaviors.

After the second repose of the piece, the mechanical quality of the previous section is transferred to another sound world. The timbral vocabulary between mm. 106 and 117 is akin to the one in the very beginning of the piece with the prevalence of dystonic sounds. Basically, the section consists of irregularly repeating rhythmic impulses without pitch focus. The subjected section is perceived as a single block, which presents a controlled irregularity of repetitiveness. The impulses are distributed to the ensemble in such a way that their combination gives rise to rhythmic patterns that are similar to each other but not exactly the same. Starting in m. 109, the bass clarinet part introduces gestures similar to the ones in the opening part. Thus the listener is able to associate the diversity of rhythmic patterns with their original presentation.

Another rhythmic/gestural strand is heard in woodblocks, between mm. 109 and 112. It introduces two phrases with accelerating rhythms phrases and descending contours. In fact, woodwind gestures assert a contrasting element to the ongoing global behavior. It suggests a forward oriented directionality as opposed to the discrete impulses produced by the rest of the ensemble. Also, the woodwind phrases suggest a certain degree of continuity, which does not exist in the other parts. This conflict between different energy articulations provokes a feeling of difficulty in advancing. This behavior suits the definition of UST called "Lordeur - Heaviness/Stiffness"; which is a non-time-bound unit where the forward-oriented energy is
disrupted but renewed at places\textsuperscript{28}.

However, there is still a gradual intensification between mm. 107 and 111 caused by the accumulation of impulses and the addition of instruments. This intensification is suddenly abandoned at m. 112 as the whole area is left to solo bass clarinet impulses. The contrast between the preceding events and decelerating bass clarinet impulses gives a "stretched" quality to the section between mm. 112 and 119. Therefore, the transition between mm. 106 and 119 also has the characteristics of the UST "contracté-étendu/contracted-stretched". On the other hand, deceleration of the rhythmic profile in the bass clarinet part suggests the loss of energy input, a behavior that is also the characteristic of UST "sur l'erre/tumbling"\textsuperscript{29}.

\textbf{VI.4: The third section}

The last section of the piece starts in m. 119. The continuous sound of rubbed bass drum has been occupying the background since m. 105 and it has been functioning as a connector between sections. With a subtle crescendo introduced at m. 118, it leads into the first chord of the last section.

Starting from m. 119, the musical discourse presents a mass of stratified sounds where the wind instruments form a polyphonic texture that is based on imitation. As was stated earlier, the parts move in different speeds. The lack of metrical reference and any dominating pulse gives an ambient quality to the temporal unfolding. The occupied pitch range is wide and the pacing of

\textsuperscript{28} MiM (2008)

\textsuperscript{29} "Sur l'erre – Tumbling" is a time-bound unit that presents a gradual extinction of energy. (MiM 2008)
the music is rather slow. Slowly moving sustained notes in the string instruments form a "sound-web\textsuperscript{30}", which provides a constantly changing environment. The string harmonies can be perceived as the resonances of wind pitches. Because of this reason, the imitative polyphony is not always clearly in the foreground. In fact, the polyphonic structure is another parameter that incorporates the ever-changing quality of this ambient sonic result.

The timbral kinship of the vibraphone and the pitched pipes helps the listener to perceive a melodic continuity between these instruments. They are tuned with a quarter-tone difference, hence are able to reflect the intervallic structure of the imitative counterpoint. Because of their contrasting attacks, the behavior of the percussion instruments is perceived as a "floating" unit, over the behavior of the rest of the ensemble, which could be labeled as "by waves".

"By waves" behavior becomes rather apparent with the elimination of pitches after m. 113, where the imitation between the wind instruments becomes clearly audible. This behavior is then transferred to the "air" sounds that are similar to the ones heard in the opening section.

The last two bars of the piece present an incomplete form of delta, with a suddenly cut crescendo. The resulting sound in these bars can be classified as a "marked onset" in Thoresen's terms\textsuperscript{31}. The sonic result can be associated with the effect of “reversed attack” and it is orchestrated by marking the ending of the crescendo of the "air" sound with the pitchless pizzicatos in strings.

\textsuperscript{30} "Sound-web" is a term originally used by Thoresen to refer to the sound-objects with long durations and constantly changing spectrum. It is defined as a special case of stratified sounds. In fact, it is the revised definition of Schaefferian concept of "trame", the thread in a sound. By their nature, these sounds create an ambient articulation of time. (Thoresen 2007)

\textsuperscript{31} Thoresen (2007: 138)
VIII. CONCLUSIONS

The previous chapter is an attempt to combine two different approaches to spectromorphological analysis, which are both based on the listening experience. This is mainly done in order to shed light on the relationship of musical structure and the heard result. For this purpose, spectromorphological considerations were always present in the process of analyzing the form as well as explaining the workings of harmonic and rhythmic formations. In a complementary fashion, the results of such evaluations informed the spectromorphological analysis of *Enfilade*. The previous chapter basically maps out the spectromorphological units that appear in smaller and larger scale. However, in the process of examining the relationship of musical structure with the listening experience, there is a remaining area to be examined: the relationship of the spectromorphological units to the overall form of the piece.

It is important to emphasize that spectromorphological approach is originated from the work of Schaeffer and in its earlier stages it was exclusively concerned with the analysis of electroacoustic music. However, after progressive studies in this field, the approach seemed applicable to acoustic pieces that are sound-based. More recently, Thoresen’s work on auditive analysis as well as the study of USTs by MiM showed that this approach can provide a platform for the analysis of sound and its morphology without being limited to style.

In terms of developing a spectromorphological approach to form, Lasse Thoresen’s two articles provide extremely valuable information. In his 2009 article, he examines two Schaeferian concepts; “value” and “character”. They had been originally introduced in *Traité des objets*.

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musicaux as features of sound-object as a part of his theoretical formula for the relationship of sounds to musical structure. The characters are the features that are inherent in every recurrence of a given sound. Values, on the other hand refer to those features of a sound character that come out of the variation in the recurrences. However, the division of the features is not simply about the similarities and differences. The concept of "character" provides criteria about what is common between the differences. Therefore it refers to constantly existent qualities in various objects. In this way, it provides a platform for the sonic diversity in a given musical work. In order to clarify these concepts, Michel Chion proposes an analogy with the relationship of pitch and timbre in traditional music. According to him, the diversity in pitch domain can be perceived as homogenous events because of the uniformity (or similarity) of timbres in such works. In this respect, a rather static field of timbre functions as a platform on which foreground structures can exist in pitch the domain.

As was presented in the previous chapter, Enfilade consists of number of spectromorphological units that are revealed either simultaneously or adjacently. Based on this analysis, it seems possible to apply the relationship of value/character to the spectromorphological units. In this respect, a simple observation would reveal that the behavior of UST "by waves" can be traced both in smaller scale structures and larger scale formal units. Even though the ambient type of temporal articulation is present in every section, a broader view of the form reveals a series of deltas in a larger temporality.

33 Thoresen (2009: 1)
34 Chion (1983: 70-71)
Table 8: Traceable “delta” forms in larger temporalities in *Enfilade*

<table>
<thead>
<tr>
<th></th>
<th>mm. 1-8</th>
<th>A single unit presenting the multiple temporalities of delta form</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>mm. 9-11</td>
<td>Delta formation serving to the transition to the next area of activity</td>
</tr>
<tr>
<td>3</td>
<td>mm. 11-38</td>
<td>“by waves” with different periodicities of cycles presented simultaneously</td>
</tr>
<tr>
<td>4</td>
<td>mm. 38-41</td>
<td>a shorter swell in strings</td>
</tr>
<tr>
<td>5</td>
<td>mm. 43-56</td>
<td>delta form in tutti, whose decay is prolonged and articulated in descends</td>
</tr>
<tr>
<td>6</td>
<td>mm. 74-95</td>
<td>this long swell consists of multiple swells that are distributed to different sections of the ensemble</td>
</tr>
<tr>
<td>7</td>
<td>mm. 99-105</td>
<td>the intensification portion of the delta leads in to the next section, which resolves to the repose moment by presenting an energy articulation that can not be sustained</td>
</tr>
</tbody>
</table>

It is clear that the delta form is a recurrent element in the first two parts of the piece in larger temporalities as well as the smaller statements. The third part of the form also presents the same unit in smaller structures. The recurrences of this unit in all of the formal divisions as well as in different temporalities points to an important fact: the behavior of “by waves” is a global behavior for the whole piece. Moreover, even though other spectromorphological units occupy the surface of music, the recurrences of delta form continue to exist in the background. In this respect, "by waves" envelops the other USTs and provides a platform on which the can interrelate to each other.

Another important property in the sound vocabulary is the dichotomy of repeated notes and the sustained sounds. Particular transitional states between these two energy articulation types are continuously exploited throughout *Enfilade*. This property is also closely related to the motivations for the composition, as it asserts an ambiguous definition, or double-meaning for the functioning of different articulations of repeated-note figures.

After such a detailed analysis, it is important to look briefly how the notion of "self-reference" and its reflection in this piece. One of the manifestations that occur as the states of “self-
reference” is "strange loop". If one should give a general definition, "loop" is a structure the end of which is connected to the beginning. However the "strange" quality in such phenomena refers to the movement of the loop, which appears to be always moving away from the origin. The technical term for such phenomena is "tangled hierarchy". Douglas Hofstadter refers to this type of structures as:

"And yet when I say "strange loop", I have something else in mind — a less concrete, more elusive notion. What I mean by "strange loop" is — here goes a first stab, anyway — not a physical circuit but an abstract loop in which, in the series of stages that constitute the cycling-around, there is a shift from one level of abstraction (or structure) to another, which feels like an upwards movement in a hierarchy, and yet somehow the successive "upward" shifts turn out to give rise to a closed cycle. That is, despite one's sense of departing ever further from one's origin, one winds up, to one's shock, exactly where one had started out. In short, a strange loop is a paradoxical level-crossing feedback loop."

The forward-oriented directionality is a constant quality in each section of the piece. However, the recurrences of the musical situations are the arrival points of this directionality. Even though directional processes seem to be leading the form, they jump back to their beginnings or the earlier stages of the evolution of their material content. In addition, the feeling of discontinuity, which is created by the repose moments in m. 8, m. 105 and m.118, asserts a contrasting notion to the overall form that presents a continuous movement among the formal sections. In a way, these are the points where the jumps from one hierarchical level to another take place as the continuity of the material is transferred between the different dimensions of the sounding result.

Figure 2: Ascending and Descending by M. C. Escher
Bibliography


APPENDIX 1
Unités Semiologiques Temporelles (UST)
[Temporal Semioologic Units]37

Group I: non-time-bound USTs
Each of these units has a duration during which they could be perceived as processes rather than short-lived moments. All of the non-time-bound USTs have only one phase.

I.1. Lordeur (Heaviness, stiffness, complexity)
This unit constitutes a sonic formation that is repeated. However the repetitions are not exactly the same and suggest a controlled irregularity. As a result of this, the unit gives the feeling of difficulty in advancing even though it presents an energy that pushes the movement forward. The energy is channelized and disrupted at times and the progression is rather slow. There can be a dynamic accent in the beginning of each repetition of the formation, which renews the kinetic energy.

Example 1: Stravinsky: Rite of Spring - beginning of the last movement
Example 2: F. Donatoni: Lame
Example 3: C. Miereanu: Les Labyrintes d'Adrien

I.2. Obsessionnel (Obsessional)
This unit has a single phase and it constitutes a cell in repetition that is eventually varied and pulsated. The repetitions behave and proceed mechanically and create a flow that appears to be uninterruptable. The energy is renewed in each repetition and the duration of each cycle should be short enough to make a reference to a pulsation. Therefore the sonic result gains a character that is persistent.

Example 1: T. Riley: In C
Example 2: R. Yvanez: Sables

I.3. Par vagues (By waves)

This non-time-bound unit has a single phase that comes out from the repetition of a sound motive in "delta" form. The repeated element can be varied and pulsed. Even though one can get the impression of movement between each cycle, there is also a feeling of "getting nowhere" within the unit's totality. Temporal progression of this unit is rather slow.

The "delta" form could be found in different morphological criteria (e.g. mass, spectral content, intensity, etc.), where the energy first grows then decays. It is characterized by two successive sound profiles: a profile of growth and a profile of decay. Therefore, each cycle suggests a regular alternation between the impression of being pushed forward and being carried away towards its ending. However, only one of these profiles may be enough in some cases. When it consists of two profiles, the decaying phase does not have to carry new information, as the reflux is nothing else than a predictable consequence of the type of the flux of the first profile; thus, the attention is alternatively captured then released.

N.B. Because of its continuous character, Par vagues is different than Qui veut démarrer, which presents a discontinuity. It is also distinct than Obsessionnel as it is possible to intervene either at the end or during the articulation of the delta. Lastly, Par vagues is distinct than Qui tourne as the latter unit presents more irregularity in its internal movement.

Example 1: J. Barreau: Mouvements
Example 2: L. Berio: Sequenza III
Example 3: F. Bayle: Les couleurs de la nuit
Example 4: G. Bryars: The old tower of Löbenicht

I.4. Qui avance (Progressing, advancing)

This single phased non-time-bound unit has an uninterrupted continuity and is globally uniform. But there is a sense of progression as the unit suggests directionality with a constantly renewed energy. It is built of a reiterated cell that includes an accent. It gives an impression of decisive forward movement with a clear regularity as the energy is renewed and canalized in the same
manner in each reiteration. The duration of the unit should not be too short in order to give the impression not of a gesture but a prolonged action.

Example 1: The chistom trait, cow boy ballad  
Example 2: B. Parmegiani: La roue Ferris  
Example 3: E. Chabrier, Scherzo valse  
Example 4: W. Lutoslawski: Trois poèmes d'henri Michaux  
Example: C. Debussy: Fêtes

I.5. **Qui tourne** (Spinning)  
This non-time-bound unit occurs in a single phase and comes out of a cyclic movement that gives the impression of rotation. The duration of the unit should be sufficiently long in order to render the cyclic phenomena perceivable. However, the cycles do not have to be too long in order to be perceived as a physical movement. Its sonic material is not necessarily uniform. The object that is turning or rotating can be found in different parameters (pitch, timbre, etc.) but it is always in continuous repetition, even though it could be presented with subtle differences. Above all, there is a necessity for an element that is accelerating and decelerating in a cyclic fashion, therefore presenting a delta form. This motive occurs to be irregular, because the first element (acceleration with a crescendo) appears to be shorter than the second element. The effect of turning or rotating is accentuated as the accelerating element gives the sensation of a peak.

Example: P. Schaeffer: Etude violette

I.6. **Qui veut démarrer** (attempting to start, trying to settle on the way of progressing)  
This unit is based on the reiteration of a figure that is composed of two successive phases. The first phase is an articulated formal unit that is short while the second phase marks an opposition, a contrast with the first one. This contrast could occur in spectral structure, proportions, intensity or other parameters. The reiteration does not appear to be strict but presents the variation on at least one parameter. These variations indicate the sense of movement. In general, the reiterated beginning of the unit creates a feeling of introducing a movement, which does not continue as an
accomplished process. The second phase can introduce a suspension, a detention, deduction, a hold, and even a silence.

Example 1: C. Debussy: La terrasse des audiences du clair de lune (prélude pour piano)
Example 2: W. A. Mozart: Symphony no. 41; beginning of the first movement

I.7. Sans direction par divergence d'information (lack of direction by the divergence of information)

In this unit, the succession of diverse elements with contrary directions gives rise to an impression of a global immobility and constant stillness. The unit is composed of successive short moments proposing different organizational systems. The divergence in the directionality of these systems is presented successively rather than being superposed. Because of these divergences, the overall energy stays globally potential.

Example: K. Stockhausen: Telemusik

I.8. Stationnaire (stationary, stable)

The unit gives a sense of immobility or the non-existence of mobility. Its temporal progression is enough slow and the global energy is stable. However, different configurations are possible:

a. Sonic elements are short, sparse, generally diverse, and do not form a structure.
   Example: Toru Takemitsu: Water Music

b. Texture could present an evolving structure or some sort of progression.
   Example: J. Barreau: Mouvements

c. a. and b. could be superposed
   Example: B. Parmegiani: Violostries

d. A cell could be presented in repetition, more or less varied.
   Example: M. Redolfi: Sunny afternoon at Bird Rock Beach
e. Stability created by overlapping elements that are contradictory to each other.
Example : Improvisation (LP DG Avant-Garde 643541)

I.9. Trajectoire inexorable (inexhaustible trajectory)
The unit has a strong directionality around a trajectory and gives the impression of a movement that prolongs itself indefinitely. It is an undividable unit in which one can hear a trajectory realized by one or more variables and get an impression of an energy that is constantly renewed.

Example 1: M. Frémiot: Ballade pour piano
Example 2: K. Stockhausen: Telemusik

I.10. En Flottement (Floating)
This non-time-bound unit progresses in time rather slowly. It takes place in a smooth continuum without pulsation and consists of isolated sonic events that succeed each other without forming structures. This smooth continuum may be implied by the silence itself and functions as the materialization of temporal domain. There is a relatively random quality in the manifestation of sonic events, which does not create a sense of expectation or suspense. The continuity plays the role of a background. That is probably why an expectation cannot be at present. The ways in which the objects are distributed in time give the impression of a linear flow. The events should be distributed not too far from each other and they should appear in pseudo-regularity. There is not a spectromorphological or energetic connection between the events and the continuum.

Example 1: B. Parmegiani: Violostries
Example 2: M Redolfi: Pacific Tubular Waves

I.11. Sans direction par l'excès d'information (Lack of direction by the excess of information)
The unit is made of multiple elements that are quite short, diverse, and often overlapping with each other. The sounding result gives an impression of a chaotic diversity of discreet events happening at the same time. There is an attractive richness of elements but also a constant contradiction among them. This creates a sentiment of saturation. The listener might have a
feeling of not being able to control the heard sequence, which, to a degree, might create tension. As an addition to the overlapping nature of the unit, the events could succeed each other quite rapidly, causing an impression of high density. Each event can add significant differences in dynamics. The unit could be short or long but not too short in order to allow the listener to grasp its nature.

Example: "Improvisation" (LP DG Avant-Garde 643541)

**I.12. En suspension** (suspended)
The unit is composed of a sonic formation that is in repetition almost without variation. Its temporal progression is rather slow, in which the sonic material and sonic events show a small degree of evolution. The unit does not suggest any directionality and has a floating quality in general. The balance between its elements gives a sensation of immobility that is tied to a sense of hesitant expectation. One knows that something will arrive but does not know what it is and when it will arrive. Additionally, this unit has an irregularity or the absence of temporal reference points.

Example 1: S. Rachmaninov: Piano Concerto No. 3 (1st Movement, the end of the piano cadenza)
Example 2: J.-C. Risset: Songes

**Group II: Time-bound USTs**
A time-bound unit corresponds to a sonic configuration whose beginning and ending are precisely marked in temporal domain. Its duration cannot exceed certain number of seconds in order to be perceived as a formal structure. Time-bound units can have several phases and with the exception of *Contracté-étendu*, they present a single type of continuity between different phases.

**II.1. Chute** (Falling/Dropping)
The unit has two successive phases. The first phase is globally uniform and presents a material with an internally animated movement. It is followed by the second phase where an accelerating
movement accompanies a descending (or sometimes ascending) gesture. This second phase may not evolve uniformly. The change from the first to the second phase is not continuous and is marked by a very short angular like an accent, or a caesura. However, a continuity of the material is necessary between to phases, even though they are not identical. In other words, there should be a common element between two phases. The global duration cannot exceed certain number of seconds in order to be perceptible as an integrated form.

Example 1: H. Dutilleux: Ainsi la nuit
Example 2: M. Ohana: Trois contes del'honorable fleur

II.2. Contracté-étendu (contracted then stretched)
Semantic Description: Interrupted compression followed by a stretched state
This time-bound unit has two successive phases. The first one consists of an acceleration which progresses with a sense of growth and connects to globally uniform second phase where the overall energy is maintained. In its totality, the unit could be described as an interrupted compression followed by a stretched state. There is a discontinuity between two phases, a similar type of "peak point" as described for the unit Chute.

Example 1: L. v. Beeethoven: Trio des esprits
Example 2: L. Prod'homme: Jeux/Thème/Temps

II.3. Élan (impetus)

The overall behavior of this unit could be described as the projection of a moment that comes out from an impulse type of supporting point. The unit can accommodate up to three successive phases, even though the first and third phases might be absent in certain instances. Three-phase structure shows the following profile:
1st Phase: a brief or sustained sound that is globally uniform
2nd Phase: a brief and exponential increase in intensity
3rd Phase: decrease in intensity or silence
II.4. Etirement (stretch)

This single-phased unit is globally uniform and presents a continuous growth at least in one morphological feature. It gives an impression of going to the extreme end of a process (or to the maximum of an effort). The elongation gives rise to a feeling of tension or increase in energy, which yields a feeling of expectation. Its temporal progression is rather slow and despite the energy increase, the movement does not get anywhere.

Example 1: C. Debussy: Prélude à l'après-midi d'une faune
Example 2: P. Mabosc: Faisceau Parallèle

II.5. Freinage (breaking, slowing-down)

This time-bound unit occurs in single phase and has a non-linear progression. It consists of two opposing profiles that are successive. The impression that the sounding result gives is slowing-down in the progression of the sonic figure due to an exterior force. This characteristic makes the unit distinct than a rallentando. A sudden slowing in the movement continues until it stops. Even though one might not be able to distinguish two profiles, it is semantically possible to feel two different movements: the first one suggests a forward advancing, while the second one introduces a hold in the movement, thus slowing down. The unit should be long enough to give the impression of a trajectory with changing normal progression. The changes in movement are underlined by the changes in intensity or pitch.

Example 1: M. Levinas: Froissement d'ailes
Example 2: G. Reibel: Variations en étoile

II.6. Suspension-interrogation (suspending-questioning)

The unit consists of a momentum that is interrupted. This takes place in two successive phases: The first phase could be any process that is followed by a brief hold in the second phase.
Example 1: C. Debussy: La terries des audiences du clair de lune (prélude pour piano)
Example 2: P. Malbosc: Fasiceau parallèle

II.7. *Sur l'erre*: (drifting away) (stopping by the natural decrease of energy)
Time-bound unit occurs in single phase, consisting a progressive extinction of energy. The movement could be associated with the image of a boat with dropped sails or turned off engines, which continues to move through its momentum without an energy input. It ultimately slows down and stops by friction. The unit should not introduce any new information during the extinction of the sounds, such as a new incident or an indication of an intervention.

Example 1: H. Fouad: Thaksim
Example 2: R. Schumann: Arabeske
APPENDIX 2

Full Score of ENFILAIDE: LAMENTO-CAMBIATA

For Large Ensemble

Completed in 2012

Revised in 2013

Full score is written in C

Approximate Duration: 10 minutes

INSTRUMENTATION

Flute

Oboe

Clarinet in B-flat (Bass Clarinet in B-flat)

Bassoon

Trumpet in B-flat

Horn

Trombone

2 Percussionists [Bass Drum, Large Tom, Medium Tom, Ride Cymbal, Chinese Cymbal, Vibraphone, Marimba, Set of Crotales, Tam-tam, 11 Microtonally tuned pipes]

Piano

2 Violins

Viola

Violoncello

Contrabass
PERFORMANCE NOTES

PIANO:

- Should be executed by playing the highest notes with right hand and damping the strings with left hand. There should be no pitch content.

- Hitting the bridge of the resonance board on the lower side with timpani mallet

PERCUSSION:

- Clef for Bass Drum: the lower line that is pointed with a dot stands for the center of the drum’s surface. Higher line indicates the outer edge of drum’s surface. The position of the hand is indicated by the approximate placement of the noteheads between these lines.

- Requested effect to be executed with continuous and circular motions on the surface of the instrument.

WIND AND BRASS

- White Noise effect: air sound without pitch

- Keyclick effect in Wind Instruments

- Oscillating around the lowest possible note in Horn.

- Lowest possible note (Trombone/Horn)

- Highest possible note (Strings)

STRINGS:

- This clef indicates the precise position of the bow between the fingerboard and the chevalet
= this clef indicates the precise position of the bow when it is played on the fingerboard and moved to the chevalet

\(\text{\textbullet}\) = Overpressure of the bow

\(\text{\textbullet} \uparrow \) = Extremely loose contrabass string (in the beginning of the piece)

\(\text{\textbullet} \downarrow \) = Pitchless Pizzicato in strings (obtained by stopping the lowest string on the highest position)

\(\uparrow, \downarrow\) = microtonally flat (less than 1/4 tone) \(\#\) = 1/4 tone sharp \(\flat\) = 1/4 tone flat
Enfilade: Lamento / Cambiata
for Argento Chamber Ensemble

Mahir CETIZ

Score

Flute
Oboe
Clarinet & Bass Clarinet in B♭
Bassoon
Trumpet in B♭
Horn in F
Trombone
Percussion 1
Percussion 2
Violin 1
Violin 2
Viola
Cello
Contrabass

Hit the resonance bridge on the lowest end with a hard mallet

Bass Drum with wire brush

Changing the strings with L.H.
There should be no pitch produced

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random fingerings to color the air sound (air)

con sord. (air)

(p)

(random fingerings to color the air sound)
(very short attack—partially pitched)
Fl.
Ob.
Cl./Bs. Cl.
Bsn.
B.Tpt.
Hn.
Tbn.
Perc. 1
Perc. 2
Pno.
Vln. 1
Vln. 2
Vla.
Vlc.
Cb.
Repeat the notes adjacentl
with accelerating and
descelerating rhythms

place a glass bottle on
the strings and move
back and forth with pressure
Bass Drum with wire brush

on the highest range of the instrument
L.H. damping the strings

pizz.
APPENDIX 3

Full Score of MISE EN ABYME

For Large Ensemble

Completed in 2012

Full score is written in C

Approximate Duration: 9’30”

INSTRUMENTATION

Flute

Oboe

Clarinet in B-flat (Bass Clarinet in B-flat)

Trumpet in B-flat

Horn

Trombone

1 Percussionists [Bass Drum, Splash Cymbal, Vibraphone, Glockenspiel, Guiro, 5 Temple-blocks]

Harp

Violin

Viola

Violoncello

Contrabass
PERFORMANCE NOTES

PERCUSSION:

\[ \text{\includegraphics{percussion.png}} \]

= Le clé pour grosse caisse: la ligne inférieure qui est fait d'un point représente le centre de la surface du tambour. Supérieur ligne indique le bord extérieur de surface de tambour. La position de la main est indiqué par le positionnement approximatif des têtes de notes entre ces lignes.

Clef for Bass Drum: the lower line that is pointed with a dot stands for the center of the drum's surface. Higher line indicates the outer edge of drum's surface. The position of the hand is indicated by the approximate placement of the noteheads between these lines.

LES CORDES:

\[ \text{\includegraphics{cordes.png}} \]

= cette clé indique précisément la position de l'archet entre la touche et le chevalet

this clef indicates the precise position of the bow between the fingerboard and the bridge

\[ \text{\includegraphics{cordes.png}} \]

= cette clé indique précisément la position de l'archet quand il est joué sur la touche et déplacé à l'chevalet

this clef indicates the precise position of the bow when it is played on the fingerboard and moved to the bridge

\[ \text{\includegraphics{cordes.png}} \]

= archet très écrasé (avec pression extrêmement)

very heavy on the bow with extreme pressure
E.S.P. = "sul ponticello" extrêmement // extreme "sul ponticello"

Ricochet = L’effet sonore n’est pas nécessaire d’être égal au nombre des notes écrites.
   The number of heard notes does not need to correspond to the number of engraved notes.

N.B.: Les cordes doivent jouer la pièce entière sans vibrato
   The strings should play without vibrato throughout the piece

HARPE SCORDATURA:
   Ces notes doivent être accordés un quart de ton plus bas
   These notes should be tuned a quarter-tone lower.

\[ T \quad \text{[Title]} \quad \text{[Composer]} \quad \text{[Arranger]} \quad \text{[Subtitle]} \]
Mise-en-abyme
pour ensemble intercontemporain

Mahir CETIZ

Partition en Do

\[ \begin{array}{c}
\text{Flûte} \\
\text{Hautbois} \\
\text{Clarinette Basse (en Si)} \\
\text{Cor en Fa} \\
\text{Trompette en Si} \\
\text{Trombone} \\
\text{Percussion} \\
\text{Harpe} \\
\text{Violon} \\
\text{Alto} \\
\text{Violoncelle} \\
\text{Contrabasse}
\end{array} \]

\[ \begin{align*}
\text{Mise-en-abyme} & \quad \text{pour ensemble intercontemporain} \\
\text{Flûte} & \quad \text{et sifflet} \\
\text{Hautbois} & \quad \text{son d'air} \\
\text{Clarinette Basse (en Si)} & \quad \text{(embouchure ouvert)} \\
\text{Cor en Fa} & \quad \text{son d'air} \\
\text{Trompette en Si} & \quad \text{son d'air} \\
\text{Trombone} & \quad \text{son d'air} \\
\text{Percussion} & \quad \text{son d'air} \\
\text{Harpe} & \quad \text{“Glissando” descendant} \\
\text{Violon} & \quad \text{“white noise” effet} \\
\text{Alto} & \quad \text{“white noise” effet} \\
\text{Violoncelle} & \quad \text{“white noise” effet} \\
\text{Contrabasse} & \quad \text{“white noise” effet}
\end{align*} \]
Fl.

Haut.

Cl. Bs.

Cor

Tpt.

Tbn.

Perc.

Hrp.

Vln.

Alt.

Vcl.

Ch.

18

oscillations autour de
la note la plus basse possible

doublés ronflants:
pour la coloration du
son d’air

(air)

F

(embouchure recouver)
Bouché

S

Flügelhorn

Cor

Percussion

Harp

Viole

Alt

Violoncello

Cello

pup. à Clarinette en Si, executez les rythmes en frappant au registre indiqué (cluster) avec une bâton métallique.
(toujours avec la pédale)
Fl.
Haut.
Cl.
Cor
Tpt.
Tbn.
Perc.
Hrp.
(Vln.
Alt.
Vcl.
Cb.

Les harmoniques résultantes=octave

(S.P.)
Strumming
gratter
avec les ongles

près de la table
baguette de tambour
jouer avec une

avec les ongles

juiser avec une
baguette de tambour
Science des sonorités -
Jouer avec la main droite
en étouffant le cordes
avec la main gauche.

pizz. 