UNIVERSIDADE ESTADUAL PAULISTA

"JÚLIO DE MESQUITA FILHO" – UNESP

INSTITUTO DE ARTES

Programa de Pós-Graduação em Música – Mestrado

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A COMPARISON OF EXCERPTS BY IGOR STRAVINSKY, ALBAN BERG, DMITRI SHOSTAKOVICH AND BÉLA BARTÓK TO EXCERPTS BY GYÖRGY LIGETI:

COMPARATIVE ANALYSIS BASED ON TEXTURAL PARAMETERS

São Paulo

2019

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Dissertação apresentada ao Curso de Pós-Graduação em Artes, do Instituto de Artes da Universidade Estadual Paulista - UNESP, como requisito parcial para obtenção do título de Mestre em Música,
Área de concentração: Música: processos, práticas e teorizações em diálogos.
Linha de pesquisa: Música, Epistemologia e Cultura.

Orientador: Prof. Dr. Marcos José Cruz Mesquita

São Paulo

2019

Ficha catalográfica preparada pelo Serviço de Biblioteca e Documentação do Instituto de Artes da UNESP

O48c Oliva, Carlos Alberto Bastos, 1961-

A comparison of excerpts by Igor Stravinsky, Alban Berg, Dmitri Shostakovich and Béla Bartók to excerpts by György Ligeti : comparative analyses based on textural parameters / Carlos Alberto Bastos Oliva. - São Paulo, 2019.

80 f. : il.

Orientador: Prof. Dr. Marcos José Cruz Mesquita

Dissertação (Mestrado em Música) – Universidade Estadual Paulista "Júlio de Mesquita Filho", Instituto de Artes

1. Ligeti, György, 1923-2006. 2. Musica - Filosofia e estetica. 3. Musica - Música - Séc. XX - Analise, apreciação. 4. Compositores - Hungria. I. Mesquita, Marcos José Cruz. II. Universidade Estadual Paulista, Instituto de Artes. III. Título.

CDD 780.94

(Laura Mariane de Andrade - CRB 8/8666)

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Dissertação aprovada como requisito para obtenção do grau de Doutor em Música, no Curso de Pós-Graduação em Música, do Instituto de Artes da Universidade Estadual Paulista – UNESP, pela seguinte banca examinadora:

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São Paulo, 31 de Julho de 2019.

ABSTRACT

This dissertation compares excerpts taken both from György Ligeti's works and from compositions by his antecessors Igor Stravinsky, Alban Berg, Dmitri Shostakovich and Béla Bartók in order to demonstrate existing sonorous similarities. Textural parameters became more evident as structural elements in music composition of the 20th century. Chapter one discusses the role of texture in the music of the 20th century through a historical overview joined to an explanation of textural characterizations made by author Wallace Berry. Most of György Ligeti's compositions of the 1960's present passages regarding textural conditions of static sounding masses and/or continuous layered sonorities. Chapter two selects four of these compositions in order to compare excerpts from Ligeti's compositions 1) String Quartet Nº 2 to Stravinsky's *Firebird Suite*, 2) Chamber Concerto to Berg's *Lyric Suite*, 3) *Atmosphères* to Shostakovich's Symphony Nº 2 – To October – and 4) Cello Concerto to Bartók's String Quartet Nº 4. György Ligeti often spoke of having been influenced by composers from the first half of the 20th century while talking about his works in interviews and lectures. The comparative analyses shown in chapter three represent an attempt to demonstrate direct influences György Ligeti received from some of his antecessors.

Keywords: György Ligeti. Texture in music. Static sounding masses. Continuous layered sonorities. Music of the 20th century.

RESUMO

Essa dissertação faz comparações entre trechos de composições de György Ligeti com trechos de composições de seus antecessores Igor Stravinsky, Alban Berg, Dmitri Shostakovich e Béla Bartók a fim de demonstrar as similaridades sonoras existentes. Os parâmetros texturais tornaram-se mais evidentes como elementos estruturais nas composições musicais do século XX. No capítulo um é discutido o papel da textura na música do século XX através de uma visão histórica aliada às explanações técnicas feitas pelo autor Wallace Berry sobre as diferentes condições texturais. Muitas das composições de György Ligeti da década de 1960 apresentam passagens relacionadas às texturas de massas sonoras estáticas e/ou de sonoridades de camadas contínuas. No capítulo dois foram selecionadas quatro composições da década de 1960 as quais apresentam tais características texturais no sentido de comparar excertos das composições de György Ligeti: 1) Quarteto de Cordas Nº 2 com a Suíte do Pássaro de Fogo de Stravinsky; 2) Concerto de Câmera com a Suíte Lírica de Alban Berg; 3) *Atmosphères* com a Sinfonia Nº 2 de Shostakovich e 4) Concerto para Violoncelo com o Quarteto de Cordas Nº 4 de Béla Bartók. György Ligeti sempre comentou em entrevistas e palestras sobre as influências recebidas de outros compositores. As análises comparativas feitas no capítulo três são uma tentativa de demonstrar influências diretas recebidas de alguns de seus antecessores da primeira metade do século XX.

Palavras-chaves: György Ligeti. Texturas musicais. Massas sonoras estáticas. Camadas sonoras contínuas. Música do século XX.

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INTRODUCTION

At the turn of the 20th century, compositional styles of classical music had shifted. Focus had moved from previous tonal parameters of melody, harmony and metric rhythm to textural characteristics. Compositions by Claude Debussy, Gustav Mahler and Arnold Schoenberg, to name just a few, were increasingly centered on textural conditions of sound masses and continuous layered sounds. Hungarian-Austrian composer György Ligeti focused his work on developing these new compositional styles, which deviated the focus of composing from previous melodic solutions to more atonal timber and textural conditions. Ligeti's music dealt primarily with those textural conditions. In György Ligeti's compositions from the 1960's, both a static type of sounding mass and a continuous layered sonority are present. A comparative analysis of excerpts taken both from Ligeti's works and from compositions by his antecessors Igor Stravinsky, Alban Berg, Dmitri Shostakovich and Béla Bartók demonstrates a close sonority. Divided into three chapters, this essay compares excerpts which contain some of the similar textural conditions which helped define György Ligeti's compositional sonority in the 1960's to the work of Stravinsky, Berg, Shostakovich and Bartók.

During the 20th century, textural parameters became an overpowering means of expression in music. Ligeti and many of his contemporaries invested heavily in textural parameters as a compositional technique. As stated by Jonathan Dunsby "[…] 'texture' probably arose as a feature of the critical vocabulary spawned by post-tonal music starting in the early years of this [20th] century." (Dunsby, 1989). The use of texture as a structural force in the dramatic music of the 19th century served to reveal its inherent structural potential within the mainstream of the modernist Western music as it appears in compositions of György Ligeti consciously conceived as textural structures (Dunsby, 1989).

This dissertation proposes a comparative analysis of specific music segments which denote a high degree of sonorous semblance. Textural and timber combinations are theoretically and graphically described in order to demonstrate the results of extensive auditory perception research. The principles of the auditory stream segregation theory were used to classify emergent qualities in the sound spectra and establish the grounds of those analyses (Wright; Bregman, 1987).

Chapter one will discuss textural parameters and their significance for 20th century music composition. Along with a brief historical overview of the use of the term texture in music, chapter one will also present Wallace Berry's broad concepts about textural parameters in order to establish the grounds for the comparative analysis presented in the third chapter. As explained by Joseph Auner

> Throughout the first half of the 20th century composers developed textural ways of working without functional harmonic progressions, including Debussy's technics of varying 'color and light', Schoenberg's tone-color melody, Stravinsky's explorations of rhythm and layering in the *Rite of Spring*, Berg's crescendo in a single note in *Wozzeck*, and Varèse's sound masses. (Auner, 2013, p. 236).

Chapter two will present an overview of György Ligeti's compositions starting with his arrival in Cologne in early 1957 up to the writing of the Chamber Concerto between 1969 and 1970. The composer often spoke of having been influenced by composers from the first half of the 20th century while talking about his works in interviews and lectures. In a conversation with Josef Häusler in 1969 about his String Quartet Nº 2, György Ligeti said

> String quartets like Berg's *Lyric Suite*, Bartók's Fourth and Fifth String Quartets and – not in a formal sense but in so far as their structural standard is concerned – also Webern's quartets, and specially the Bagatelles, these have been touchstones for me. (Ligeti apud Eulenburg, 1983, p. 105).

When investigating the composers who have influenced György Ligeti, the names of Claude Debussy, Igor Stravinsky, Béla Bartók and Alban Berg constantly reappear. Chapters two and three demonstrate the repeated occasions in which György Ligeti referred to his influences.

The third chapter will develop four comparative analyses regarding similar textural sonorities present in 1) an excerpt from Igor Stravinsky's *Firebird Suite* which denotes a sounding result close to the sound of an excerpt by György Ligeti's String Quartet Nº 2, 2) an excerpt from Alban Berg's Lyric Suite which denotes sounding qualities parallel to an excerpt from Ligeti's Chamber Concerto, 3) the beginning of Dmitri Shostakovich's Symphony Nº 2 – To October – in which sonorous results are similar to letter H in György Ligeti's *Atmosphères* and 4) the beginning of the third movement from the Béla Bartók's Fourth String Quartet which resembles the sonority of a segment from Ligeti's Cello Concerto.

The analyses presented are based on both quantitative and qualitative aspects of the textural features of the eight excerpts. An enclosed DVD presents the audio-video score of the four comparisons as illustration of the analyses.

Chapter 1

THE PARAMETER OF TEXTURE

This chapter will discuss a change in direction which took place around the turn of the 20th century. This directional change was related to textural parameters and these parameters became more evident as foreground subject matter in music composition. This chapter will serve as the basis for the comparative analyses present in the chapter 3.

Historically, textural layers appeared either as background harmonic accompaniment for melodic passages or as density enhancement during a cadential punctuation. A pair of interesting things happened, however, in the 19th century. The concert orchestras grew in size and increased instrumentation. Also, orchestral composers invested in compositional chromaticism. Composers began to use varied textural colorations as an element of contrast and/or to display grandiosity (Dunsby, 1989). The emancipation of dissonance through chromaticism, polytonality and polymodality also helped to turn textural aspects in music into a major component of structural organization.

> Texture music is not simply another "ism", but a more general manifestation of the new possibilities of creating form, structure and expression when melodic development and harmonic progression play only a limited role. (Auner, 2013, p. 236).

1.1 A historical view of musical texture in the 20th century

After having organized specific literature related to the appearance of the term texture in music analysis since the beginning of the 20th century, an extended and scrutinized bibliography made relevant historical writings on the technical parameters of texture become apparent.

In 1908, H. P. Allen wrote an article entitled *Some Considerations of the Effect of Orchestral Colour upon Design and Texture in Musical Composition*. In his article, the author mentions the creation of impressions and atmospheres by means of what he calls colour, which he treats as going beyond the mere characteristics of form and structure. Among the explanations and examples regarding colorations and musical shapes, Allen discusses ways to arouse the interest and attention of the listener "[…] by the use of a texture which, by the subtlest mixtures of orchestral colourings rather than by the use of melodic lines is kaleidoscopic in effect and never ceasing." (Allen, 1908, p. 109).

In 1923, George Dyson wrote two articles for the Music and Letters journal called *The Texture of Modern Music I* and *II*. In these articles, he discusses the relevance of textural aspects using examples from the classical and romantic periods. In the introduction to the first article,

Dyson writes that "[…] Of the many formal characteristics which contemporary music exhibits, the most consistent is its devotion to qualities of texture." (Dyson, 1923, p. 108). The author further expounds upon the relevance of architectural cohesion and thematic development by 18th and 19th century composers. While comparing the two topics, which he calls products, George Dyson mentions the significance of textural aspects using the music of J. S. Bach as an example.

> Contemporary music is predominantly a development of texture, and as the last great period in music when texture occupied this paramount place was that which is associated with Bach, it will provide an essential element of perspective if the two products [architectural cohesion and thematic development] are compared and contrasted. (Dyson, 1923, p. 108).

In the book entitled *Music Ho! A Study of Music in Decline*, dated from 1934, Leonard Constant uses the term texture while analyzing Debussy's *Images* when addressing the newness of the composer's harmonic approach as well as the non-conventional treatment of his counterpoint. In the chapter *Impressionism and Disruption*, Constant asserts that "[…] technically speaking this *Images* display a far greater liveliness and variety of texture than the earlier works of Debussy." (Constant, 1934, p. 35).

According to Jonathan Dunsby, a reference to the term texture first appeared as a title in the book *Musical Textures,* written by musicologist Donald Tovey, in 1941. Dunsby also mentions seven categories of texture (unison, melody and accompaniment, secondary melody, part-writing, contrapuntal texture, chords and complex textures) by author Walter Piston in his 1955 book called *Orchestration* (Dunsby, 1989).

Later in 1965, Constant Vauclain wrote an article for The Musical Quarterly Journal entitled *An Experiment in Musical Texture*. In the article, many suggestive assumptions are made about tonal and atonal compositions from the first half of the 20th century. The author alludes to textural conditions of polytonality as having evolved from the 19th century:

> The possibility was discussed of music having two or even more tonal-functional streams operating simultaneously, and intellectually this last seemed a particularly logical way of continuing the development of musical textures in a direct line from the 19th century. (Vauclain, 1965, p. 320).

Reginald S. Brindle suggests in his book, Serial Composition (1966), that "[…] texture, in one sense, can be defined as structure or the arrangement between parts." In the same book, he writes in the chapter called Orchestration, Texture and Tone Colour that

> Musical texture is a subtle amalgam of various elements – instrumental, colour, density, pitch, movement, rhythmic configuration, etc. All those factors are usually present, though their relative importance will vary in every situation. (Brindle, 1966, p. 136).

1.2 Texture according to Wallace Berry

In the second edition of the book *Structural Functions in Music,* dated from 1987, the Canadian-American composer and music theorist Wallace Berry devotes an entire chapter to the subject of musical texture. Grounded in the principles of music theory and analysis, Berry uses examples from various periods and styles in order to demonstrate and conceptualize a large number of textural shapes. He analyses situations in which quantitative and qualitative aspects are taken into account in order to describe different categories of sound projection. As stated by the author, the texture of music

> consists of its sounding components; it is conditioned in part for the number of those components sounding in simultaneity of concurrence, its qualities determined by the interactions, interrelations, and relative projections and substances of component lines or other sounding component factors. (Berry, 1987, p. 184).

Quantitative and qualitative textural classifications are of utmost significance in analyzing different types of musical textures. The quantitative aspects are related to density and regard the number of elements as well as the range over which those elements interact. The qualitative aspects are conditioned by the nature of the interaction between the elements, when taking characteristics of melodic, rhythmic and harmonic independence or interdependence among the sounding components in a given textural space into account.

Monophony is the simplest type of musical texture. Polyphony represents different degrees of complexity, depending on the number of voices and on the range in which those voices are enclosed. Polyphony may imply two other aspects of textural density. One aspect is represented by the overall timbre,[1] which will depend on the quality of the instrumentation. The other aspect has to do with the level of compression, which is related to the interval attributes of consonance and/or dissonance among the voices within the range.

Along with the quantitative aspects, qualitative conditioning of sound projection is of supreme importance when evaluating specific types of texture. A monophonic excerpt, for example, will denote different sounding qualities depending on register, articulation, dynamics, rhythmic displacement, speed, interval leaps and direction. In polyphonic contexts, in addition to those attributes regarding individual voices, circumstances implying homophony or heterophony will determine possibilities for textural characterizations.

[1] Characteristics of timbre will also determine textural conditions in monophonic passages.

Wallace Berry describes different categories of voice independence and interdependence in polyphonic contexts which rely on direction, intervallic and rhythmic content. In the next example quoted from his book, it is possible to observe some distinct types of voice correlations which occur when using various textural procedures. See figure 1.

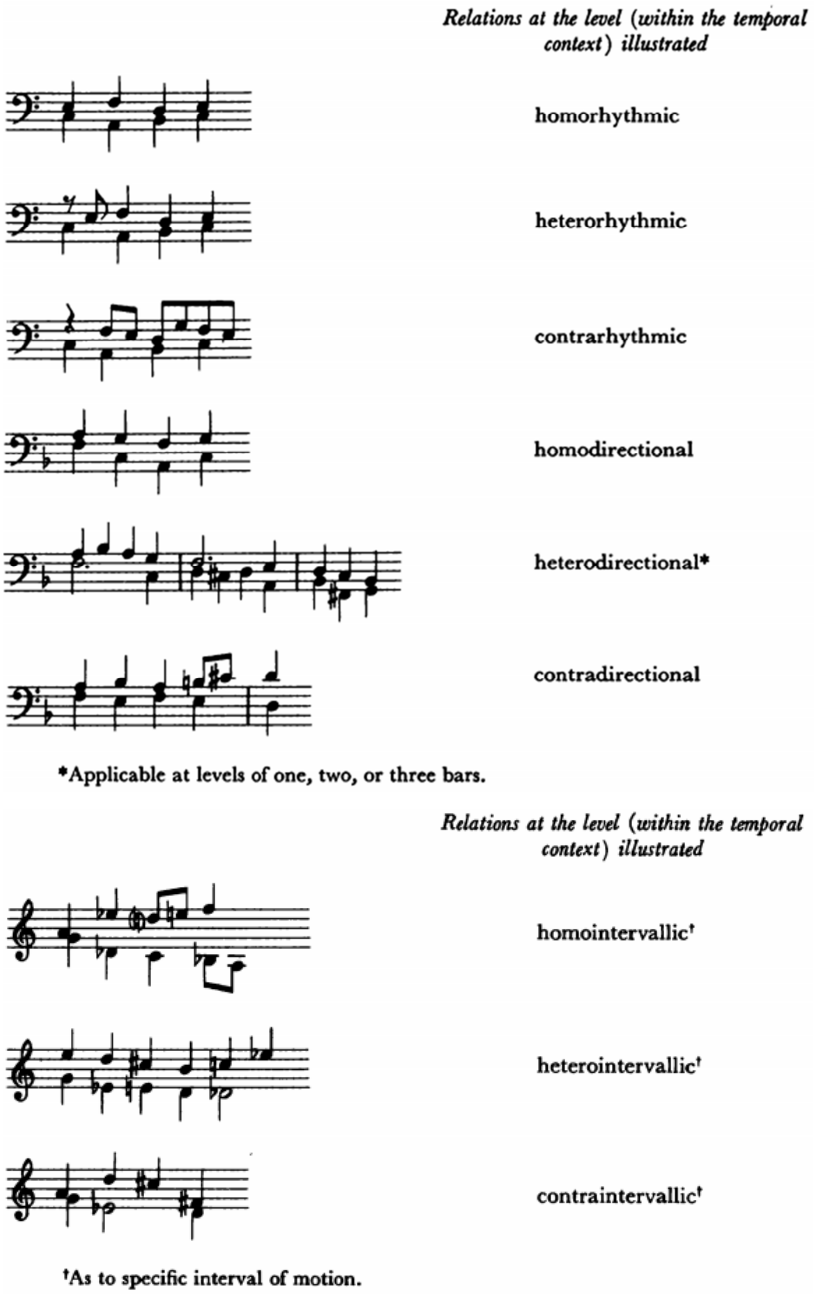

Figure 1- Relations of rhythm, direction and intervals quoted from Wallace Berry's Structural Functions of Music, pages 194 and 195.

In addition to the categories presented above, other aspects are also significant in determining textural results. Instrumentation, register, dynamics and articulation, along with parameters of density, compression and qualities of interrelation among the sounding components are distinctive and vital factors which determine the sonority outcome.

1.3 The role of texture in the music of the 20th century

> One of the most significant trends since the World War II involves the de-emphasizing of melodic and harmonic motion, and even the significance of individual notes, to allow texture, timbre, rhythm, dynamics and register to take center stage. (Auner, 2013, p. 235).

The use of sound-mass texture became more evident among the composers of the turn of 20th century. Static harmonic shapes formed of layers of sound started to play an important role in structuring music. Composers from the first half of the 20th century like Gustav Mahler, Claude Debussy, Arnold Schoenberg, Charles Yves, Maurice Ravel and Edgard Varèse began to incorporate dense timbre passages into their compositional ideas. Examples of texture music are found in Debussy's *Nocturnes* for Orchestra (1899) and *La Mer* (1903-05), Mahler's 9th Symphony (1908-09), Schoenberg's Five Pieces for Orchestra (1909), Charles Yves' Symphony Nº 4 (1910-24), Ravel's *Daphnis Et Chloè* (1912) and Edgard Varèse's *Amèriques* (1918-21), to name just a few. Polyphonic passages of dense textural sonority became a major structuring component in music composition. These passages appeared both as a pronounced accompaniment for melodic content and as a superposition of layers in which qualities of timbre represented the most relevant sounding aspects. An example quoted from *Farben*, the third of Arnold Schoenberg's Five Pieces for Orchestra, Op. 16 (1909), shows a three measure passage in which flute, English horn, clarinet, bassoon, contrabassoon, French horn, trumpet, trombone, cello and contrabass perform a static sound complex.

> The opening of this piece [Op. 16, No. 3] consists of a five-tone chord whose color is constantly renewed through a system of dissolves, and the ambiguity of timbre is moreover functional, since it acts as a medium for the overall structure: so for the first time we see timbre being used properly for its own sake, functionally, and not simply as a result of the instrumentation. (Boulez apud Iverson, 2009, p. 160).

A superposition of twenty voices between mm. 9 and 11 presents a thick textural layer in which each instrument performs a single note line. The contrabassoon, which descends from B1[2]

[2] For a pitch reference we will use C3 as the middle C.

to Cb1 in the 10th measure, is the only exception. The segment sounds for about ten seconds. See figure 2.

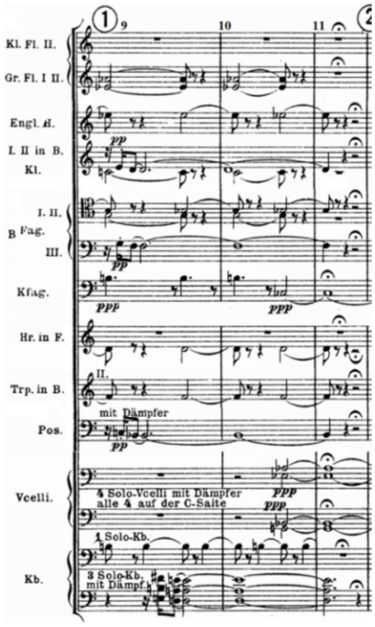

Figure 2 - Measures 9 to 11 of Farben quoted from Schoenberg's Five Pieces for Orchestra Op. 16[3].

Figure 3 shows a range which extends from an Ab3, played by the flute, down to a Cb1, played by the contrabassoon. The lines performed by the instruments represent a large layer of sounding mass. Although the segment presents heterorhythmic displacement of the voices, it denotes a dense textural environment because each of the instruments remains on the same pitch. See figure 3.[4]

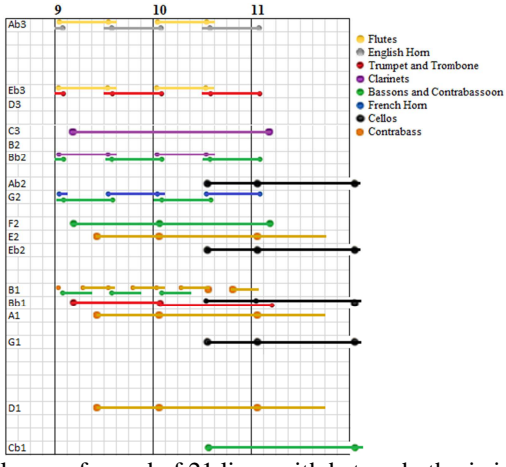

Figure 3 - Farben's textural space formed of 21 lines with heterorhythmic interrelation.

[3] The 16th notes D3, G2, C1, F#2, B1 and E1 played respectively by clarinet I, bassoon III, trombone and contrabasses are not being considered.
[4] See track one on the audio video DVD enclosed.

The concurring lines create a uniform sound structure in which individual pitches are disguised. Three different parts are observable in the segment: 1) the different rhythmic figurations in each voice from the beginning of m. 9 to the first half of m. 10 which create a subtle kind of motion within the structure; 2) the second half of m. 10 to the first beat of m.11 denotes a static sounding texture and 3) from the second beat of m. 11 to the end of the segment, the remaining lines of the contrabassoon, cellos and contrabass conclude the section. See figures 4, 5 and 6.

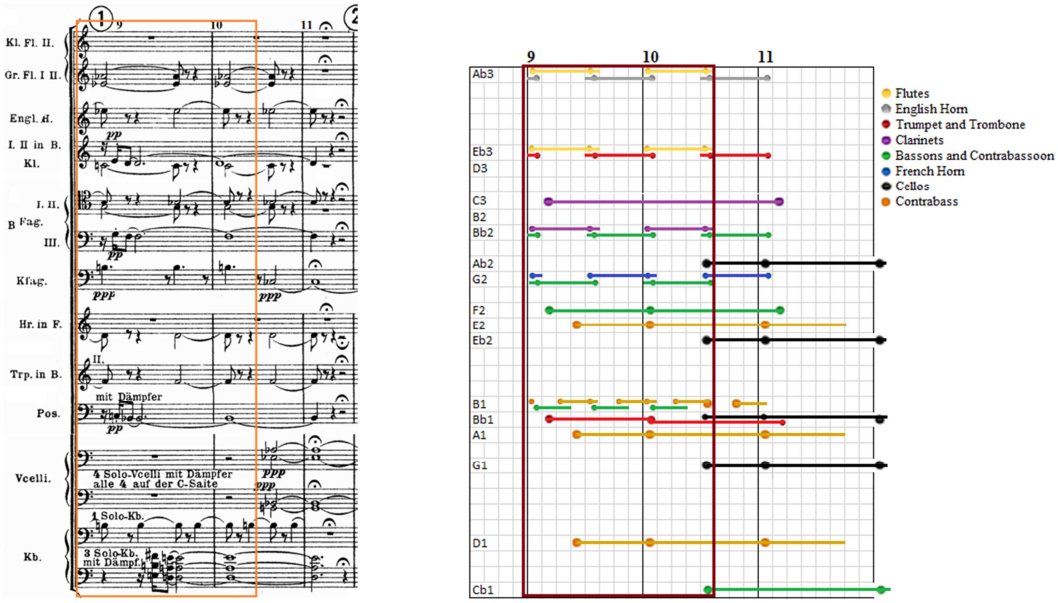

Figure 4 - First part of Farben's segment

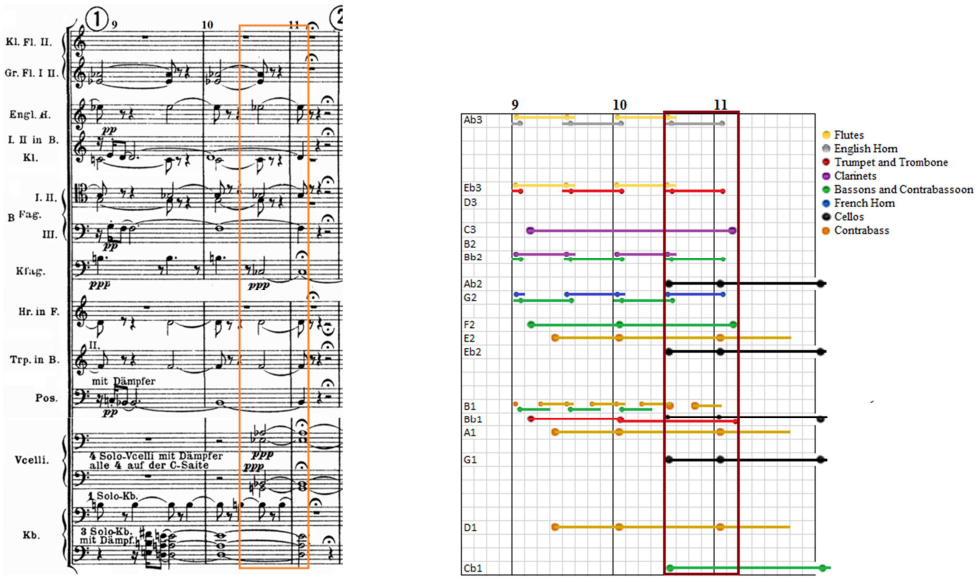

Figure 5 - Second part of Farben's segment.

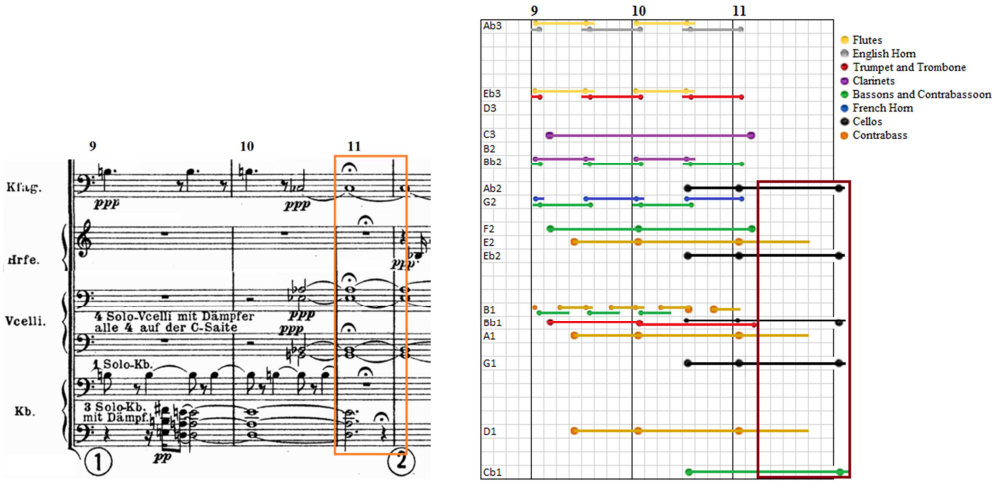

Figure 6 - Third part of Farben's segment.

Even though there are ten different pitches sounding concurrently, the entire textural space is not fully chromatic. Nonetheless, distinct chromatic superposition among the voices is observable. See figure 7.

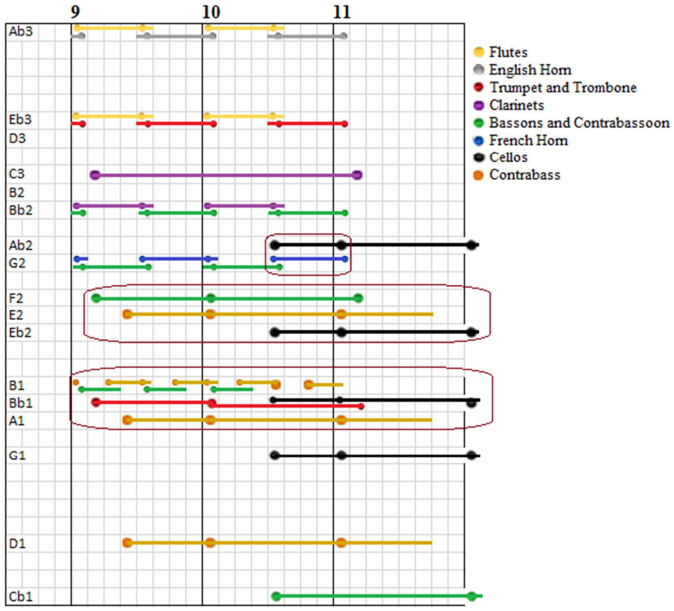

Figure 7 - Superposition of chromatic lines in Schoenberg's Farben excerpt.

Jennifer Jay Iverson analyses the beginning of Schoenberg's *Farben* in detail in her dissertation, quoting Hans Heinz Stuckenschmidt who points out that

> Schoenberg provided an experiment [Op. 16, Nº 3], which seeks to make timbre the exclusive bearer of the musical form. A chord appears unchanged, but in ever new instrumentation, and provides the acoustic equivalent of an object that is cast in a flood of color-changing light. (Stuckenschmidt, 1951apud Iverson, 2009, p. 163).

Later in the 20th century, the parameters of texture became more evident as a consequence of the variety of compositional styles and techniques of the post-modernist composers. According to Joseph Auner

> The origins of what we will call "texture music" lie in electronic music, Integral Serialism, and indeterminacy. But composers working in this broad category have developed a remarkable range of compositional technics that draw upon an equally remarkable diversity of influences and inspirations. (Auner, 2013, p. 235).

Compositions by Olivier Messiaen (*L'Ascension*, 1933), Iannis Xenakis (*Metastasis*, 1953-54), Karlheinz Stockhausen (*Gruppen*, 1955-57) and Krzysztof Pendereky (Threnody to the Victims of Hiroshima, 1961) offer examples of texture and timbre as means of expression inherent to the composers' musical concepts.

The next chapter discusses the works of the Hungarian-Austrian composer György Ligeti from the beginning of the 1960's. In this period, he accomplished his first superposition of layers of dense sonority. At the same time, he put his conceptual ideas of static music into practice. He spoke of this in an interview with Péter Várnai in 1978.

> I first began to think about a kind of static music you find in Atmosphères and Apparitions in 1950; music wholly enclosed within itself, free of tunes, in which there are separate parts but they are not discernable, music that would change through gradual transformation almost as if change the colour from the inside. (Eulenburg, 1983, p. 33).

Ligeti conceived *Víziók,* his first piece related to static sounding textures*,* in 1956 while still living in Hungary. Later in 1957, he began experimenting with superposing layers of sounds. At the time, he was studying at WDR electronic music studio, in Cologne. There, he composed the electronic pieces *Glissandi* (1957) and *Artikulation* (1958). As he worked on those pieces, the composer discovered new techniques in electronic sound manipulation (Eulenburg, 1983). Aware of the limits of both integrally serial composed and electronic music, Ligeti realized that his compositional goals for static texture music would be much easier to achieve writing for an orchestra. His compositions Apparitions (1959) and Atmosphères (1961) are the culmination of his techniques at that time. Later in chapter 3, comparative analyses are made between excerpts from György Ligeti's compositions and Igor Stravinsky, Alban Berg, Dmitri Shostakovich and Béla Bartók compositions. The comparisons are made with respect to the floating and fluctuating types of textural environments which became so common in compositions from the first half of the 20th century.

Chapter 2

GYÖRGY LIGETI'S COMPOSITIONAL TRAJECTORY FROM 1957-1970

This chapter deals with György Ligeti's very distinct compositional style. Starting with the composer's first electronic attempts with *Glissandi* (1957) and *Artikulation* (1958), the chapter also deals with the transformative moments in Ligeti's style during the 1960's to the writing of the Chamber Concerto from 1969 to 1970. The main focus of the chapter is the compositional technique which creates sound mass textures found in the orchestral works of *Apparitions* (1959), *Atmosphères* (1961) and later in the *Requiem* (1963-65), *Lux Aeterna* (1966) and *Lontano* (1967). The chapter also addresses the compositional technique which created the tinier textural layers present in Ligeti's Cello Concerto (1966) and the String Quartet Nº 2 (1968).

2.1 Romania and Hungary

The Hungarian-Austrian composer György Sándor Ligeti (1923 – 2006) obtained a well-grounded music education in music first in Romania (1941-45) and later in Hungary (1945-49). Ligeti studied composition with Ferenc Farkas, and piano with Pál Kadosa. He graduated from the Budapest Academy of Music in 1949 having studied under Sándor Veress and Pál Járdányi. After graduating from the Budapest Academy, György Ligeti went on an extended tour of Romania collecting and annotating hundreds of Transylvanian/Hungarian folk songs, following in the footsteps of his antecessors Béla Bartók and Zoltán Kodály. Ligeti became a lecturer in harmony, counterpoint and music analysis at the Budapest Academy of Music and worked there from 1950 and 1956 (Floros, 2014).

In 1941 and at the age of 18, Ligeti composed the piece *Kineret* for mezzosoprano. This was his first published work. While in Budapest, Ligeti's compositions were highly influenced by Béla Bartók and Igor Stravinsky, as he relates in his interview with Josef Häusler: "[…] Up to then [1950] and even a little later, my compositions were largely influenced by Bartók and Stravinsky, and to a certain extent by Alban Berg." (Eulenburg, 1983, p. 88). Among those compositions were two cantatas, unaccompanied choral works, songs and piano pieces, arrangements of Romanian and Hungarian folk-songs and several orchestral works. From 1950 to 1956, Ligeti composed only a few pieces which he considered worthy of publication. These included his *Six Bagatelle*s for wind quintet (1953), two unaccompanied choral pieces, *Night* and *Morning* (1955), his String Quartet Nº1, *Métamorphoses Nocturnes* (1953-54) and *Víziók* (1956)

which became the first movement of *Apparitions*. The composition *Apparitions* was completed three years later.

Hungary was politically and culturally isolated from Western Europe between 1949 and 1956. Western musical developments were not accessible. In an attempt to overcome the isolation, György Ligeti listened to clandestine radio broadcasts from Germany to obtain information on the new music of the time. Ligeti managed to listen to music by Olivier Messiaen, Wolfgang Fortner, Pierre Boulez, Karlheinz Stockhausen and Luigi Nono, to name just a few, on radio transmissions from Bavaria, South West Germany, West Germany and North Germany. In his conversations with Josef Häusler, Ligeti commented "[…] and then we had indirect information that totally new ideas were in existence. I heard not until later, 1952/53, that electronic music existed, serial music, and that was a person called Cage in America and what he was doing." (Eulenburg, 1983, p. 90).

In 1953, György Ligeti heard about the new possibilities electronic music studios were offering. Groundbreaking work was being done synthetically producing all types of musical sounds from pure sine waves. The composer declared that "[…] it fired my imagination and I absolutely want to go to Cologne. That was one of the reasons for my leaving Hungary in December 1956." (Eulenburg, 1983, p. 35).

2.2 From the Electronic Studio to *Apparitions* and *Atmosphères*

Upon arriving in the West, György Ligeti was given a scholarship to study electronic music at the WDR studio under Karlheinz Stockhausen and Gottfried Michael Koenig. He learned about additive synthesis[5] and composed two electronic pieces: *Glissandi* (1957) and *Artikulation* (1958). At the same time, Ligeti became acquainted with the compositional trends in serial music through studying scores of Stockhausen and Pierre Boulez. Although the two-year period from 1957-58 put György Ligeti in direct contact with the new music that was being written in Western Europe, the composer realized that serial and electronic principles were not for him. Ligeti considered the limitations imposed by electronic equipment and the plain sonorous results from serial composed music to be restricting factors. Nonetheless, the electronic and serial concepts mixed together with the composer's Eastern heritage formed the background

[5] Stockhausen's technique of layering a number of sine waves to produce more complex sounds. (Iverson, 2009, p. 310).

over which Ligeti composed his first orchestral pieces in the West, *Apparitions* (1959) and *Atmosphères* (1961). These compositions addressed the static textural aspects he had imagined in his Hungary years.

> What I learned in Cologne came as a shock; that was the first time I set eyes on a Boulez score and Stockhausen was then working on *Gruppen*, which is scored for three orchestras. There certainly was something in the general atmosphere which warranted the feeling of the Cologne group that they were creating something radically new. (Ligeti apud Eulenburg, 1983, p. 34).

In a conversation with Peter Várnai, Ligeti asserted that it took him six months to acquire the technical knowledge necessary to work in the studio. The composer thought that the electronic processing of sound would help his compositional concepts come to fruition. However, his first optimistic impressions were gradually reduced to a more realistic view. The equipment at the time was actually quite limited (Eulenburg, 1983).

György Ligeti understood the procedures for serial composition and, after an analysis of Pierre Boulez's *Structures Ia,* he affirmed that "[…] While I was there [Cologne] I made a detailed analysis of Boulez's *Structures Ia*, with the result that whilst I found serial music extremely interesting I realized that it was not for me." (Eulenburg, 1983, p. 35). According to Ligeti, Schoenberg's twelve-note system should have been the logical continuation of the musical concepts Richard Wagner began. In Richard Wagner's *Tristan und Isolde*, all the notes can be both tonic and leading tones. Ligeti thought that once the concept of the twelve-tone series was extended to twelve different note lengths and twelve grades of dynamic intensity the sounding results would be plain and pre-determined.

2.3 György Ligeti's selected works from the 1960's

The following chapter contains a comparative analysis of four of György Ligeti's remarkable works from the 1960's to the work of some of his antecessors. Atmosphères (1961), The Cello Concerto (1966), String Quartet Nº 2 (1968) and the Chamber Concerto (1969-70) are compositions in which static textural aspects and/or continuous and uniform sounding layers are present. Similar effects are found in some of Ligeti's colleagues' compositions from the first half of the 20th century.

György Ligeti, when interviewed, spoke often of composers and styles which had influenced him. Music from as far back as the 15th century all the way up to music from the first half of 20th century served as reference or inspiration. The names of Johannes Ockeghem, Claude

Debussy, Béla Bartók, Igor Stravinsky and Alban Berg were mentioned many times in both his interviews and his lectures. György Ligeti declared that he had been directly influenced by Bartók, Stravinsky and Berg. While talking about the String Quartet Nº 2 in conversation with Josef Häusler he said "[…] There is everything on it [String Quartet Nº 2]: Bartók's initial influence, a tone of voice recalling Stravinsky and Alban Berg". (Eulenburg, 1983, p. 16). Ligeti also mentioned that he had thoroughly studied and admired Bartók's string quartets and Alban Berg's Lyric Suite score (Eulenburg, 1983).

Atmosphères

> The compositional idea I tried to realize in Atmosphères signified, on the one hand, the overcoming of 'structural' thinking in composition – a mode of thinking that characterized the entire musical development of the last ten years – and on the other, represented a disowning of every kind of dialectic within musical form. There are, in the form thus come into being, no longer any oppositional elements or reciprocal actions; the diverse states of the musical material take over from each other, or one turns almost imperceptibly into the other, without the emergence of any causal connections within the formal progress. (Ligeti apud Floros, 2014, p. 84).

While elaborating the score of *Atmosphères*, György Ligeti worked on three distinct types of textural shapes: stationary planes, vibrating surfaces and mosaic-like textures. The sound differentiation among those three textural shapes has to do with characteristics of timbre and dynamics. The stationary planes refer to the unchanging clusters of static sound. The vibrating surfaces are represented by the swaying-like figurations (trills and tremolos) which create motion within a given textural space. The mosaic-like textures are characterized by the dissolutions of lines into individual components. An example of the overlapping sound fields appears between mm. 44 and 53 in letters H and I of *Atmosphères*. There, a highly complex 28-voice cannon and 20-voice mirror cannon perform an archetypal sample of György Ligeti's technique (Floros, 2014). This specific section will be further compared with the beginning of Dmitri Shostakovich's Symphony Nº 2 in chapter 3.

The Cello Concerto

> The [Cello] Concerto has two movements, the second being a variant of the first. The musical material presented in the first movement is followed by a great crescendo. At the end of the crescendo the orchestra suddenly stops as it torn off and the cello goes on by itself. (Ligeti apud Eulenburg, 1983, p. 52).

Constantin Floros pointed that "[…] The Cello Concerto was not written in keeping with the Romantic type of the symphonic concerto. Neither as though the solo cello and the orchestra were two separate units confronting each other in competition and contrast". (Floros, 2014, p.

111). The concerto-like character permeated the entire construction of the music. However, György Ligeti defined the relation between the soloist and the orchestra affirming that

> Ever new instrumental groupings continue to reticulate the motions, with the solo cello serving as the foundation of the varying instrumental combinations; beyond that, it also stands up in virtuoso voice-leading as concertant principal instrument, although its unity with the orchestral happening remain always in effect. (Ligeti apud Floros, 2014, p. 111).

According to Stephen Plaistow, Ligeti wanted to suggest to the listener that the music happening in the beginning of the Cello Concerto, which almost imperceptibly seems to appear out of nothing, had somehow always been there. In the whispering cadenza at the end, the concerto fades until absolute silence has been reached as well. The music seems to just flow back into the cello and can even be thought of as perhaps continuing at the end beyond the threshold of our hearing (Plaistow, 1974).

Significantly, most of the instrumental virtuoso passages in the Cello Concerto, rather than sounding composed, seem like improvisation. Nonetheless, every aspect of the concerto is entirely annotated. In sections of the Cello Concerto, the soloists seem to lose their self-control and break into wild playing. Then these eruptions are followed by calmer sections which are mechanically precise (Floros, 2014). Further in chapter 3 an excerpt from Ligeti's Cello Concerto will be compared to the introduction of the third movement of Béla Bartók's String Quartet Nº 4 due to the great deal of sound similarities between those two segments.

String Quartet Nº 2

> The Second Quartet sums up all the different kinds of music I had composed, all the various technical and expressive features, the floating quality of *Atmosphères,* the machine-like character of my composition for 100 metronomes, the cooled expressionism of *Aventures*. (Ligeti apud Eulenburg, 1983, p. 17).

Throughout György Ligeti's String Quartet Nº 2, a five-movement piece, the same musical material is used, although treated differently in each one of the movements. When interviewed by Joseph Häusler in 1969, right before the premiere of this piece, Ligeti explains that "[…] The same musical idea is carried out in five totally different ways, and so I arrive at an articulation of the overall form." (Eulenburg, 1983 p. 107). What differs from one movement to the next is basically how the composer worked out the parameters of harmony and rhythm. Ligeti always referred to the timbre and texture variations as being strong structural tools. When he composed for smaller ensembles, such as the string quartet, timbre and texture were used differently from his previous orchestral works.

> I have developed the technic of very, very dense polyphonic structures. With the Second String Quartet I strove to do something different. I did so by modifying this technic, without abandoning it altogether. (Ligeti apud Satory, 1990, p. 105).

In his chamber-like music of the second half of the 1960's, György Ligeti harmony related to chromaticism to a great extent in the same way it did in his works from the beginning of the decade. However, he started to use small interval units suggesting passages of a more consonant sound and which contrast with the overall chromatic environment. The interval signs, as they were called by Ligeti himself, represented a very significant tool in his scheme of articulating the form. Octaves, tritones, major 2nd, minor 3rd and three-note whole tone chords served as strong components of timbre and texture transformations. (Power, 1995).

> In the Second String Quartet, there are chromatic pilings-up, even if these are not always clusters. There are various chord formations which I sought completely intuitively, just like Bartók in his Second String Quartet, or like Stravinsky in *Le Sacre*. They are rather complementary harmonies, but within chromaticism. (Ligeti apud Satory, 1990, p. 104).

The parameter of rhythm is also worked out differently in György Ligeti's String Quartet Nº2 from the methodology used in his previous orchestral pieces *Apparitions* and *Atmosphères*. The thick mass of textures present in *Atmosphères*, for example, is the result of a great amount of chromatically superposed cannons in which each one of the voices develops a distinct rhythmic configuration. In his String Quartet Nº 2, Ligeti gave each of the four string instruments distinct rhythmic figurations, thus obtaining an effect similar to that of *Atmosphères*' cannons. As a consequence of that, the note attacks happen in different parts of the beat ensuring that they never coincide. (Power, 1995).

At the end of the first movement from György Ligeti's String Quartet Nº 2, the six measure passage between mm. 79 and 84 forms a dense textural path resembling a chordal harmony progression. In chapter 3, this segment is compared with an excerpt from Igor Stravinsky's Firebird Suite. It also creates a very similar textural sounding result.

The Chamber Concerto

The Chamber Concerto (1969-70) was the summation of the technical skills György Ligeti had developed since composing *Atmosphères* (1961), his first orchestral composition of the decade. The four-movement piece resembles the static and continuum textural approaches, formed of clustered cannons, present in Atmosphères, *Requiem*, *Lux aeterna*, and *Lontano*. The piece also resembles the chromatic lines of the Cello Concerto (1966) and the String Quartet Nº 2 (1968). It contains, further, the mechanical features of the *Poème Symphonique* (1962), String Quartet Nº 2 and *Continuum* (1968). As Michael Searby acutely concluded, "[…] the first three

movements are related to the process in late 1960's works – for example Lontano (1967), Lux Aeterna (1966) and the Second String Quartet (1968)" (Searby, 1989). Searby also observes that the

> Chamber Concerto reflects one of Ligeti's recurrent obsessions: that of mechanics objects in general and clocks in particular – also seen in the *Poème Symphonique* (1962) for 100 metronomes, the third movement of the Second String Quartet, and *Continuum* for Harpsichord (1968). (Searby, 1989, p. 31).

Along with the four movements of the *Chamber Concerto,* György Ligeti made use of all the techniques he had acquired in his prior works. The composer had moved towards new concepts of harmony while rediscovering melodic content. "[…] in the Chamber Concerto Ligeti has experimented to a degree which was some distance from his mature language of the 1960's" (Searby, 1989, p. 34). In his book entitled Ligeti Beyond Avant-garde and Postmodernism, Constantin Floros addressed the Chamber Concerto's compositional novelties when he pointed that "[…] Ligeti experimented not only new procedures in polyphony and cluster formation but also with new kinds of harmony, timbre, melody instrumentation and rhythm." (Floros, 2014, p. 38). In his interview with Joseph Häusler in 1969, György Ligeti affirmed that

> Creating something that already exists is not interesting for me. If something new has been tried out and a result has emerged from it, it is not worth making the same experiment again. That would be like a schoolboy repeating the same school chemistry experiment at home – it is nothing but pottering. (Eulenburg, 1983, p. 94).

One of the most outstanding compositional procedures featured in the Chamber Concerto is the rediscovery of melody. Previously, melody had been obscured in Ligeti's complex textural surfaces. In the fourth movement of the Concerto, between mm. 24-29, twelve-tone melodies are played in the foreground by the piccolo and the French horn. Michel Searby wrote, "[…] These tone-rows are perhaps a reminiscence of the second Viennese School – perhaps a nostalgic yearning for a time of greater melodic freedom. (Searby, 1989, p. 33).

> In my orchestral piece of summer 1971, *Melodien*, the polyphony is no longer 'micro', yet the texture of this piece does not suggest a reversion to earlier technics. It can rather be seen as the logical outcome of micro-polyphony, though containing no micro-polyphonic movement in the literal sense of the word. (Ligeti apud Eulenburg, 1983, p. 137).

The next chapter will present a comparison between sections of *Presto*, the fourth movement of György Ligeti's Chamber Concerto and *Allegro Misterioso,* the third movement from Alban Berg's Lyric Suite.

Chapter 3

A COMPARISON OF EXCERPTS BY IGOR STRAVINSKY, ALBAN BERG, DMITRI SHOSTAKOVICH AND BÉLA BARTÓK TO EXCERPTS BY GYÖRGY LIGETI

This chapter presents the results of four comparative analyses. Segments taken from four selected pieces by György Ligeti are compared to segments taken from pieces by Igor Stravinsky, Alban Berg, Dmitri Shostakovich and Béla Bartók. All of the segments were selected through processes of auditory perception based on the principles of the stream segregation (Wright; Bregman, 1987). György Ligeti's excerpts were chosen because of their respective textural conditions of both static sounding masses and continuum layers of sound. After having selected excerpts from *Atmosphères*, String Quartet Nº 2, the Chamber Concerto and the Cello Concerto, the analyses were performed comparing these excerpts to carefully selected segments from composers György Ligeti claimed had influenced him. The excerpts which are compared to the ones by György Ligeti were chosen based on similarities in textural sounding conditions. The analyses are based on the characteristics of density and compression (Berry, 1987) and refer to parameters of instrumentation, expression, rhythm, melodic and harmony aspects allied to the conditions of static and/or continuous textural space.

3.1 Excerpts from Igor Stravinsky's Firebird Suite and György Ligeti's String Quartet Nº2

Igor Stravinsky received his first commission as a composer in December of 1909 at the age of 27. On January 29, 1909, a Russian talent agent named Sergei Diaghilev heard the composer's Scherzo Fantastique and was impressed. Diaghilev needed someone to write the music for his ballet company's presentation, The *Ballets Russes*, which was to be held the following year at a Paris art venue. After two unsuccessful attempts with composers Nicolai Tcherepnin and Anatoly Lyadov, Diaghilev hired Stravinsky, a newcomer, to create the music for the Firebird Ballet (Pople, 2003).

Stravinsky joined the creative team formed by Diaghilev, the choreographer Mikhail Fokine and the photographer Alexander Benois to assemble a ballet based on the Russian folk legends of the Firebird and the evil magician Kastchei. The composer created specific musical features or themes for each of the legend's characters, and used different registers to represent a human, a supernatural force and a Russian. Stravinsky used techniques he had learned from Rimsky-Korsakov, his former instructor between 1905 and 1908 (Gardner, 2013). The premiere

took place at the Paris Opera on June 25, 1910 and was an overwhelming success. Stravinsky was made famous overnight.

The music for the Firebird Ballet was conceived for a full orchestra, but Stravinsky created three different scores so the music could be performed without the ballet dancers. The first version of the Firebird Suite for Orchestra was written in 1911 by extracting suitable sections from the original ballet score and placing them into seven movements. In 1919, Stravinsky further reduced the form to five movements and included more music from the ballet version. Finally, the last version, compiled in 1945, was the complete Ballet Suite for Orchestra using all the written music (Pople, 2003).

3.1.1 The Berceuse

In the second and third scored versions of the Firebird Suite, the movement called Berceuse (Lullaby) comes just before the Finale. A slow moving layer of sound performed by the string section in the Berceuse represents the Firebird character singing to help King Kastchei fall asleep. Once he falls asleep, his soul can be killed and Prince Ivan can be released from the magic spell so he can then set Princess Tsarevna free. In the Berceuse movement, measures 159 through 164 will be analyzed. In these measures, the string section performs a sul tasto passage in a chordal progression which denotes a dense sounding textural path. The segment begins with a large vertical range from G5 to G1 on m.159 narrowing to G#3 to B4 in m. 164. See figure 8.

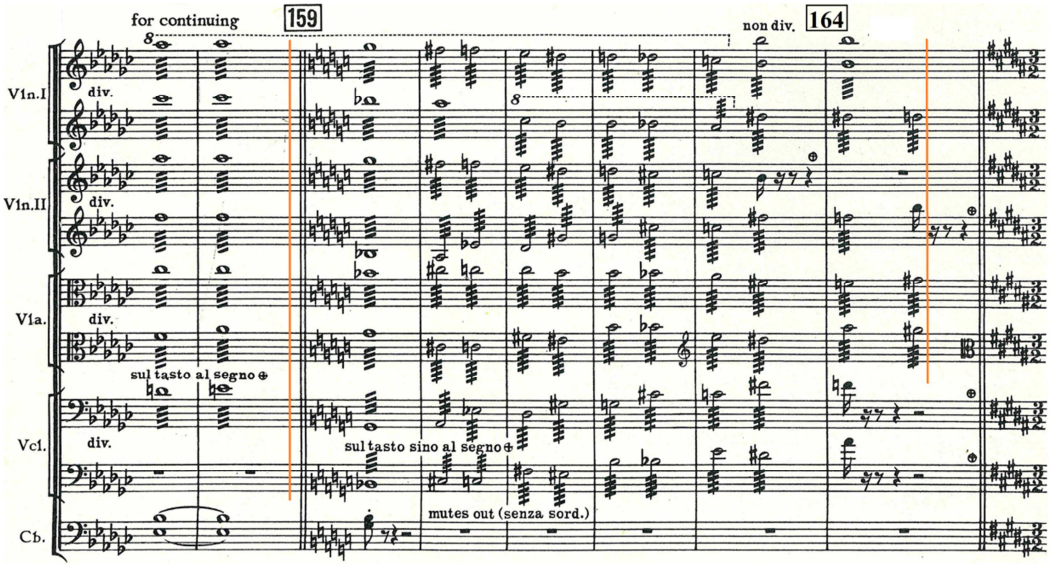

Figure 8 - Strings section on the last six measures of Firebird's Berceuse movement starting on m. 159.

3.1.2 György Ligeti's String Quartet Nº 2

> In my works from about 1966 onwards I began to thin out the dense polyphonic network: for example, in the second movement of the Cello Concerto, and even more radically in the works after 1968. The individual parts were still more or less subliminal, but now and again there emerged musical shapes at a level of the individually perceptible. Typical of this thinned-out micro-polyphony - now resembling the transparency of a drawing rather than the opaqueness of a painting - are the Second String Quartet (composed 1968) and the Chamber Concerto for thirteen players (composed 1969-1970). (Ligeti apud Power, 1995, p. 22-23).

Commissioned by J. K. S. and Südwestfunk Baden-Baden and written between March and July 1968, György Ligeti's String Quartet No 2 was dedicated to the La Salle Quartet which performed its premiere in Baden-Baden on December 14 1969. Ligeti stated in many interviews that the String Quartet No 2 was the composition which presented most of his conceptual ideas (Feraru, 2009). "[...] It is perhaps my Second Quartet which reflects my ideas most clearly – where you would find all the different techniques I have used." (Ligeti apud Satory, 1990, p. 101).

The music was conceived in a moment in which György Ligeti was concerned mostly in writing for chamber music and solo pieces. Besides the 2nd String Quartet, Ten Pieces for Wind Instruments (1968), Ramifications (1968-69), Chamber Concerto (1969-70) and the solo pieces Continuum (1968) for harpsichord, Harmonies (1967) and *Coulée* (1969) for pipe organ were all composed in that same three year period of 1968-70. This resulted in a transition from the massive textural features of a large ensemble such as Apparitions (1959-60) and Atmosphères (1961) to reduced ones of fewer instruments such as the String Quartet N° 2 and the Chamber Concerto (Vitale, 2012). As a consequence of those new timbre textural environments, other aspects of Ligeti's music were also treated differently once the composer abandoned the stands of rhythm and harmony neutrality returning to work with those parameters in other conditions. "[…] and then I began to look for a new kind of harmonic system … I am searching for new rhythmic configurations as well." (Ligeti apud Satory, 1990, p. 108). The composer found a solution creating states in which harmonic transformations would occur. He made use of interval signs including octave dyads, tritones, major seconds, minor thirds and/or tri-chords of whole tones. Working with electronic music and studying the scores of Pierre Boulez, Karlheinz Stockhausen and Olivier Messiaen helped György Ligeti to construct rhythms without metric regulation. These constructions allowed the composer to prevent using the beat as reference (Power, 1995).

The five movements of the String Quartet Nº 2 were crafted with the same kind of musical material. They were, however, treated with different types of motion and articulation, as Marina Lobanova commented: "[…] the five movements of the work can be compared to five different views of the same object." (2002 apud Feraru, 2009, p. 227). As a composition, the String Quartet Nº 2's relation to the tradition of string quartet writing is remarkable. At the same time that György Ligeti had to deal with harmony and rhythm with smaller groups of instruments, references to the past were used as the foundation for developing newer schemes within the composer's conceptual framework (Temes, 2012). This was done not by implementing ideas through connecting compositional strategies from the past, but rather by using the past strategies and ideas as prime matter to develop his current writing purposes (Feraru, 2009).

3.1.3 György Ligeti's String Quartet Nº 2 *Allegro Nervoso*

> Movement I is a study in Ligeti's 'splintered type' of form. Several contrasting textural states are abruptly juxtaposed with each other, establishing an expectation for disruptions, but still surprising the listener since these changes occur at unexpected moments. (Power, 1995, p. 41).

In most of György Ligeti's works from the 1960's, the music was structured around the opposition of two different musical types of form or motion. The first type, found in compositions such as Apparitions (1959-60) and Atmosphères (1961), is known as static or stationary, this refers to the gradual transformation of musical material in which resulting textural weavings from dense superposition of cannons move gently from one state to another. The second type is called splintered and is present in the later 1960's pieces *Aventures* (1962)*, Nouvelles Aventures* (1962-65) and the Requiem's *Dies Irae* (1966). In these pieces, abrupt changes occur throughout the progression of the music (Power, 1995). The first movement of György Ligeti's String Quartet Nº2 - *Allegro Nervoso* - represents an extensive example of a splintered type of structural form due to the contrast existing between the sections. Parts that might evoke the static clusters with legato harmonics and low dynamics are abruptly superseded by others that, according to the composer's description might be understood as "[…] a frantic, tormented quality of sound which may seem like a disorderly, wild gesticulation, haphazard and completely uncontrolled…" (1983 apud Power, 1995, p. 24).

The beginning of the first movement of String Quartet N° 2 clearly demonstrates the splintered form. It starts with eight to ten seconds of silence which ends abruptly with the entrance of the 1st violin, viola and cello performing a three note pizzicato chord. The 2nd violin

simultaneously enters with a *ppp* harmonic E4 tremolo bowing. From m. 5 onwards, rhythmic figurations in the four instruments, also using tremolo harmonics, expand to a cluster formation with some internal changes. The music progresses through m.14. In m. 15, the sudden change to *prestissimo sfrenato fortississimo* creates intense movement among the voices which lasts until m. 18. Another abrupt change occurs in m. 19 with the beginning of a new section and the cello and viola whole notes. See figure 9 and 10 for the first nineteen measures of the piece.

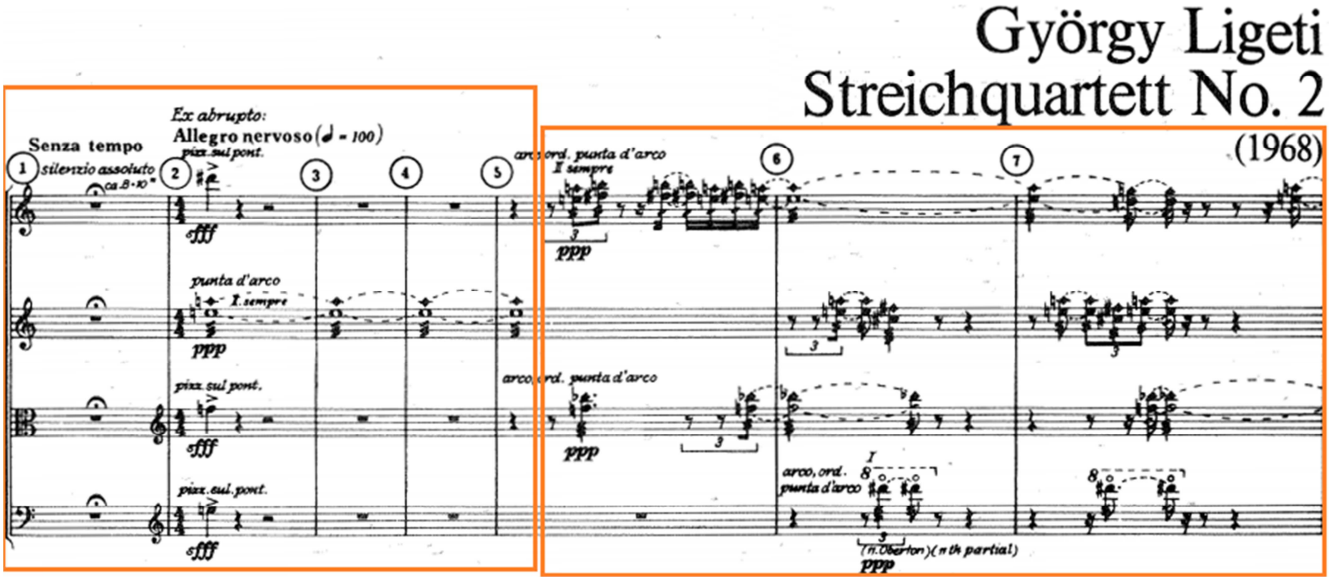

Figure 9 - First 7 measures of György Ligeti's String Quartet Nº 2.

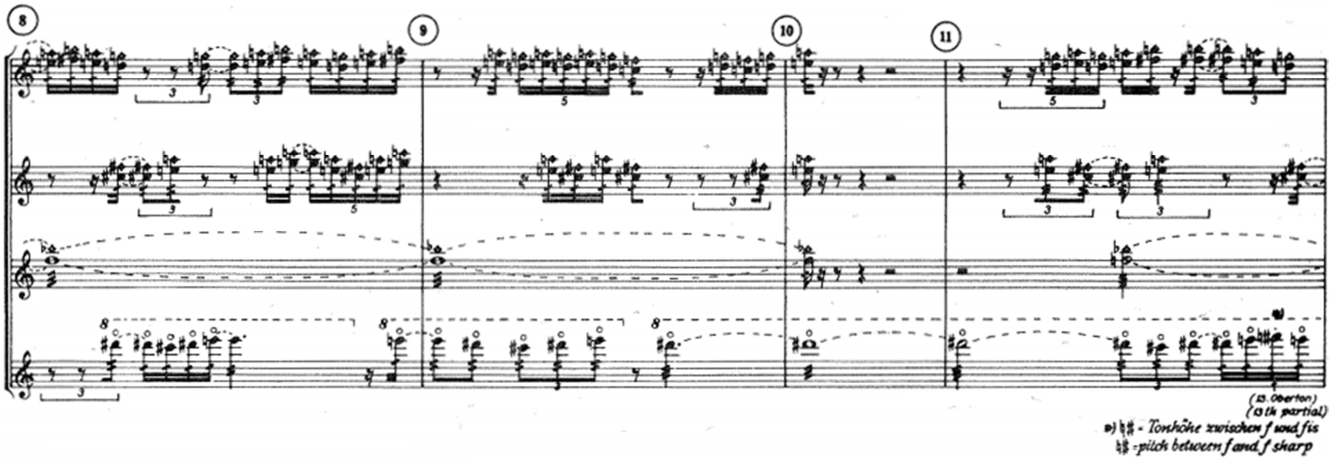

Figure 10 - Measures 8 to 19 of the beginning on Ligeti's String Quartet N° 2.

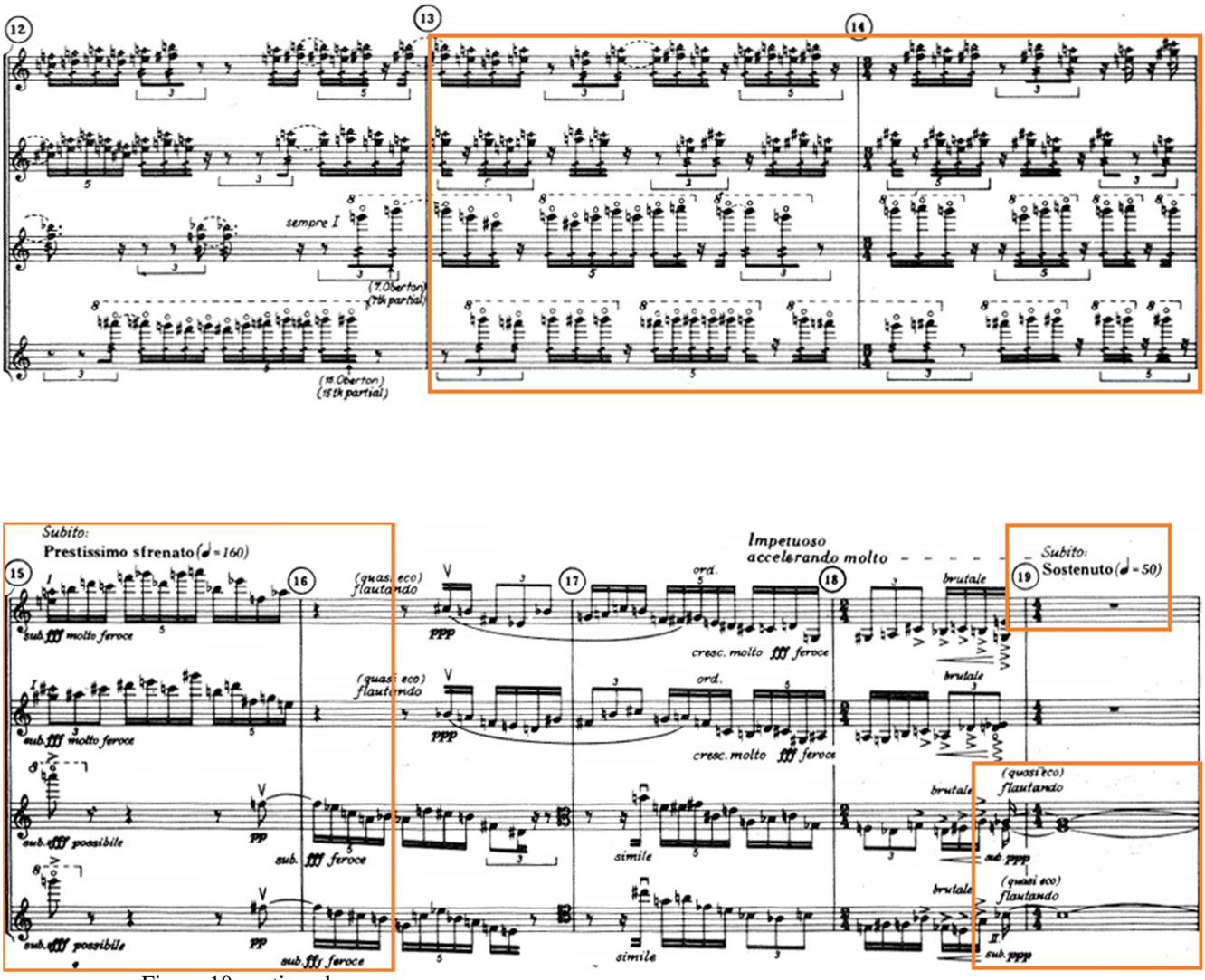

Figure 10 continued.

The use of chromatic lines, a remarkable feature of the string quartet, happens in various passages of the *Allegro Nervoso*, even when there is the use of octave displacement (Searby, 1997). When questioned about the harmonic content of the 2nd String Quartet during an interview with Stephen Satory, Ligeti replied "[…] Concerning chromaticism, there is an even distribution of the twelve notes, but without twelve-note rows." (Ligeti apud Satory, 1990, p. 102). In the second half of m.79 near to the end of the first movement, a pianissimo and *sul tasto* harmonic formation with tremolo bowing remains static until the end of m. 80. The cello has a double stop major 6th interval between E1 and C#2, the viola plays an A#2, the 2nd violin has an F#3 and the 1st violin a C4. That configures a vertical axis pitch range of two octaves and a minor 6th between the C4 in the 1st violin and E1 in the cello. On the 1st beat of m. 81, the three lower

voices start a chromatic homodirectional upward motion with note attacks occurring over different parts of the beat. The four beats of each measure are subdivided in groups of 8th notes, 8th note triplets, 16th notes, quintuplets and 16th sextuplets. On the 1st beat of m. 82, the 1st violin descends from C4 to B3 compounding a linear motion in which the three upper voices move by semitone downwards while the two voices on the cello ascend chromatically. The result is a shortening of the vertical range to a major 3rd on the 3rd beat of m. 84 with the superposition of F#2 in the viola, G#2 in the 2nd violin, A2 in the 1st violin and Bb2 in the cello. See figure 11 and 12.

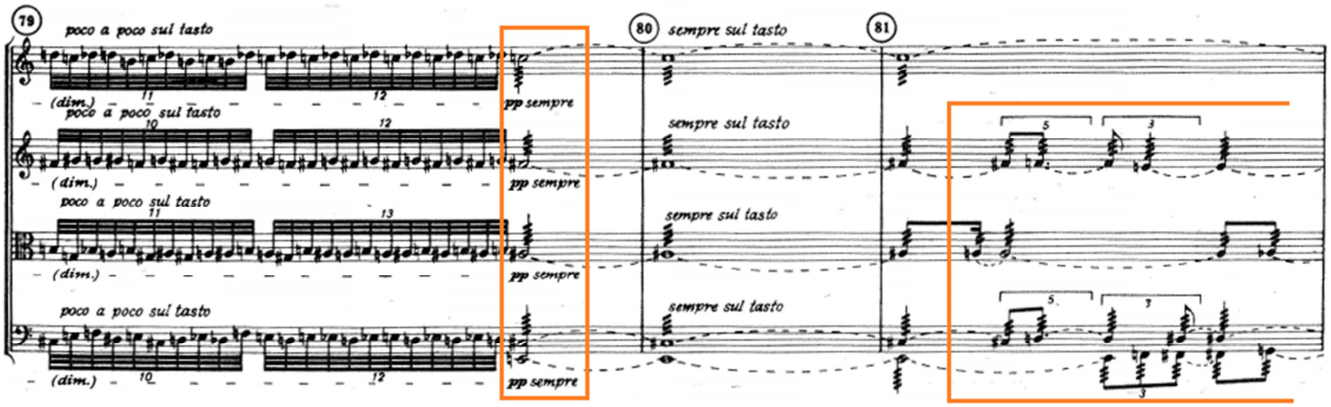

Figure 11- Ligeti's String Quartet N°2 Allegro Nervoso movement mm. 79 to 81.

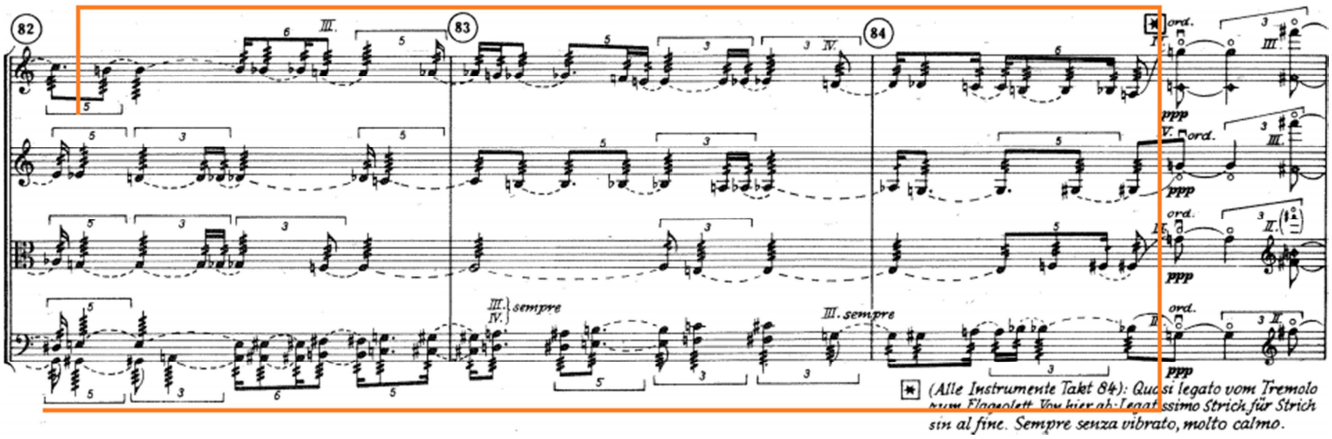

Figure 12 - Ligeti's String Quartet N°2, Allegro Nervoso, mm. 82 to 84.

3.1.4 Comparative analysis

Heterodirectional motion and range shortening

Starting on m.159, the Firebird Suite excerpt shows a vertical axis range extending from G5 to G1 and narrowing to a compound minor third between B4 to G#3 at the end of the segment on m. 164. The shortening of the range space is due to heterodirectional motion among the voices. Although the 1st violin I and 1st violin II parts are homodirectional from the starting point until m. 163, the remaining voices, despite being individually contradirectional, denote an overall heterodirectionality. The upper voices move downwards while the lower ones move upwards. See figure 13.[6]

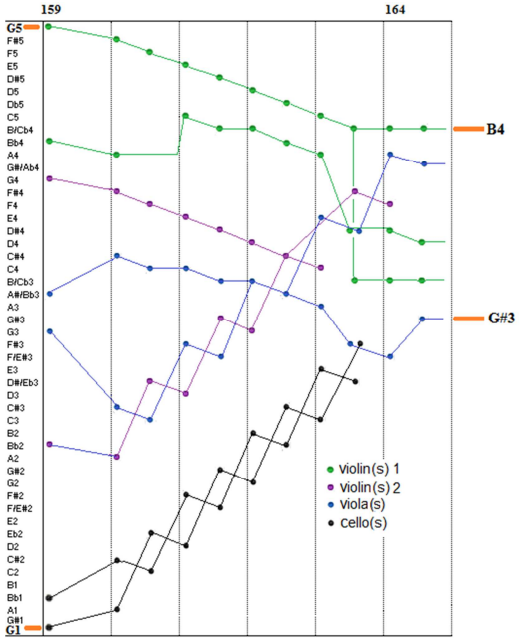

Figure 13 - End of Firebird's Berceuse movement pitch range between m.159 to m.164.

Ligeti's passage shows a large pitch range starting on the 2nd half of m.79 covering from C4 to E1. The heterodirectional motion of the voices from m. 81 to the end of the segment, with the upper voices (violins and viola) predominantly moving downwards while the two lines on the cello progress in the opposite direction, result in the narrowing of the range between Bb2 and Gb2 on the 3rd beat of m.84, similar to what appears on Stravinsky's segment. See figure 14.

[6]The two contrabass staccato 8th notes, Bb1 and G1, on the 1st beat of m. 159 have not been considered.

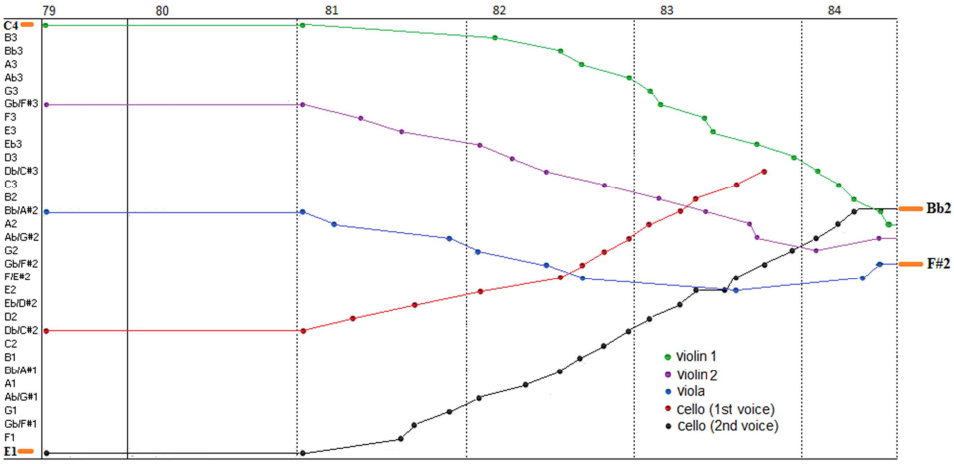

Figure 14 - Segment from the 3rd beat of m. 79 to 3rd beat of m. 84 in Ligeti's 2nd String Quartet, 1st movement.

Rhythmic aspects

The displacement of the voices in the excerpt from Firebird is a demonstration of homorhythmic chordal progression and creates a continuous thick layer of sound. It starts with a whole note in each voice on measure 159. This is followed by two half notes per voice in the remaining measures, with the exception of the 2nd violin I voice in m. 160. See figure 15.

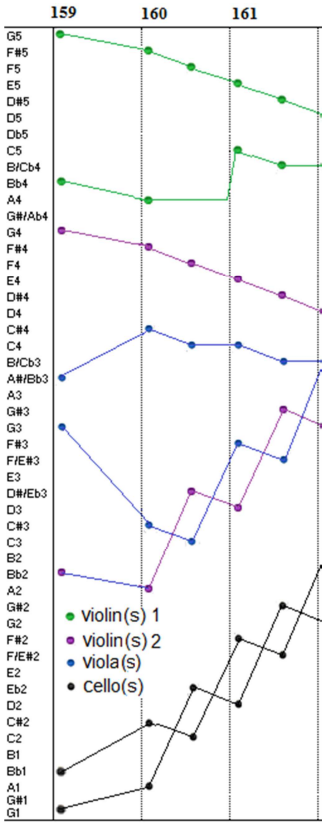

Figure 15 - Rhythm figures in the beginning of the excerpt from Stravinsky.

Ligeti's 2nd Quartet segment also presents homorhythmic displacement of the voices from its starting point until m. 81. From the second beat of m. 81, each voice performs note attacks on different parts of the beat within rhythmic subdivisions in groups of 8th notes, 8th note triplets, 16th notes, quintuplets and 16th note sextuplets. The five voices run heterorhythmically and contraintervallically. This produces a dense and layered texture, denoting a chordal passage. See figures 16 and 17.

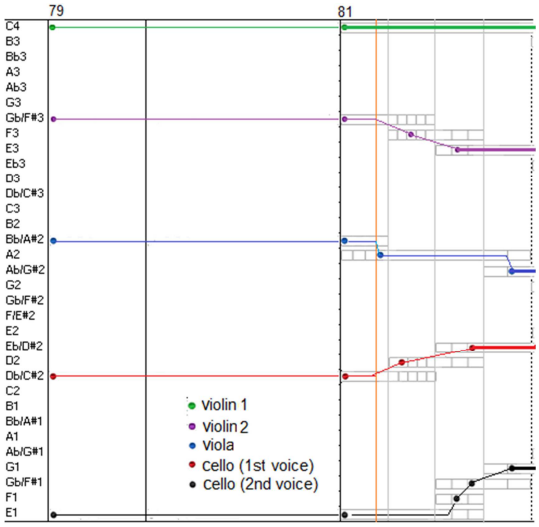

Figure 16 - Sustained chord from 3rd beat of m. 179 up to the 1st beat of m. 81in Ligeti's excerpt.

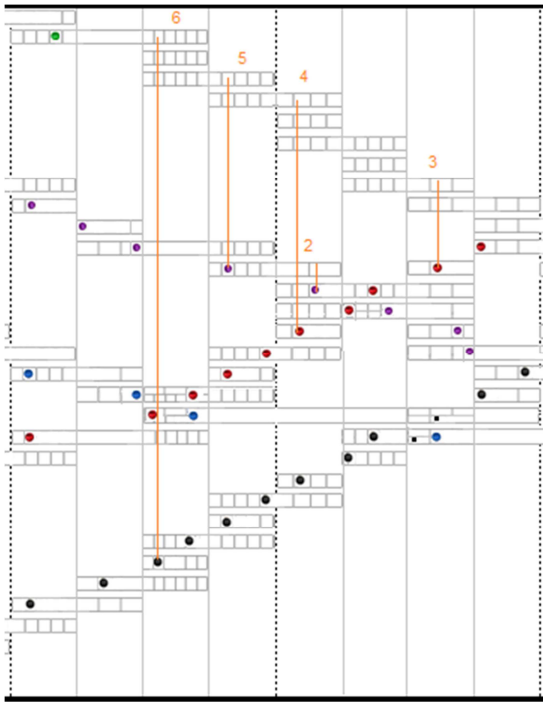

Figure 17- Note attacks on different parts of the beat from m.81 to m. 84.

Chromatic content

Heterointervallic interdependence appears between the lines in the Firebird Suite's segment with the upper voices running simultaneously and chromatically downwards as the remaining voices run diatonically and in accordance with the harmonic organization. See figures 18, 19, 20 and 21.

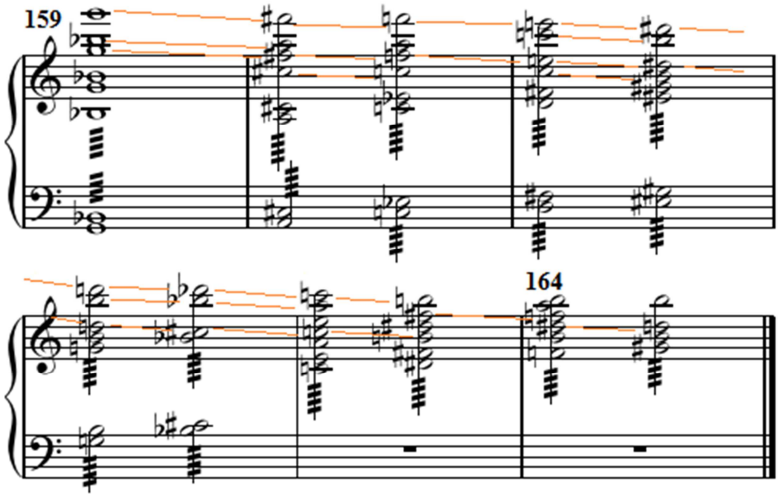

Figure 18 - Upper voices descending chromatically mm. 159 to 164 on Stravinsky's segment.

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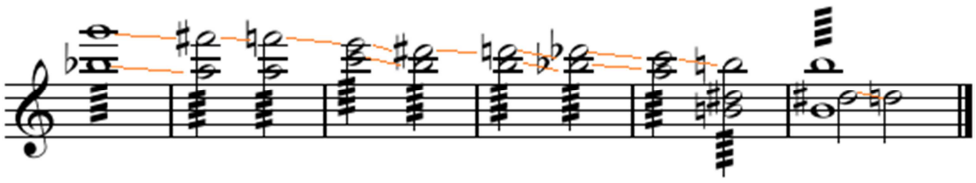

Figure 19 - 1st violins descending chromatically.

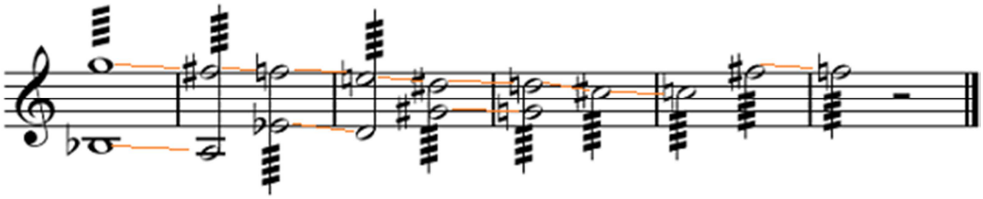

Figure 20 - 2nd violins descending chromacticaly.

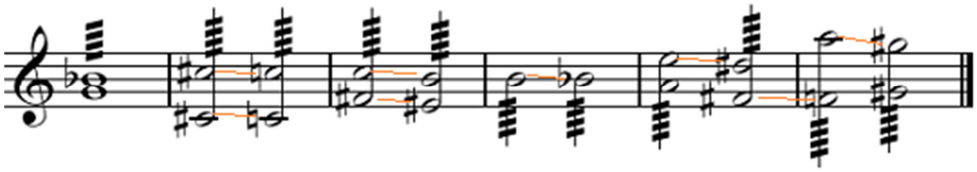

Figure 21 - Heterodirectional chromatic motion of the Violas.

Although not chromatic, Stravinsky's segment presents upward motion in the cello voices which enhances an overall chromatic environement with a dense textural result. See figure 22.

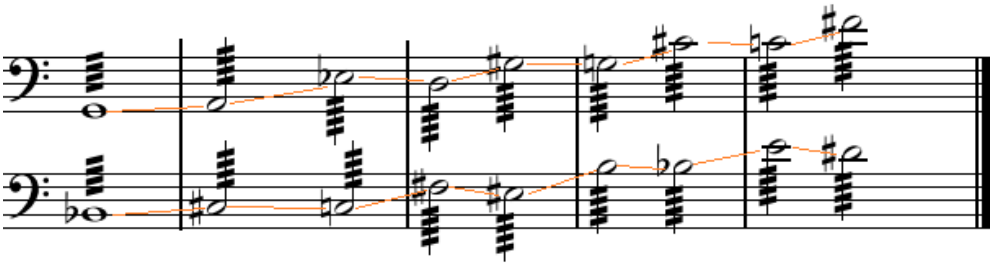

Figure 22 - Cello lines with upward movement on Stravinsky's segment.

Ligeti's *Allegro Nervoso* segment presents chromatic displacement in five voices starting from the 1st beat of m. 81 up to m. 84. The upper strings move downward while the cello voices move upward. The resulting path resembles a dense textural layer of sound. See Figures 23, 24, 25 and 26.

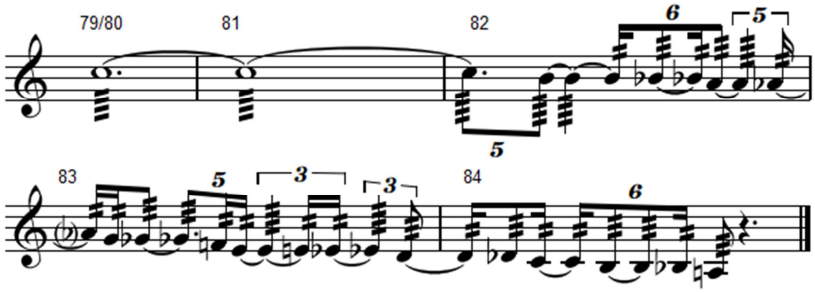

Figure 23 - Downwards chromatic displacement of the 1st violin in Ligeti's segment.

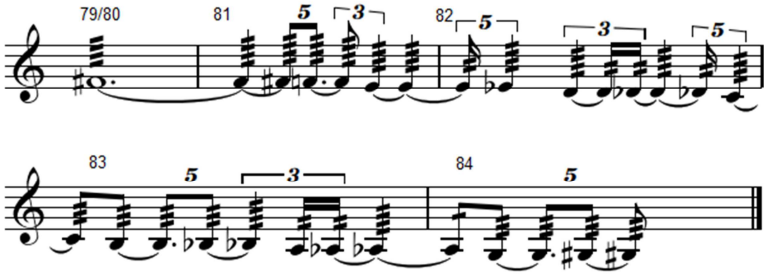

Figure 24 - Downwards chromatic displacement of the 2st violin line.

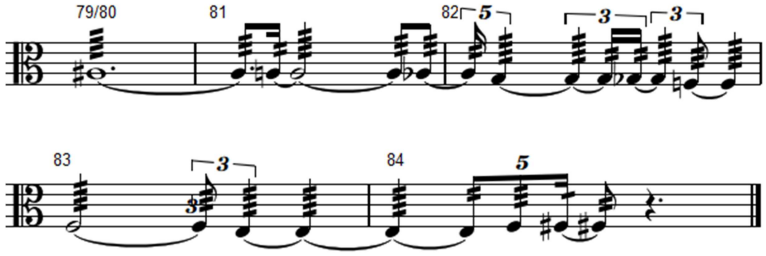

Figure 25 - Downwards chromatic displacement of the viola in Ligeti's segment.

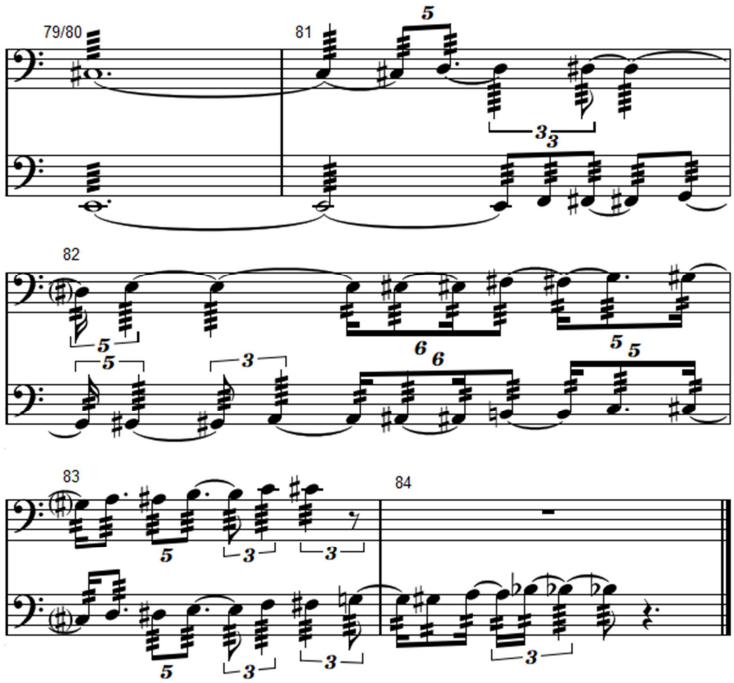

Figure 26 - Cello parts moving chromatically upwards in Ligeti's segment.

Harmonic comparison

The homorhythmic alignment of the voices in Stravinsky's excerpt demonstrates a diatonic chord progression and is analyzed as follows. See Figure 27.

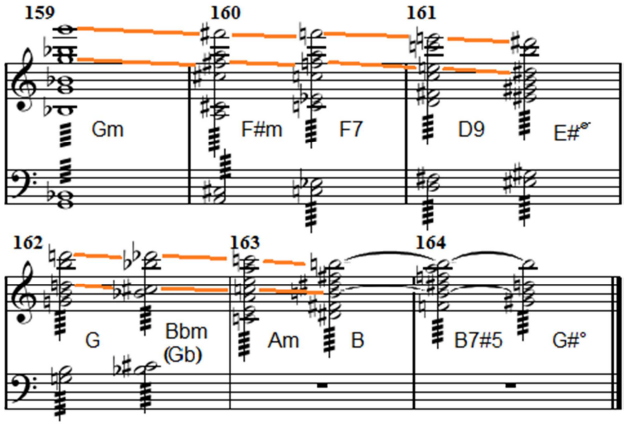

Figure 27 - Diatonic chord progression in the Firebird excerpt.

In Ligeti's segment, some of the voices' vertical alignment resembles diatonic block chords. The voices also obey chromatic heterodirectional motion. In a 4/4 time signature, a quarter note will sound for a little less than a second when the metronome mark is 66 bpm. From the 2nd half of m.79 until the 3rd beat of m. 82, five different block chords are identifiable.[7]

[7] These block chords may be seen in their original sequence in Figures 11, 12 and 14.

Despite the shortness of length in each vertical formation, the segment denotes an evident diatonic chord progression for about twelve seconds.[8]

The first block chord is formed on the 3rd beat of m.79 and lasts for about six seconds. It is analyzed as an F# major with the flat fifth over E. See Figure 28.

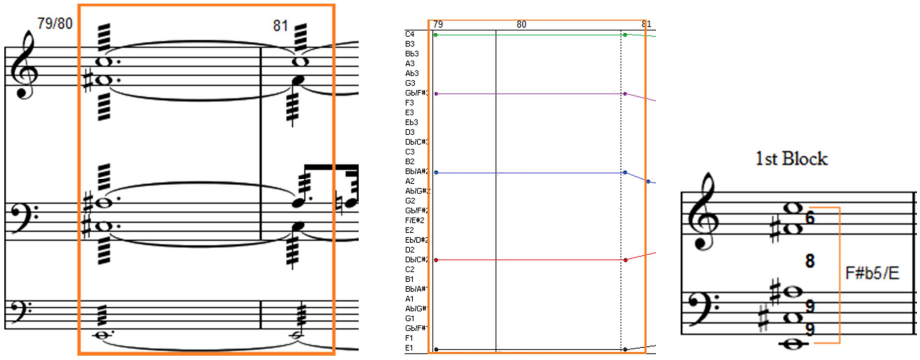

Figure 28 - Block chord F#(b5)/E formed in m.79 of Ligeti's excerpt.

On the 2nd beat of m.81, the viola descends from A#2 to A2, the 1st violin descends from F#3 to F3 and the cello goes up a half step from C#2 to D2. This forms a second chord which is analyzed as a D minor seventh over an E. See figure 29.

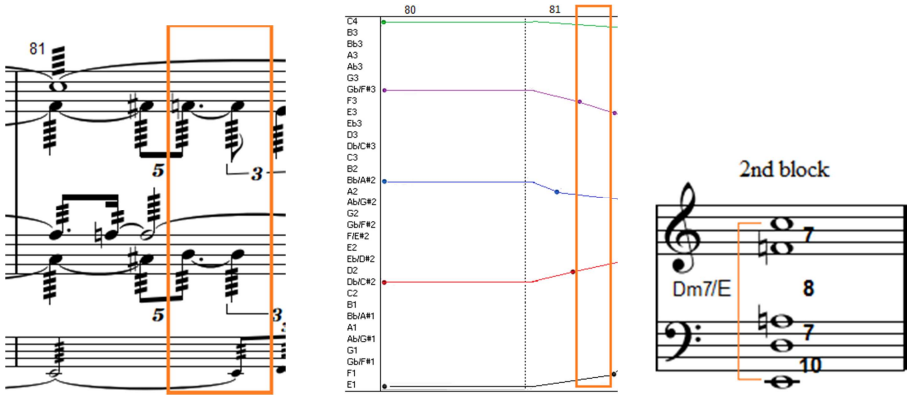

Figure 29 - Dm7/E block chord on 2nd beat of m. 81.

Starting on the last beat of m.81, another block chord occurs as the viola descends from A3 to Ab3 and the bottom voice of the cello ascends a half step from F#1 to G1. The result of this superposition of intervals does not indicate a specific type of chord. See figure 30.

[8] The distances among the voices are numbered in half steps.

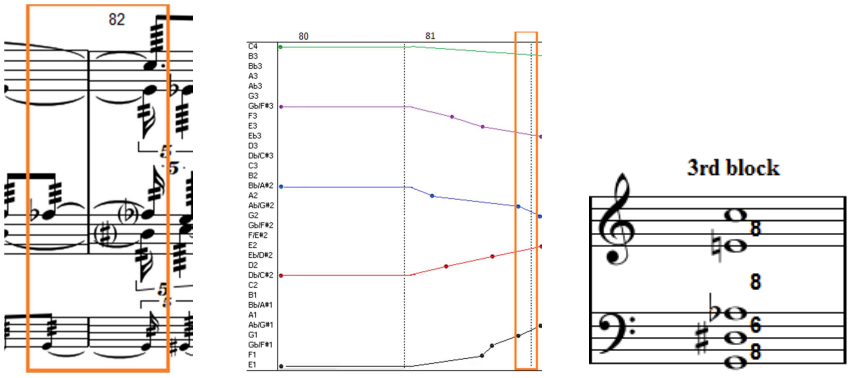

Figure 30 - Block chord formed between mm. 81 and 82.

The fourth block chord is formed when the 2nd violin descends from E3 to Eb3, the viola descends from Ab2 to G2, the upper voice of the cello ascends from D#2 to E2, the bottom voice of the cello ascends from G1 to G#1 and the 1st violin descends from C4 to B3. As before, the combination of intervals in this example fails to indicate a definite chord type as well. See in figure 31.

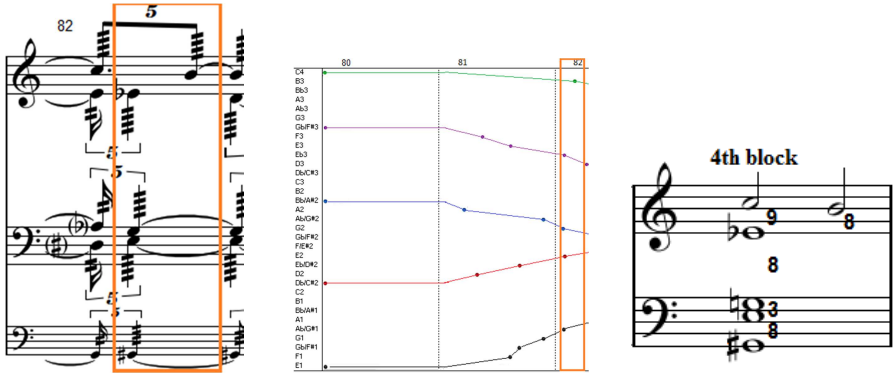

Figure 31 - Block chord in m. 82.

The last block chord appears before the voice motion becomes too intense on the 2nd beat of m.82. However, once again, it is not a recognizeble chord type. See figure 32.

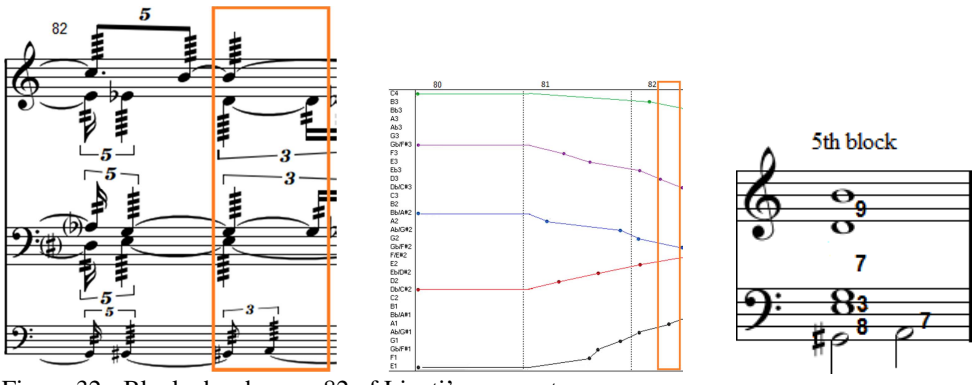

Figure 32 - Block chord on m. 82 of Ligeti's segment.

The resulting sounds of both excerpts are quite alike, due to the similarities in instrumentation, dynamics, tremolo articulations, harmonic features and chromatic movements of the voices. The overall sonority is determined by the similarity of the textural conditions in the sound field. Those conditions include the use of strings with parallel articulations, voice motion with heterodirectional character, high density and compression levels, and a large vertical axis at the beginning which narrows towards the end.

In the segment of the String Quartet Nº2, György Ligeti achieved a continuous sounding texture with note attacks on different parts of the beats, some vertical alignments indicating chordal formations and the prevalence of chromatic heterodirectional motion of the voices. Igor Stravinsky's Firebird Suite segment also demonstrates heterodirectional voice motion, a great deal of chromaticism, and a homorhythmic diatonic progression. In spite of having been composed over 50 years apart with differing compositional procedures, both segments show very similar sonorous results.

See audio score on DVD, track 01.

3.2 Alban Berg's *Allegro Misterioso* and György Ligeti's Presto Movement

> Speaking of music and language: among the most conspicuous characters of Ligeti's music is that of whispering (bisbigliando). Whispering or whisper-like passages and effects occur repeatedly in the most diverse shadings in both vocal and instrumental works. There is, for example, … or the fourth movement of the Chamber Concerto, which commences with whisper-like passages. Some characteristics of Ligeti's whispering/ murmuring music are note sequences to be played very fast, mostly small-stepped diastematics, an even rhythm, pianissimo and legato articulation. He evidently received a sustained impression from the Allegro Misterioso of Alban Berg's Lyric Suite – a famous movement, whose flurry-like tonal character evokes associations with whispering. (Floros, 2014, p.43).

3.2.1 Alban Berg's Lyric Suite

Alban Berg wrote his first extended twelve-tone piece, his Lyric Suite, between September 1925 and October 1926. This was one and a half years after Arnold Schoenberg announced his dodecaphonic discoveries. Alban Berg publicly explained the workings of and plans for his composition, a programmatic composition, but kept his real compositional motives secret. All of the secret planning that Alban Berg did for his programmatic composition was related to a personal affair that Alban Berg had with Hanna Fuchs-Robetin (Perle, 1977). The secret planning, or program, for his twelve-tone piece became public in 1976 after the composer

George Perle discovered an annotated score which had been given to Mrs. Fuchs-Robetin by Alban Berg himself and which contained all of the details (Ashby, 2008).

Although the Lyric Suite was the first Alban Berg's twelve-tone endeavor, the composition does not adhere entirely to the dodecaphonic technique. Only the 1st and 6th movements obey a completely twelve-tone orientation. The 2nd and 4th movements are atonally composed. The 3rd movement – *Allegro Misterioso* – is based on twelve-tone sets, despite the enclosed free trio. The 5th movement is freely written, but contains a twelve-tone section (Ashby, 2008; Green, 1977).

The twelve-tone set in the *Allegro Misterioso* movement is retrograded from the set present in the Lyric Suite's 1st movement and transposed a half step below with two pitches which changed places. The original set in the 1st movement encloses [F, E, C, A, G, D, Ab, Db, Eb, Gb, Bb and B]. After a brief one measure introduction, the movement starts with the set [Bb, A, F, B, C, G, Db, Gb, Ab, D, Eb, and E]. In order to represent an accurate transposition of the retrograde transposed row, the 4th pitch should be a D note instead of the permutated B which would take the 10th place in the row. This permutation of pitch position in the set occurred in order to have the notes Bb, A, F and B occupying the 1st group in the row. This was not by a chance. Using the German notation, Bb is written as B. B natural is noted as H. Given that, the sequence of the four initial pitches re-notated as B A F H become the initials for Berg, Alban and Fuchs, Hanna (Green, 1977). See figure 33.

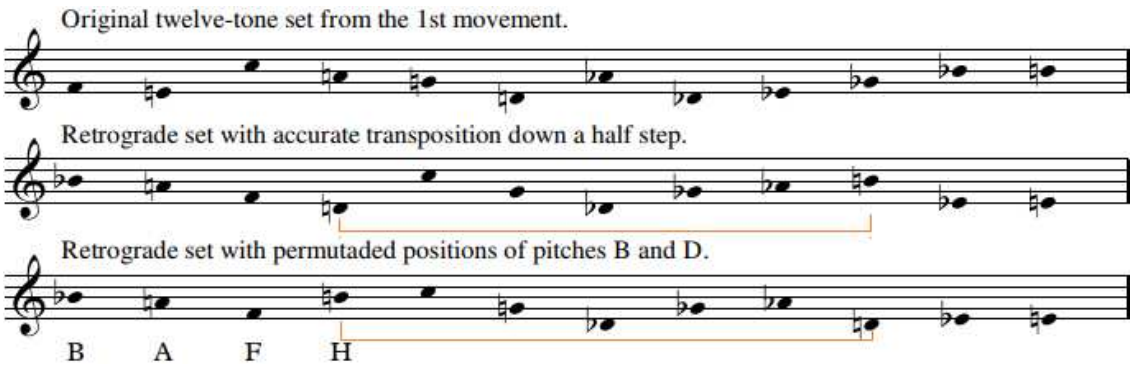

Figure 33 - Original twelve-tone row, retrograde and retrograde with permutations.

The original twelve-tone set of the 1st Movement is first presented by the Violin I between 2nd and 4th measures, see Figures 34 and 35.

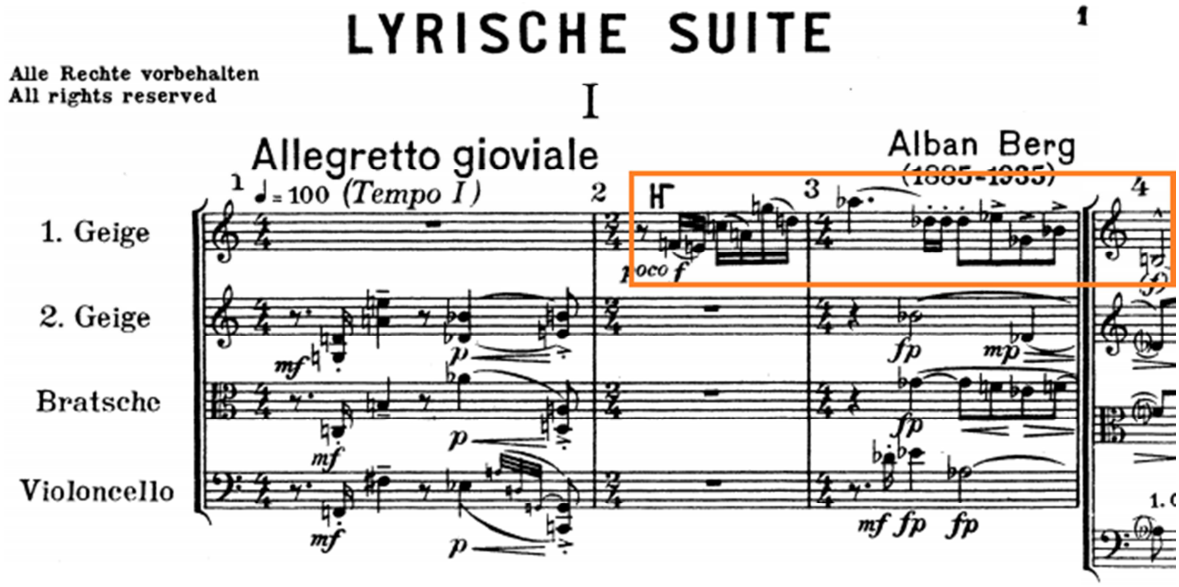

Figure 34 - Introduction to the Lyric Suite's 1st movement.

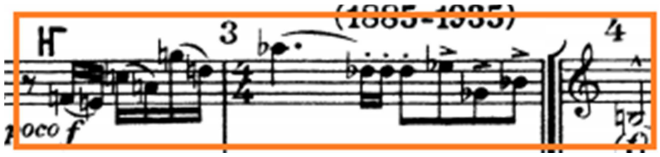

Figure 35 - Original set from the Lyric Suite's 1st movement.

3.2.2 Allegro Misterioso

In the very beginning of the *Allegro Misterioso,* Violin I, Violin II and Viola play alternate phrases with the notes Bb (B in German), A, F and B natural (H in German) in 16th note groups. This precedes the retrograde, transposed and permutated twelve-tone set in m. 2 played by Violin I. See Figure 36.

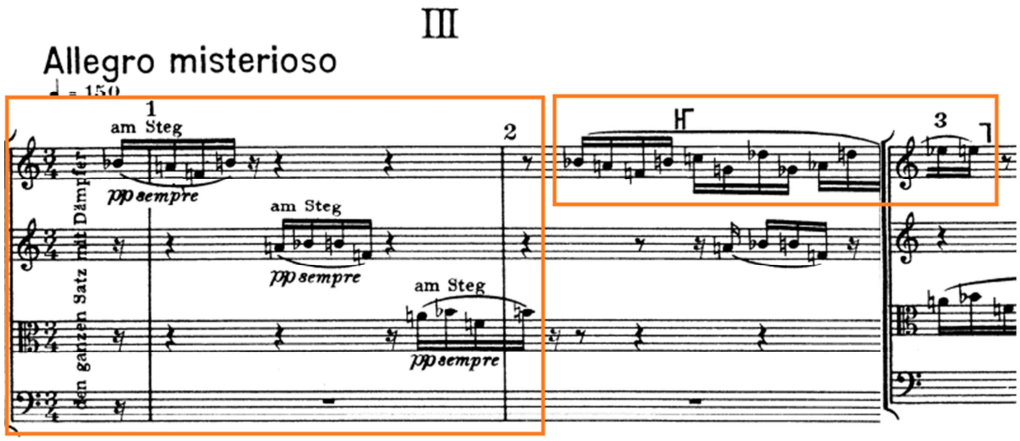

Figure 36 - Introduction to the Allegro Misterioso movement.

Between measures 45 and 66, an intense four voiced twelve-tone cannon uses retrograde, inverted and transposed versions of the Allegro Misterioso twelve-tone set to create a textural layer that is a continuous mass of sound. The rhythmic and melodic development results in a uniform shape and the four voices perform a dense line moving concurrently from a lower to a higher register. The contrapuntal homorhythmic character of the overlapping cannons makes it impossible to hear each note distinctively, as does the 9/16 time signature, where the dotted 8th note equals 200 bpm and a measure with nine 16th notes sounds for a mere second. In the 16th note homorhythmic motion of the cannons, the four voices together resemble a single thick layer of sound. The superposition of the several twelve-tone sets establishes a highly compressed sounding structure, in an almost fully chromatic environment (Berry, 1987). Nonetheless, some passages among the twelve-tone rows are performed *col legno battuto* and articulated *martellato* instead of *col legno tratto* and *legato.* This differentiation denotes a contrast within the excerpt. A total of 46 cannons spread among 21 measures are variations of the *Allegro Misterioso* original twelve-tone set and they compose a densely occupied textural space. See figure 37 and 38.

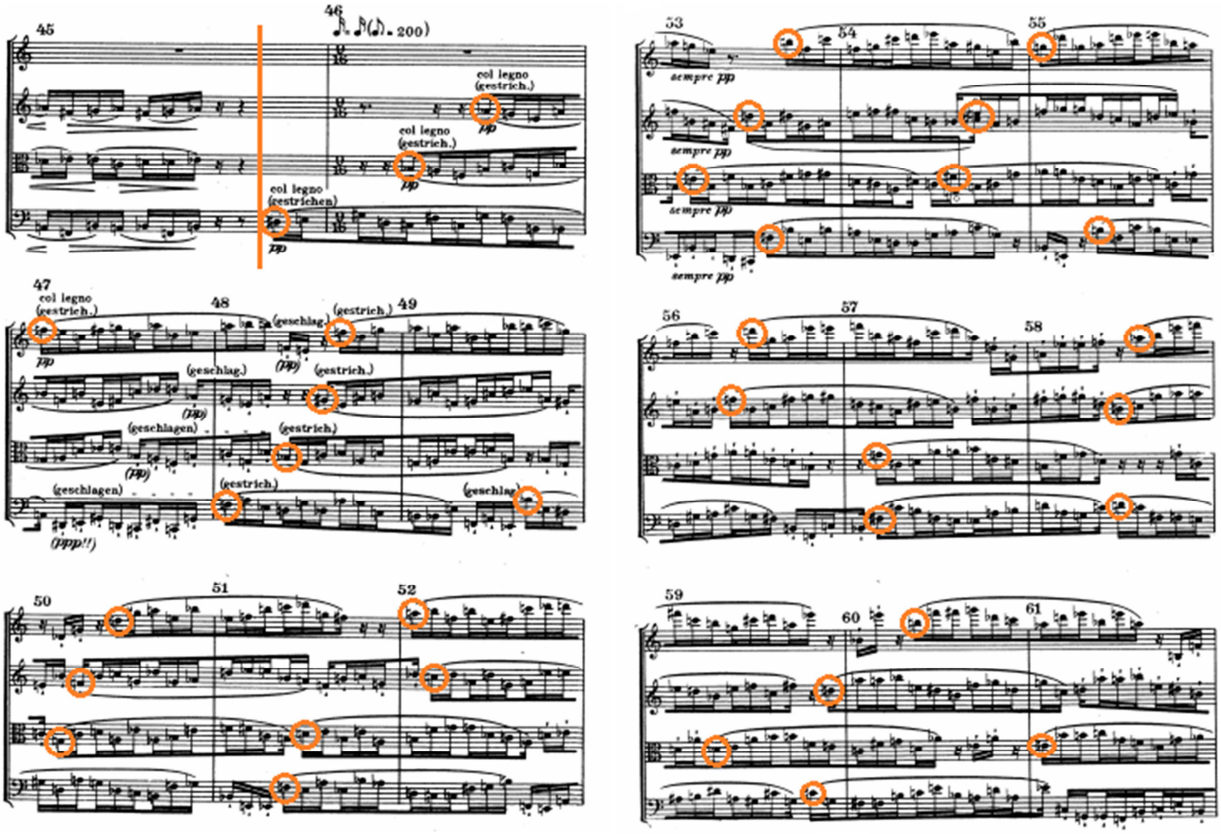

Figure 37 - Allegro Misterioso cannons between mm. 45 and 61.

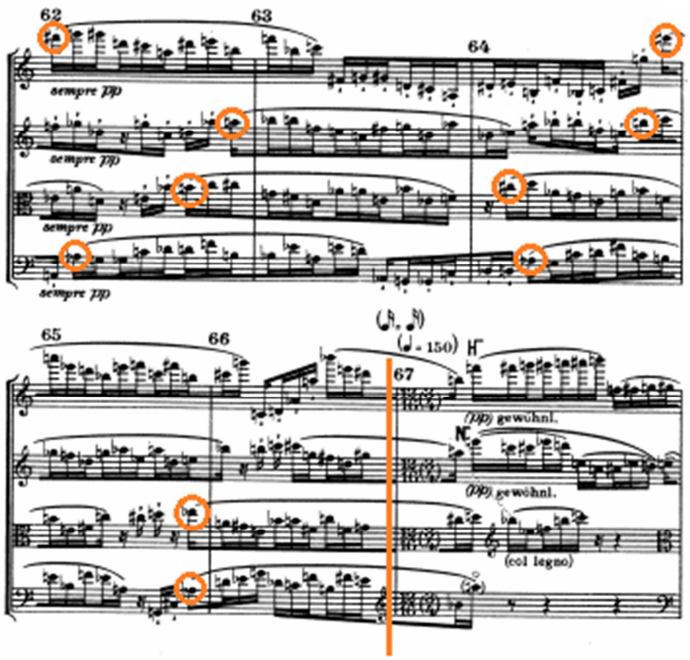

Figure 38 - Allegro Misterioso cannons between mm. 62 and 66.

3.2.3 György Ligeti's Chamber Concerto

Composed between 1969 and 1970, György Ligeti's Chamber Concerto is a four movement piece written for thirteen instrumentalists. The work was commissioned by the Berlin Festival 1970 and dedicated to the Austrian composer Friedrich Cerha, who conducted its premiere on October 1st 1970 with the *Die Reihe* ensemble. The first three movements of the Chamber Concerto are clearly related to the Ligeti's compositions from the second half of the 1960's, including Lontano (1967), Lux aeterna (1966) and the 2nd String Quartet (1968). Those pieces are examples of cluster mass texture as the result of the overlapping cannons. This technique is very common in the composer's work in the period. Only the fourth movement – *Presto* – is constructed with a different approach and a slight recovery of the melodic content (Searby, 1989).

At letter 'W' between mm. 42 and 45, the string section presents an intense chromatic passage among the four voices with a metronome marking of a quarter note equal to 80 bpm. The excerpt shows each one of the voices performing intervals of a 5th and a 6th ascending chromatically in vertically superposed groups of septuplets, 32nd notes and nonuplets. See Figure 39.

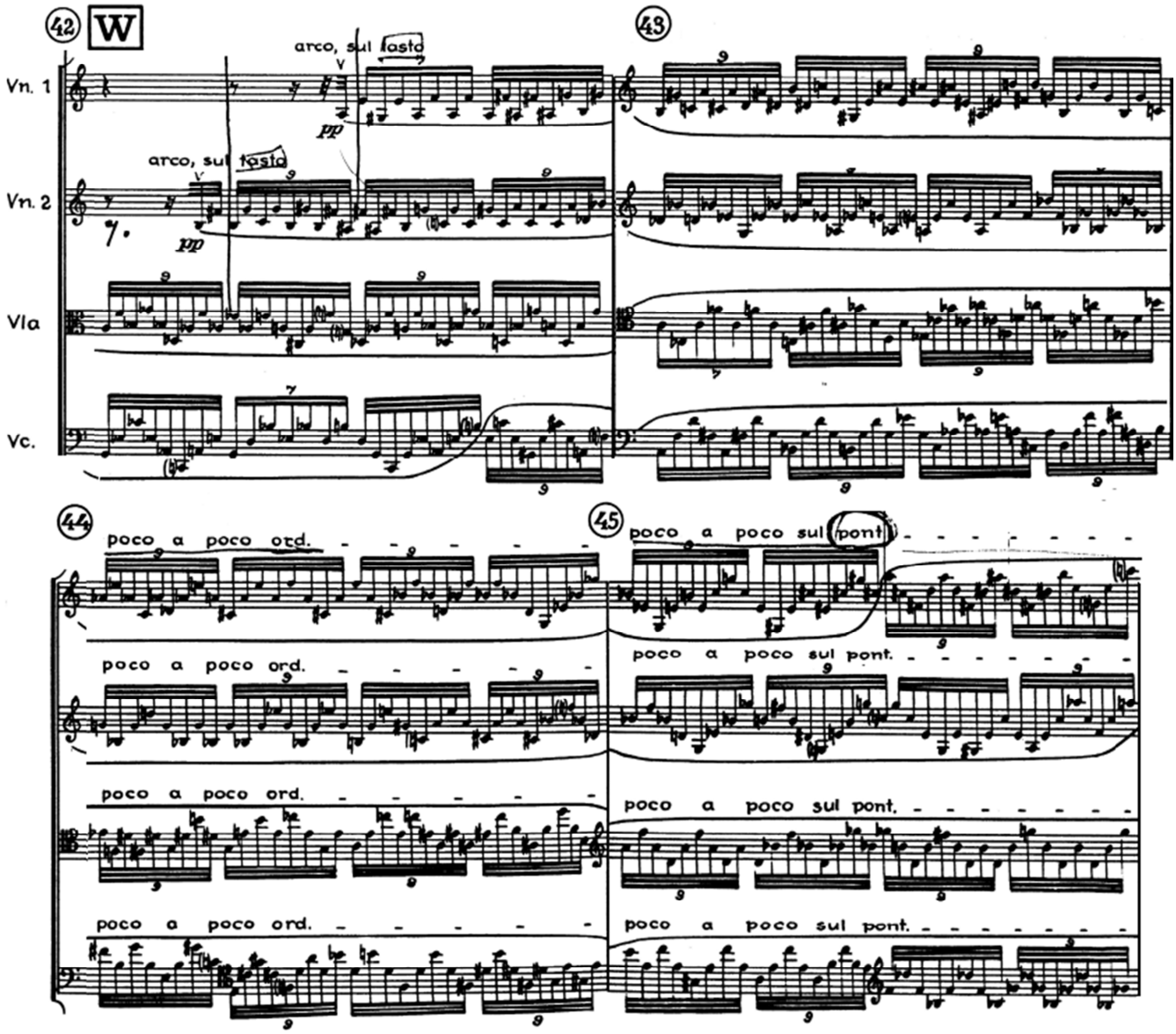

Figure 39 - Presto movement of Ligeti's Chamber Concerto mm. 42 and 45.

In a 4/4 time signature with the metronome marking at 80 bpm, each beat of the measure sounds for about 1.3 seconds. Under those conditions, it is impossible to distinguish between the individual pitches of the four instruments. This causes the perception that the created sound is one single line moving upward. Additionally, each of the parts in Ligeti's composition makes use of large interval leaps which create few different chromatic lines denoting a compound melody structure within each instrument (Dawson, 1986; Berry, 1987). See figure 40.

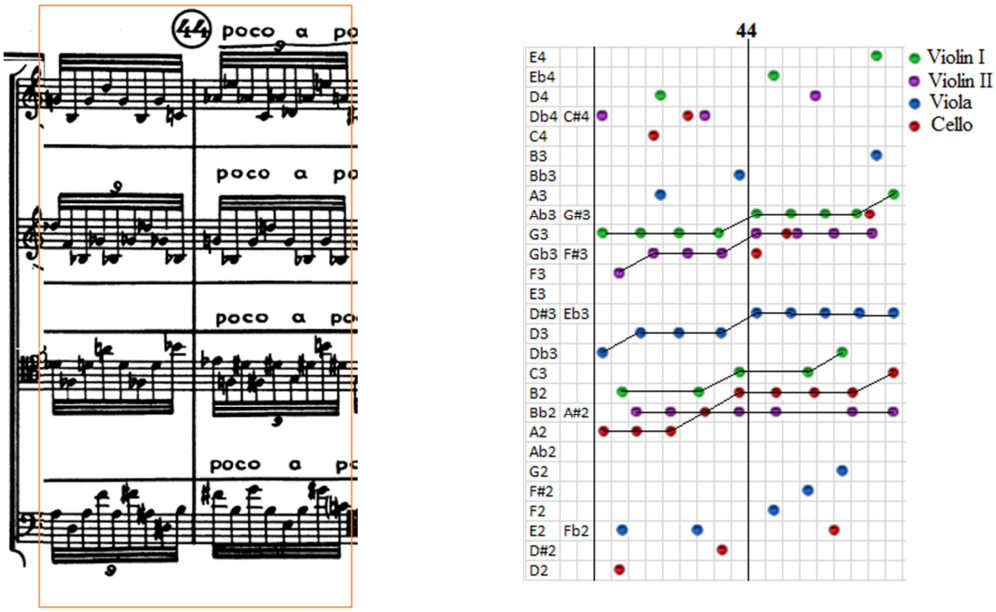

Figure 40 - Last beat of m. 43and first beat of m. 44 in Presto movement.

3.2.4 Comparative Analysis

Comparing the expression parameters

The two excerpts are easily compared. The clearest similarity lies with their comparable timbre since both are performed by a string quartet. It is important to denote that timbre as defined by Eric J. Heller "[…] is the third of the three executive summaries of sound provided to our consciousness after pitch and loudness" (Heller, 2013, p. 480). Another similarity between the two excerpts is dynamics marked as *pianissimo* all the way through. A third, then, is the similarly treated *legato* articulation. The Chamber Concerto segment uses *legato* all the way through. The *Allegro Misterioso* excerpt uses this articulation in the complete twelve-tone cannons. The interpolated fragments between the canons, however, are marked *martellato* and *col legno battuto*. One of the few timbre differences between the two pieces appears due to the use of the *sul tas*to in the strings in Ligeti's section and the *col legno* in Alban Berg's. The inclined bowing to the hair side in the later, however, favors the sound of the pitches (Simms, 2014). See figures 41 and 42.

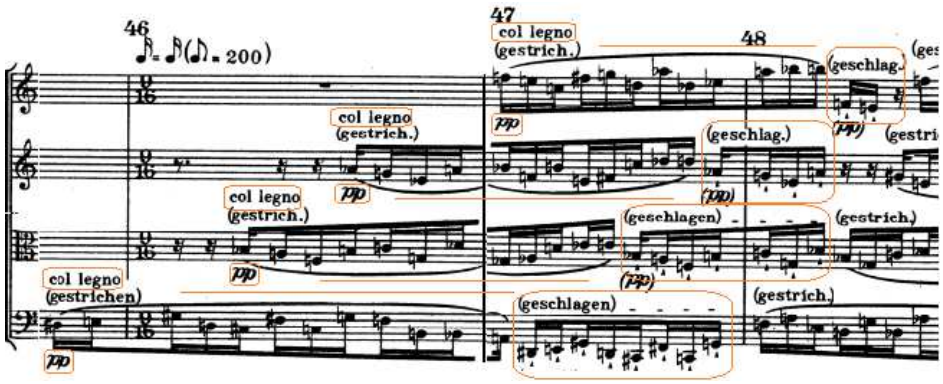

Figure 41 - Expression marks in Berg's Allegro Misterioso excerpt.

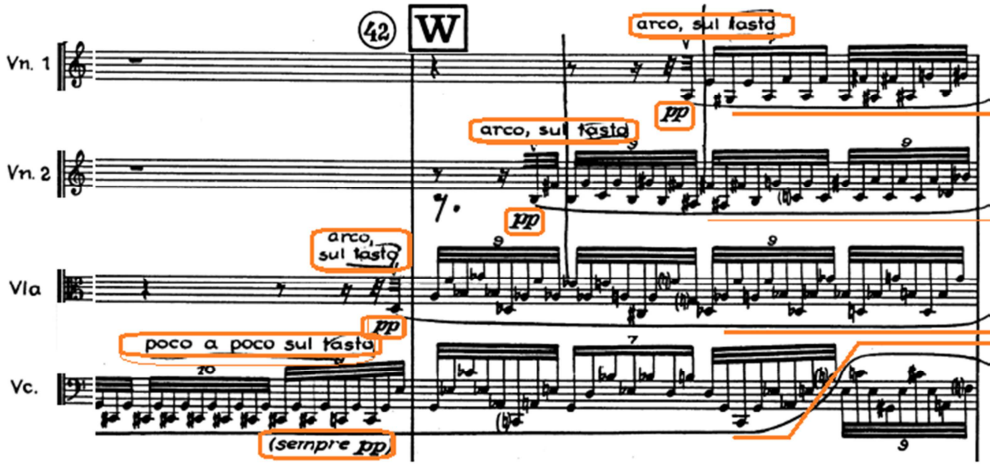

Figure 42 - Expression marks in Ligeti's Presto excerpt.

Comparing the change of register

> The spatial factor (texture-space) might be defined as the field enclosed by "lines" tracing the pitch successions of outer components in addition to the vertical, or diagonal "lines" linking these components at "left-right" extremities at *some given level of structure* (Berry, 1987, p. 249).

Another evident similarity between the two excerpts is the gradual change of the vertical axis from a lower to a higher register. The following examples demonstrate the range limit of the outer voices favoring the upward motion of the textural space. Three different parts were considered. The segments come from the beginning, middle and end in order to demonstrate the gradual change of the register to a higher path. In m. 47 of the *Allegro Misterioso,* Violin I starts with an F4 and ascends to an Ab4. The cello starts over with an A1 and extends to C1 as the lowest note of the measure. See Figures 43.

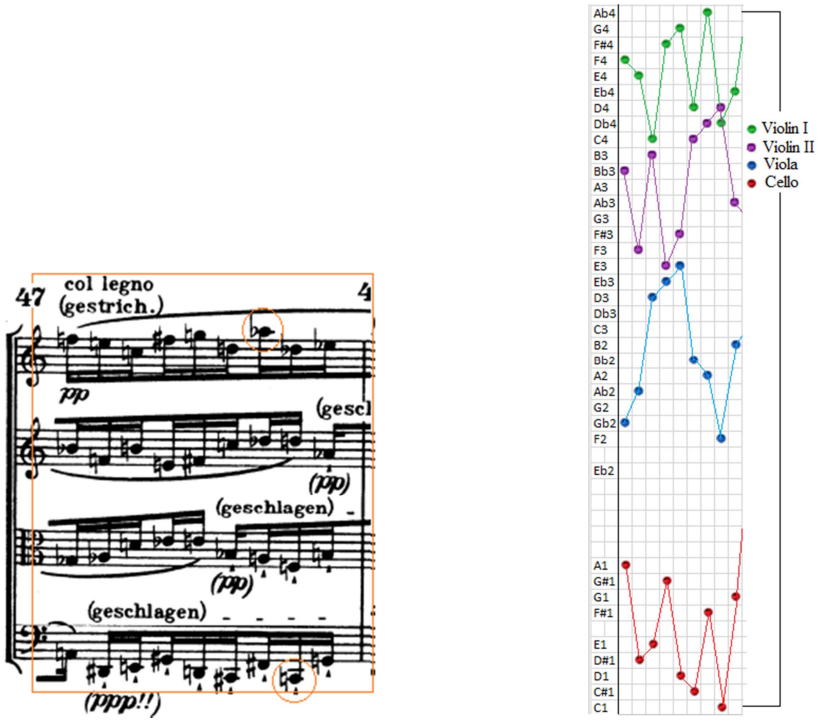

Figure 43 - Measure 47 from the Allegro Misterioso: range C1 to Ab4.

The following examples show the superposition of the four lines in the middle section between mm. 57 and 58 of the *Allegro Misterioso*. The highest pitch is Db5 in the Violin I part and the lowest pitch is Eb2 in the Cellos. The vertical axis is formed between the outer notes which were raised up a perfect 4th in the 1st voice (Ab4 to Db5) and a minor 10th in the 4th voice (C1 to Eb2). Compare Figures 43 and 44.

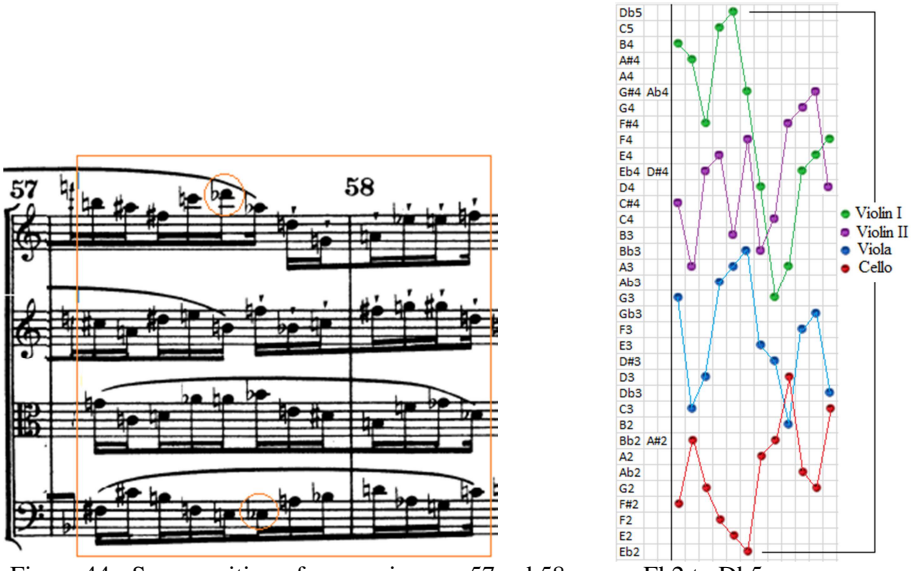

Figure 44 - Superposition of canons in mm. 57and 58: range Eb2 to Db5.

At the end of the *Allegro Misterioso* segment in mm. 62 and 63, the highest note is G#5 in the Violin I. Gb2 is the lowest pitch in the Cello part. The vertical axis moved up a perfect 4th in the upper voice from Db5 to G#5 (Ab5) and a minor 3rd from Eb2 to a Gb2 in the lowest voice. See Figure 45.

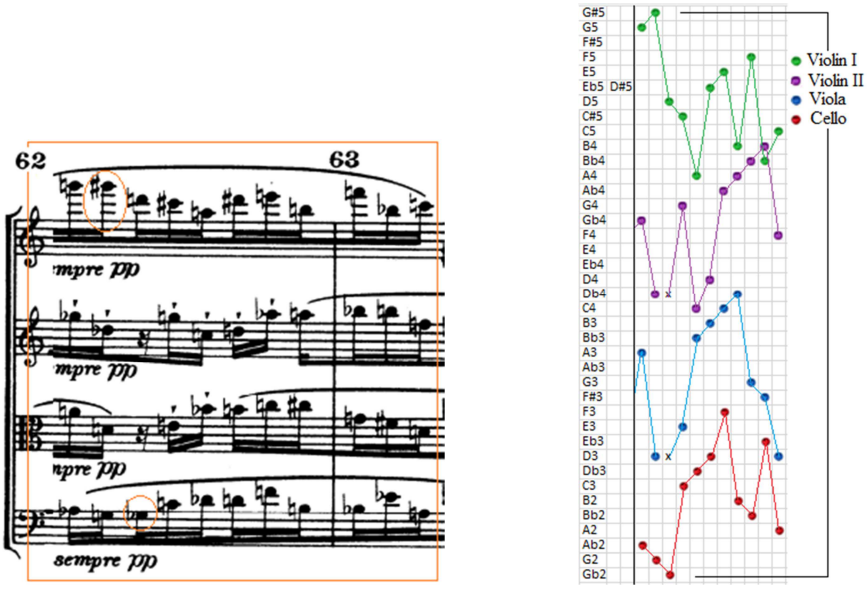

Figure 45 - Canons of Allegro Misterioso on mm. 62 and 63: range Gb2 to G#5.

Three segments were taken from the beginning, middle and final sections of the Chamber Concerto's excerpt in order to demonstrate the accentuated upward motion of the register. Starting with the two last beats of m.42, the highest pitch is Bb3 in the Violin II part. The lowest pitch is C1 in the Cello part. See Figures 46.

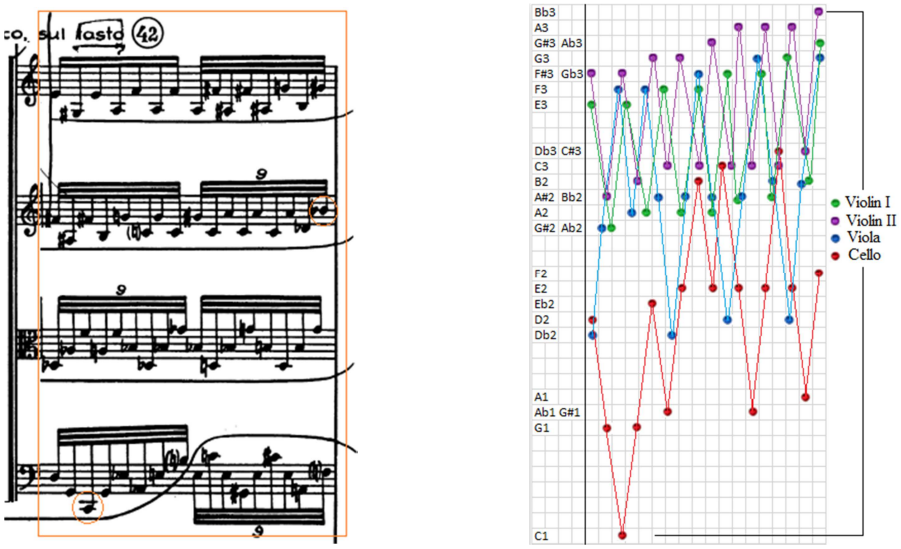

Figure 46 - Beats 3 and 4 of m. 42 in Ligeti's piece: pitch range from C1 to Bb3

The last beat in m. 43 and the first beat in m. 44 are exactly in the middle of the section. The highest note in the outer voices is an E4 in Violin I. D2 in the Cello is the lowest note. The overall register went up an augmented 4th from a Bb3 to an E4 in the upper voice and a major 9th from a C1 to a D2 in the lower voice. See Figure 47.

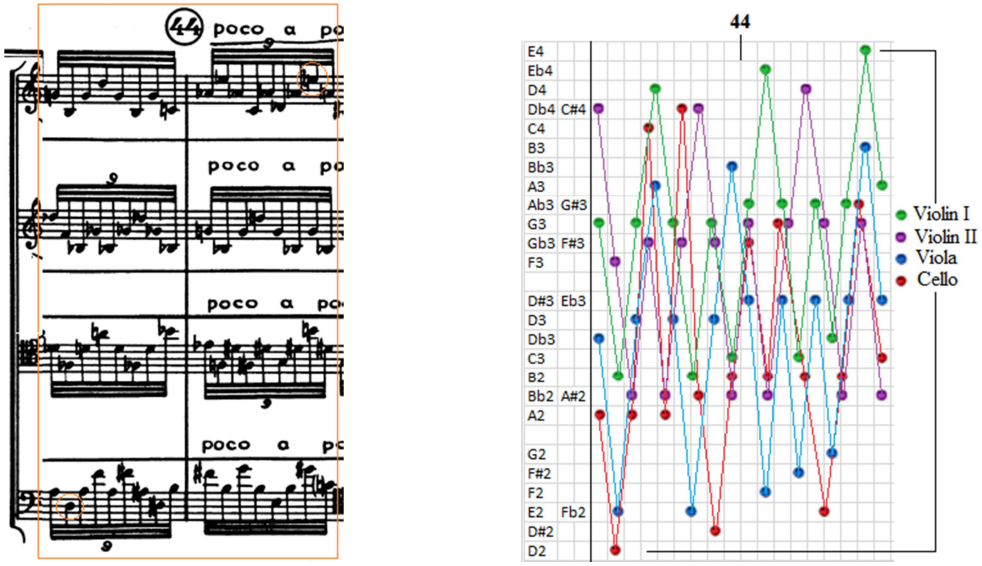

Figure 47 - Last beat m. 43, first beat m. 44 in the Chamber Concerto: pitch range from D2 to E4.

The last segment from the Chamber Concerto excerpt happens on the two last beats of m.45. The whole register moved up and, comparing with the previous example, the first voice went up a minor 6th from E4 to C5 while the lower voice raised a minor 6th from a D2 to a Bb3. See Figure 48.

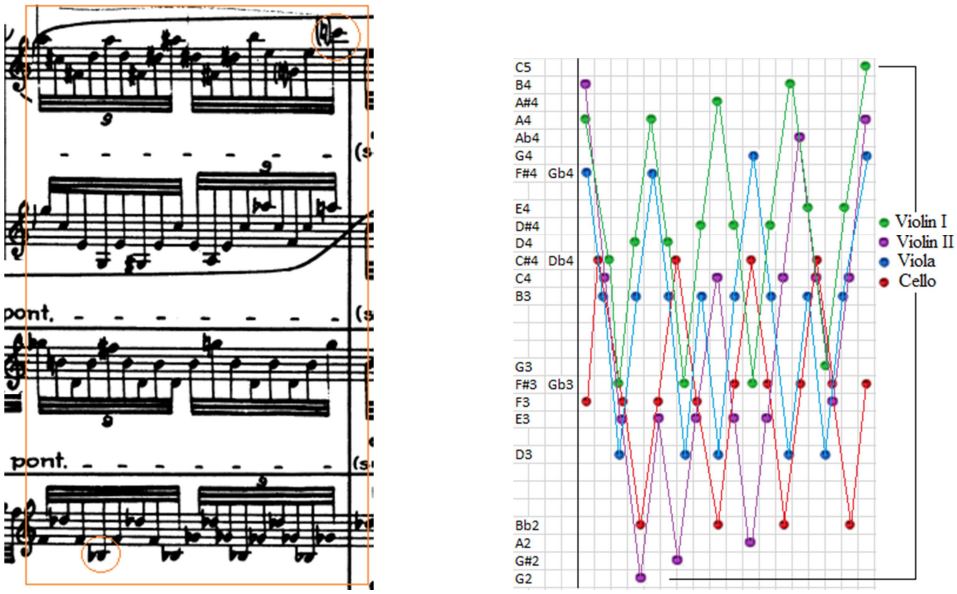

Figure 48 - Last two beats of m. 45: pitch range from C5 to Bb3.

Chromatic textural-space

Another common feature in both excerpts is the intense chromatic occupation of the texture-space. Texture-space is a term which Wallace Berry describes as […] "the modulating field in which events take place." (Berry, 1987, p. 249). The superposition of the cannons in Alban Berg's *Allegro Misterioso* excerpt shows an accrual of pitches within a short space of time. This also happens in the lines formed in the four parts of Ligeti's Chamber Concerto *Presto*. An excellent example is the segment starting on measure 57 of Berg's piece in which there are four entire twelve-tone cannons running simultaneously. The segment amounts a total of 44 pitches covering a range of two octaves plus a perfect 4th, from Ab4 to Eb2, all played in the space of a little over one second. In Ligeti's *Presto* excerpt, on the last beat of m. 43 and the first beat of m. 44, there is an almost complete chromatic occupation within a range of two octaves plus a major 2nd (from E4 down to D2). Only the notes Ab2 and E3 are missing. 68 different notes sound during about two seconds. See Figures 49 and 50.

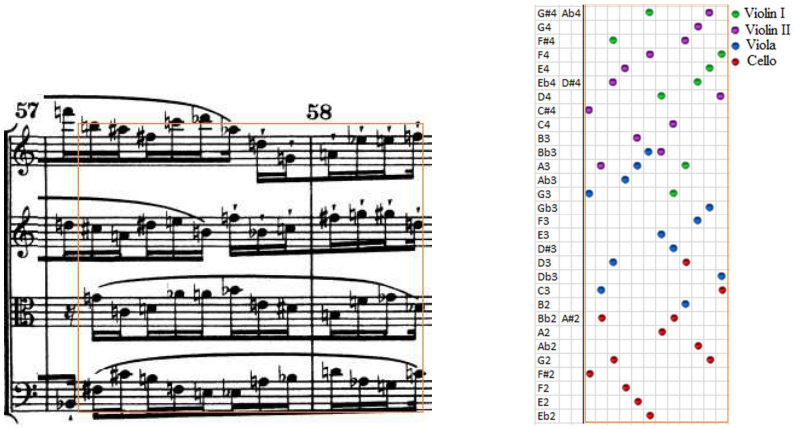

Figure 49 - Berg cannons in mm. 57 and 58: range from Eb2 to Ab4, all occupied.

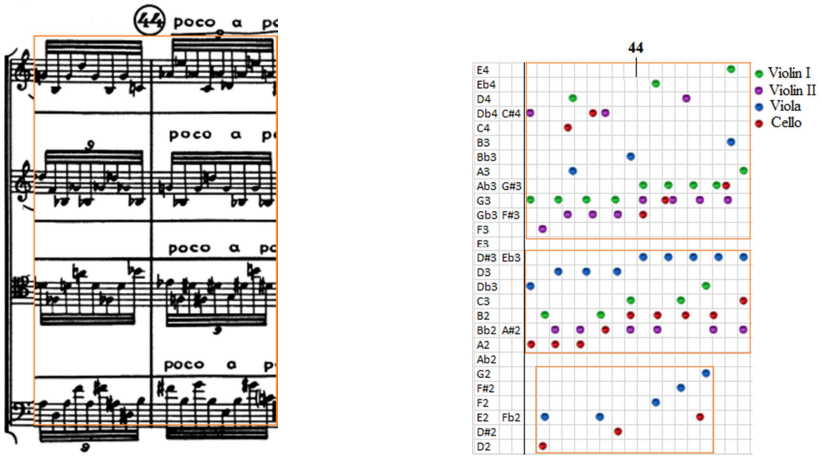

Figure 50 - Ligeti's 4 voiced lines, mm. 43 and 44: range from D2 to E4 missing E3 and A2.

Chromatic textural space, gradual change of register in an upward direction and the timbre of the legato strings are components of the compositions which are similar in both Ligeti's and Alban Berg's excerpts and favor the close sounding result presented in both.

See audio score on DVD, track 02.

3.3 Dmitri Shostakovich's Symphony Nº 2 and György Ligeti's *Atmosphères*

3.3.1 Symphony Nº 2

By the age of 21, Dmitri Shostakovich had already received his first commission from the Propaganda Division of the Russian State Publishers Music Section to compose a symphonic work in honor of the 10th anniversary of the Bolshevik Revolution. The piece was written between March and July 1927 and its premiere occurred on November 5th of the same year. It was performed by the Leningrad Philharmonic and Academic Capella and was conducted by Nicolai Malko. It was published at first with the title: *To October, a Symphonic Dedication, op. 14*. The term 'symphony' was only added two years later, in 1929, when the title was changed to: *Symphony Nº 2, Dedication to October, op. 14* (Fay, 2000).

Shostakovich's Symphony Nº 2 is a programmatic single movement piece. Thematicism and development are avoided because the music unfolds episodically rather than organically. The use of contrasting instruments in widely separated registers creates the dramatic frames of this piece, which was written using the constructivist horizontal counterpoint technique (Ottaway, 1978). According to David Hurwitz, Shostakovich's rather dissonant and unmelodic symphony was of major importance and won first prize from the Leningrad Philharmonic Society. This symphonic work offers a touch of ultra-realism and even makes use of a factory siren to symbolize Russia's industrial modernization in the 1920's (Hurwitz, 2006).

3.3.2 Introduction of the Symphony Nº 2

> The symphony opens mysteriously, on the threshold of hearing, as a web of sound on muted strings begins to grow. This effect is created in a notable way: an extend metrical accelerando built into a fixed tempo. (Bloker, 1979, p. 48).

In the introduction section of this one movement symphony, the string section of the orchestra performs a dense and compact superposition of interdependent melodic lines. Every voice progresses with diatonic melodic fragments and distinct rhythm figures. The bass drum enters on the first measure playing *pianississimo* tremolo whole notes while the contrabass starts

the first melodic line playing quarter notes. The cellos enter with an 8th note line at the end of m. 2 and the violas enter in m. 5 playing 8th note triplets. The 2nd violin II enters playing 16th notes in m. 9. The 1st violin II enters playing groups of 16th note triplets and two 16th notes in m. 12. The time signature changes to 5/4 in m. 16 as the 2nd violin I starts a line with the rhythm figure of two 16th notes plus a 16th note triplet. In m. 17, back again to a 4/4 time signature, the cymbal attacks a tremolo whole note with timpani mallets. The 1st violin I enters playing two groups of 16th note triplets in m. 20. All the strings are marked *pianississimo con sordina*. See figures 51, 52, 53 and 54.

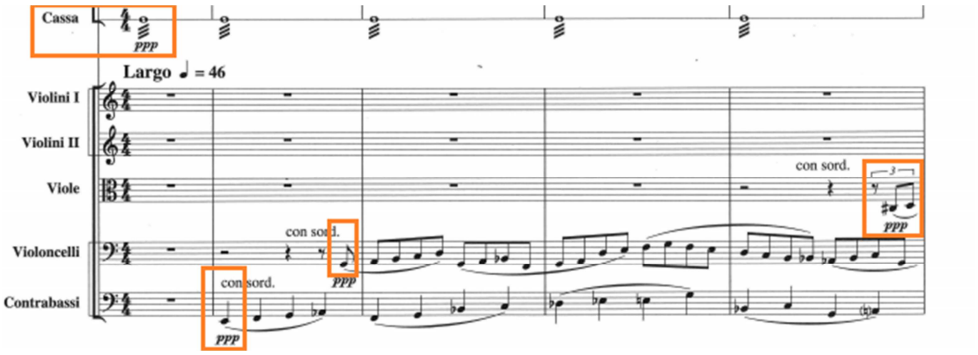

Figure 51 - First 5 measures of Shostakovich's Symphony Nº 2.

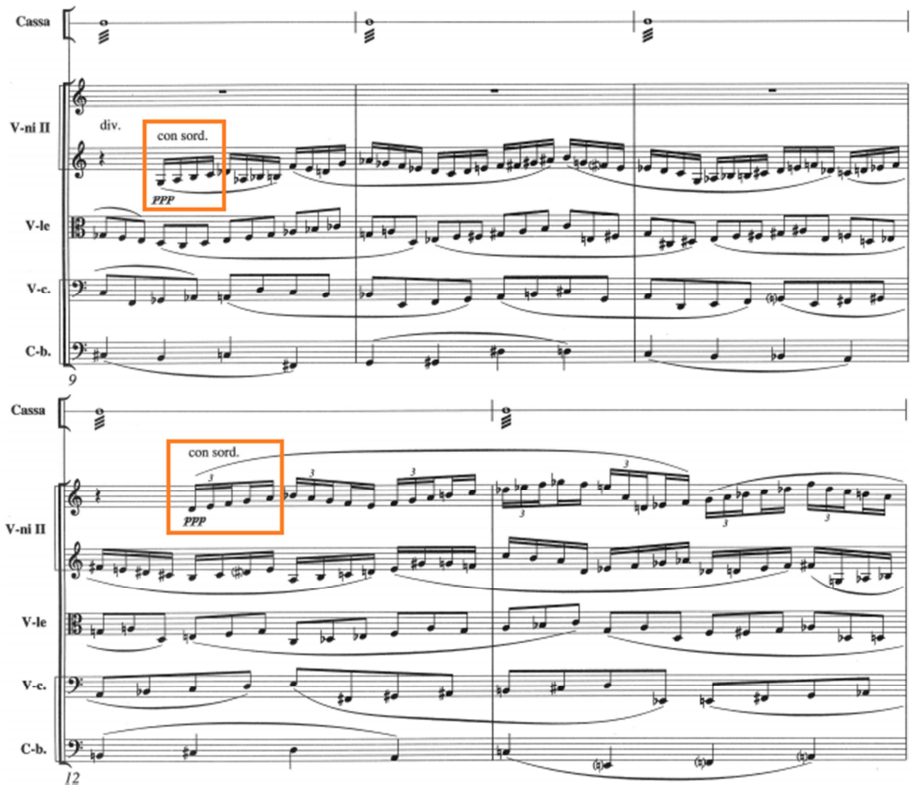

Figure 52 - Measures 9 to 13 of Shostakovich's Symphony Nº 2.

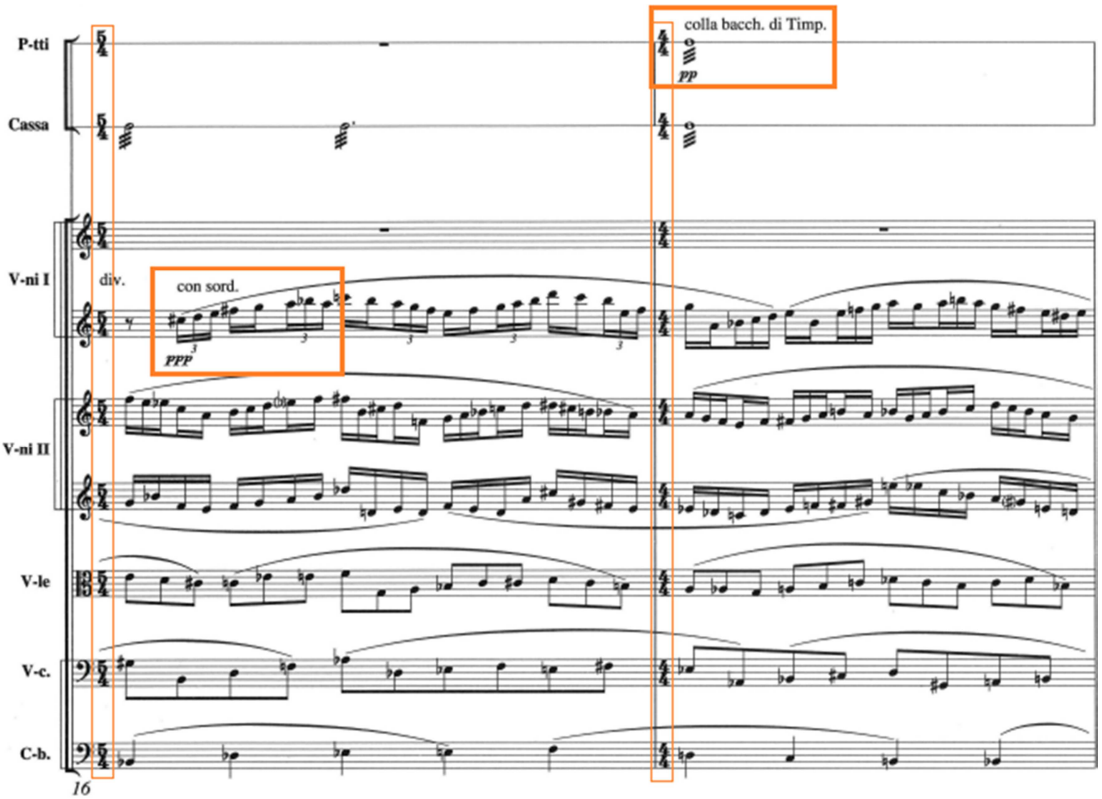

Figure 53 - Measures 16 and 17 of Shostakovich's Symphony Nº 2.

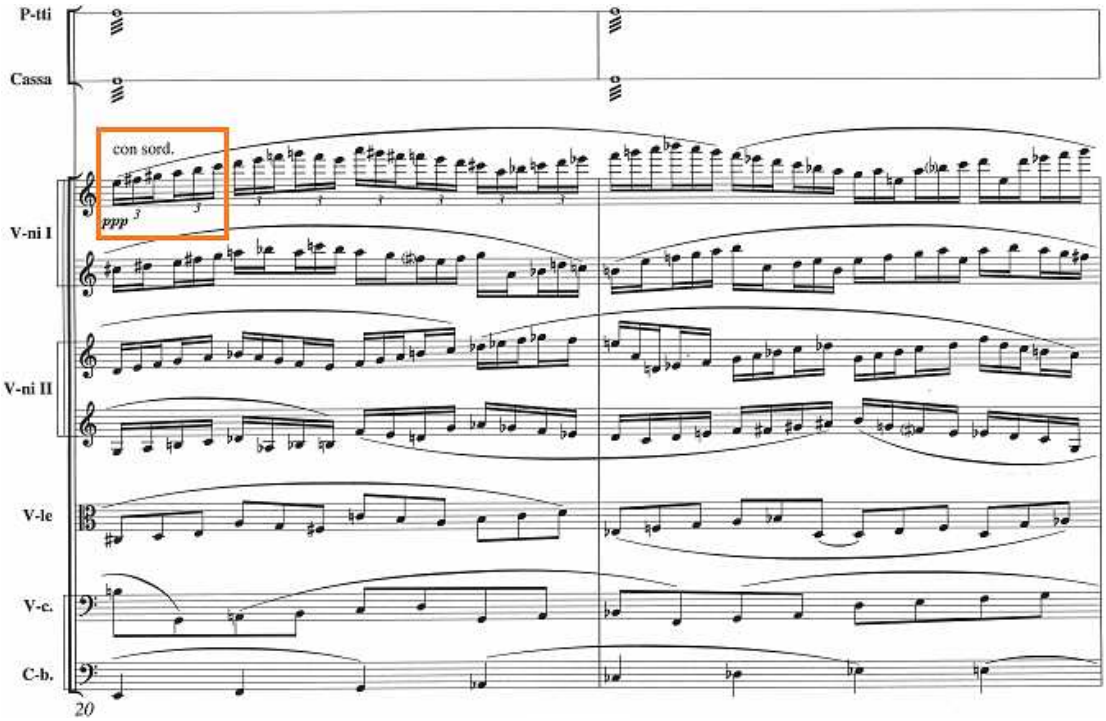

Figure 54 - Measures 20 and 21 of Shostakovich's Symphony Nº 2.

Starting on m. 16, with the addition of the 1st violin I in m. 20, on each beat all the strings play a different rhythmic, played *legato* and *con sordina.* The effect of this creates a dense and compressed type of continuous sound exposure. The thick textural layer lasts for the entire introduction, although the highlighted segment for this analysis happens between mm. 16 and 22, prior to the entrance of the tuba, trombone III and the two English horns in m. 23. See figures 55 and 56.

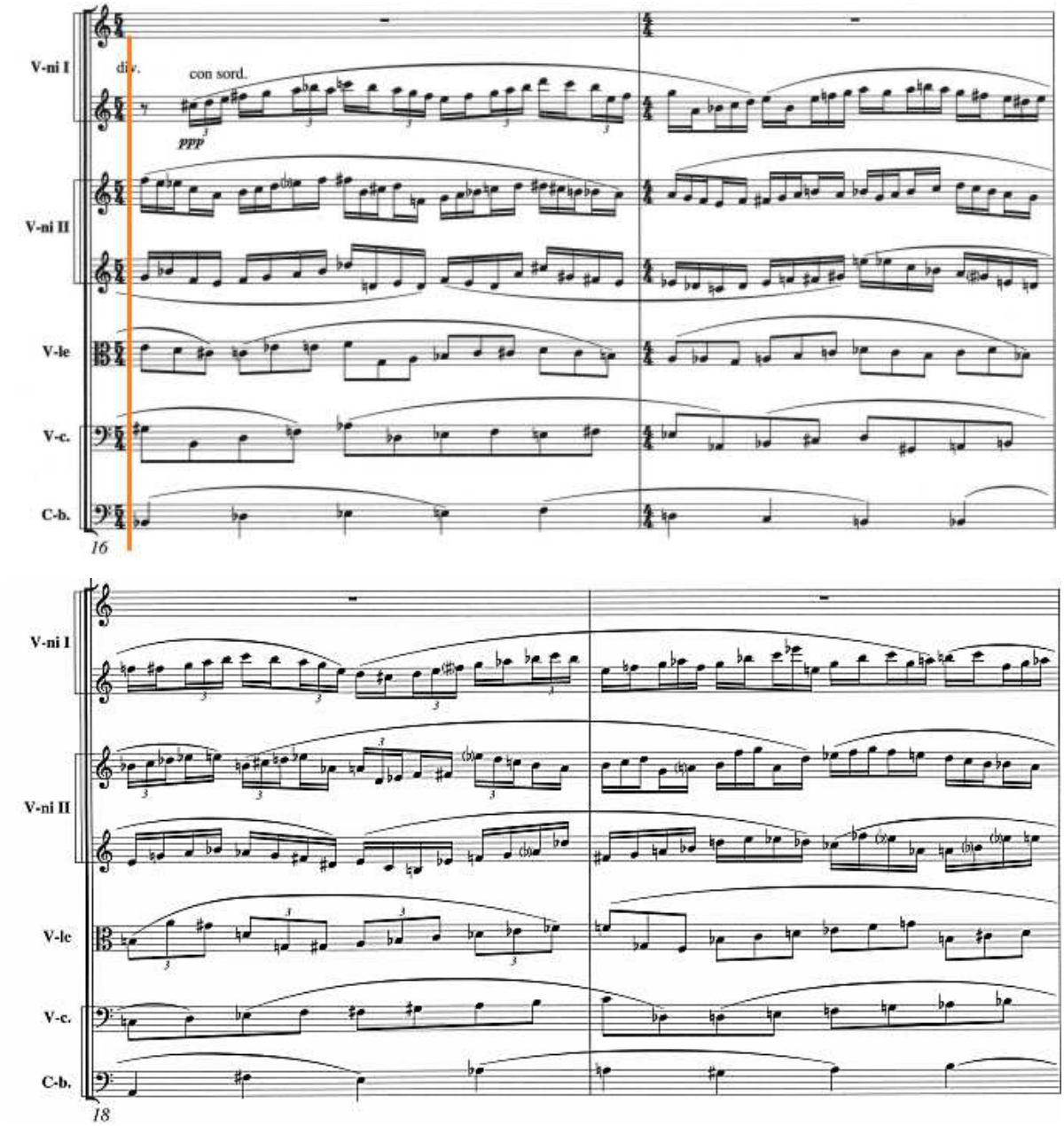

Figure 55 - Shostakovich's Symphony Nº 2 mm. 16 to 19.

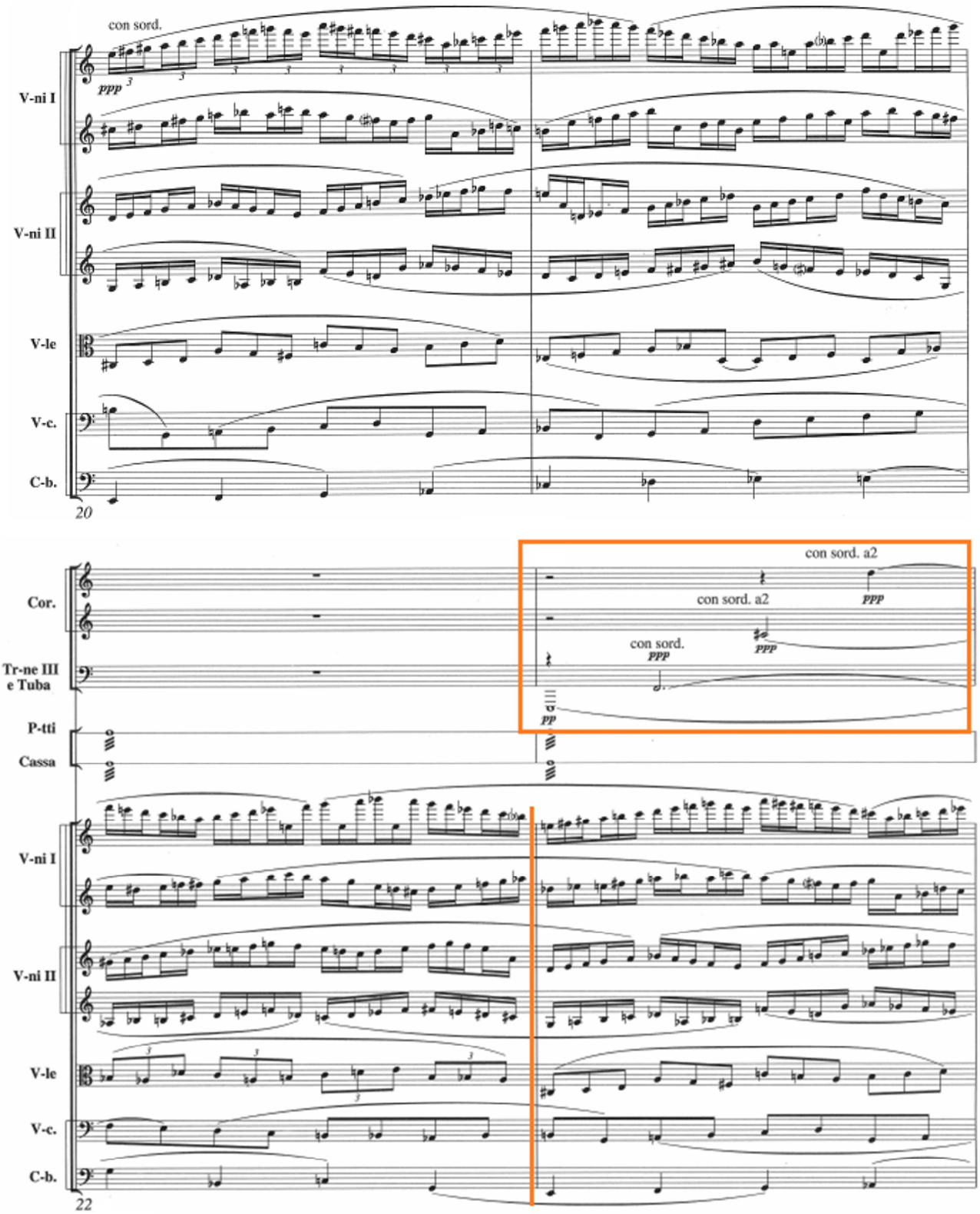

Figure 56 - Shostakovich's Symphony Nº 2 mm. 20 to 23.

3.3.3 György Ligeti *Atmosphères*

György Ligeti worked intensively on composing Atmosphères from February to July of 1961. However, the piece's conceptual ideas were conceived eleven years before while the composer was living in Hungary. At that time, he felt he still had not found a way to put his concepts of static music into practice.

> I could not get away from the notion of metrical rhythm; in my first attempts in Budapest, the static planes of sound were still squeezed into a conventional metrical scheme. (Ligeti, 1983, p. 90).

Arriving in Cologne in early 1957, György Ligeti was exposed to electronic music at WDR studios, thanks to Karlheinz Stockhausen and Gottfried Michael Koenig. This helped Ligeti to implement his ideas. After writing the two electronic pieces *Glissandi* (1957) and *Artikulation* (1958), Ligeti attempted a third composition which he first named *Atmosphères*. He later changed the name to *Pièce Électronique Nr. 3* (1957-58)[9]. Ligeti's idea was to create forty-eight layers of composite sounds which would emerge and fade away again like shadows. The results were not as he had hoped and later he wrote, "[…] It dawned on me that the sound I wanted could be realized much more easily with an orchestra." (Ligeti, 1983, p. 37).

Dedicated to the memory of the Hungarian composer Mátyás Seibers, *Atmosphères* for Orchestra was premiered on October 21st 1961 by the South West German Radio Orchestra, conducted by Hans Rosbaud at the Donaueschingen Music Festival (Floros, 2014). The performance was an absolute success and the audience demanded an encore of the whole piece (Eulenburg, 1983). *Atmosphères* was the second composition in which Ligeti extensively used micropolyphonic technic and the originality of his ideas broadened his exposure at the time. Divided into twenty-two individually structured sections, the composition displays three basic types of tonal fields: the stationary planes formed out of unchanging clusters, the vibrating expanses represented by tremolos, trills having internal motions within a differentiated sound field and the mosaic-like textures characterized by the dissolution of lines into individual components (Floros, 2014).

3.3.4 Letter 'H' in section 9 of *Atmosphères*

From mm. 44 to 48 in letter H of *Atmosphères,* a cannon of chromatically superposed voices progresses within the string section. In m. 40, prior to the beginning of the cannon, a

[9] "The first title I gave to *Pièce Électronique nº 3* was *Atmosphères*." (Ligeti, 1983, p. 37).

layered cluster of eight chromatic voices starts in the contrabass section. Played *fortississimo* tenuto from G#-1 to C#-1, the contrabass cluster gradually fades away between mm. 45 and 46. A rising dense sounding mass of strings is simultaneously heard. See figure 57.

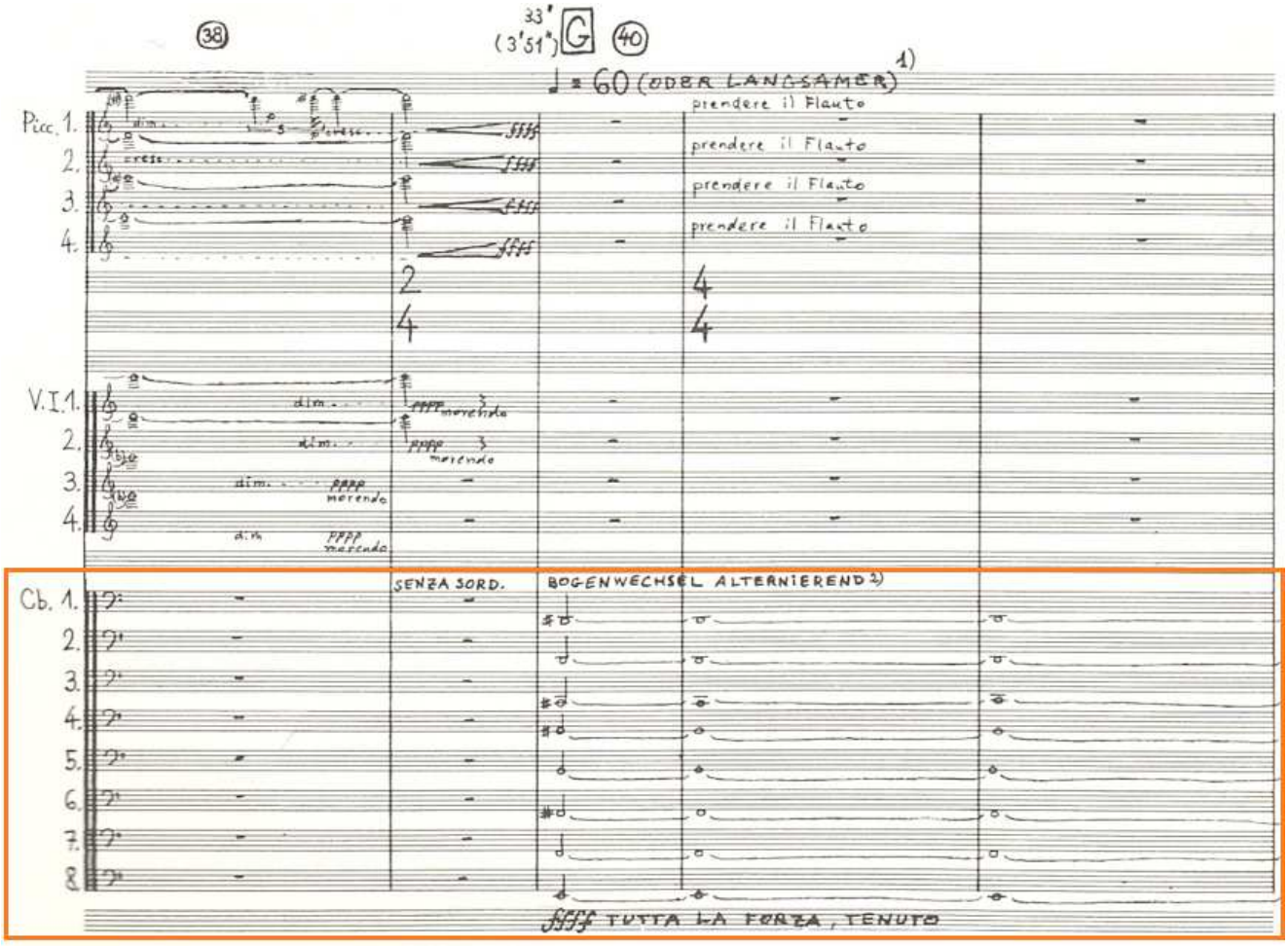

Figure 57 - Contrabass static cluster starting on m. 40 in *Atmosphères* segment.

The chromatic superposition starts on m. 44. Fourteen uninterrupted lines in each of 1st and 2nd violins sections descend chromatically. Ten lines in the violas and ten lines in the cellos both ascend in half steps. The cannons perform different rhythmic figures in legato, *pianississimo* and articulated *sul tasto* in a 2/2 time signature and the half note at 30 bpm. The 1st violins have an 8th note quintuplet subdivision on each beat and occupy a large vertical range from G5 on 1st violin nº 2 down to an Ab4 on 1st violin nº 14, *all senza sordina*. The 2nd violins range from a G4 in the 2nd violin nº 1 to an Ab3 in the 2nd violin nº 14, *con sordina* with a straight quarter note subdivision. The section of the violas ranges from an A2 in the viola nº 10. The Viola nº 1 has a

C2, *senza sordina*, also played with straight quarter note subdivisions. The cellos range from G3 in cello nº 10 to Bb2 in cello nº 2, *con sordina.* The cellos' rhythmic figures are subdivided into triplet quarter notes. See figures 58, 59, 60 and 61.

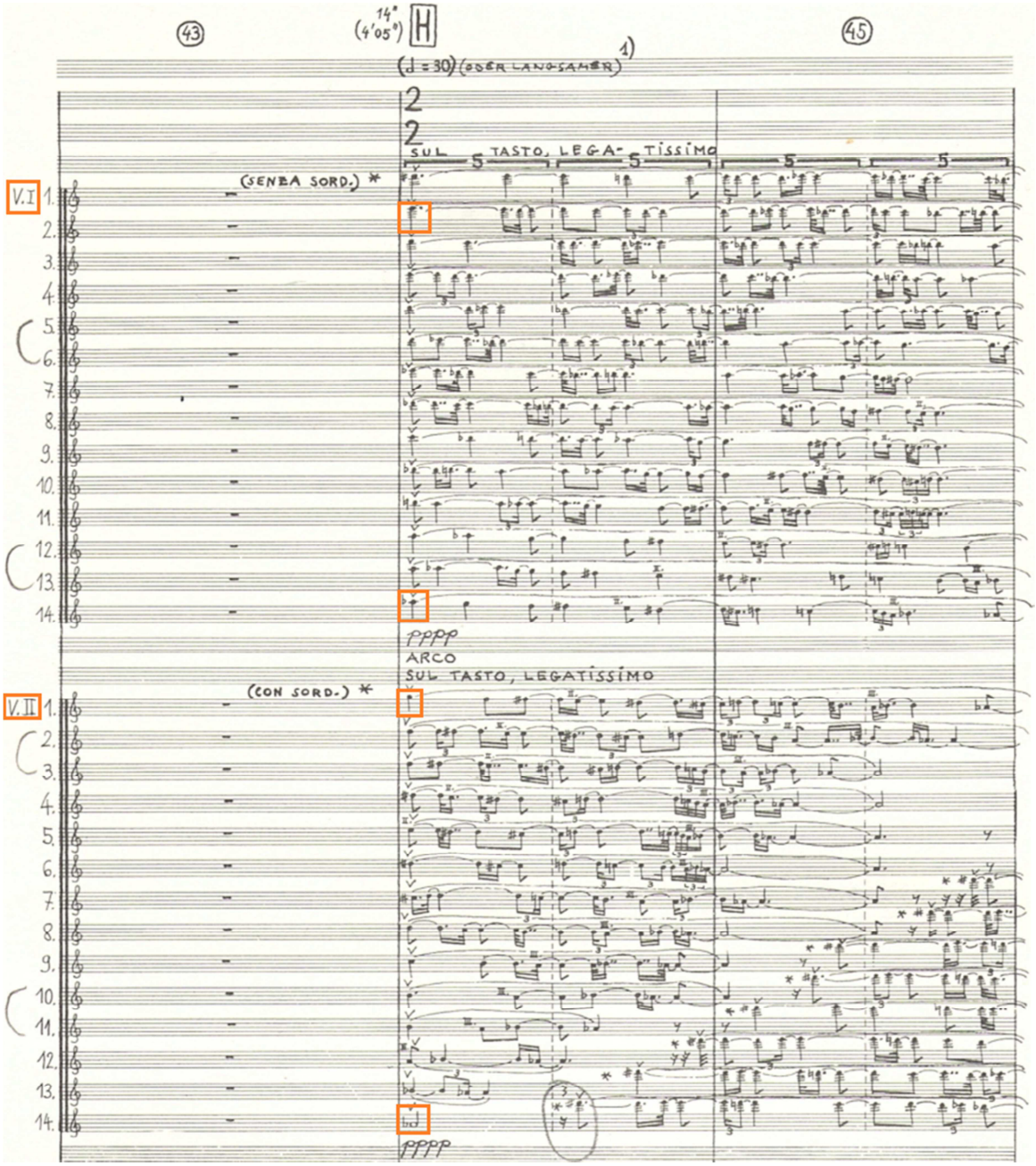

Figure 58 - Violins I mm. 44-48 at letter H of *Atmosphères*.

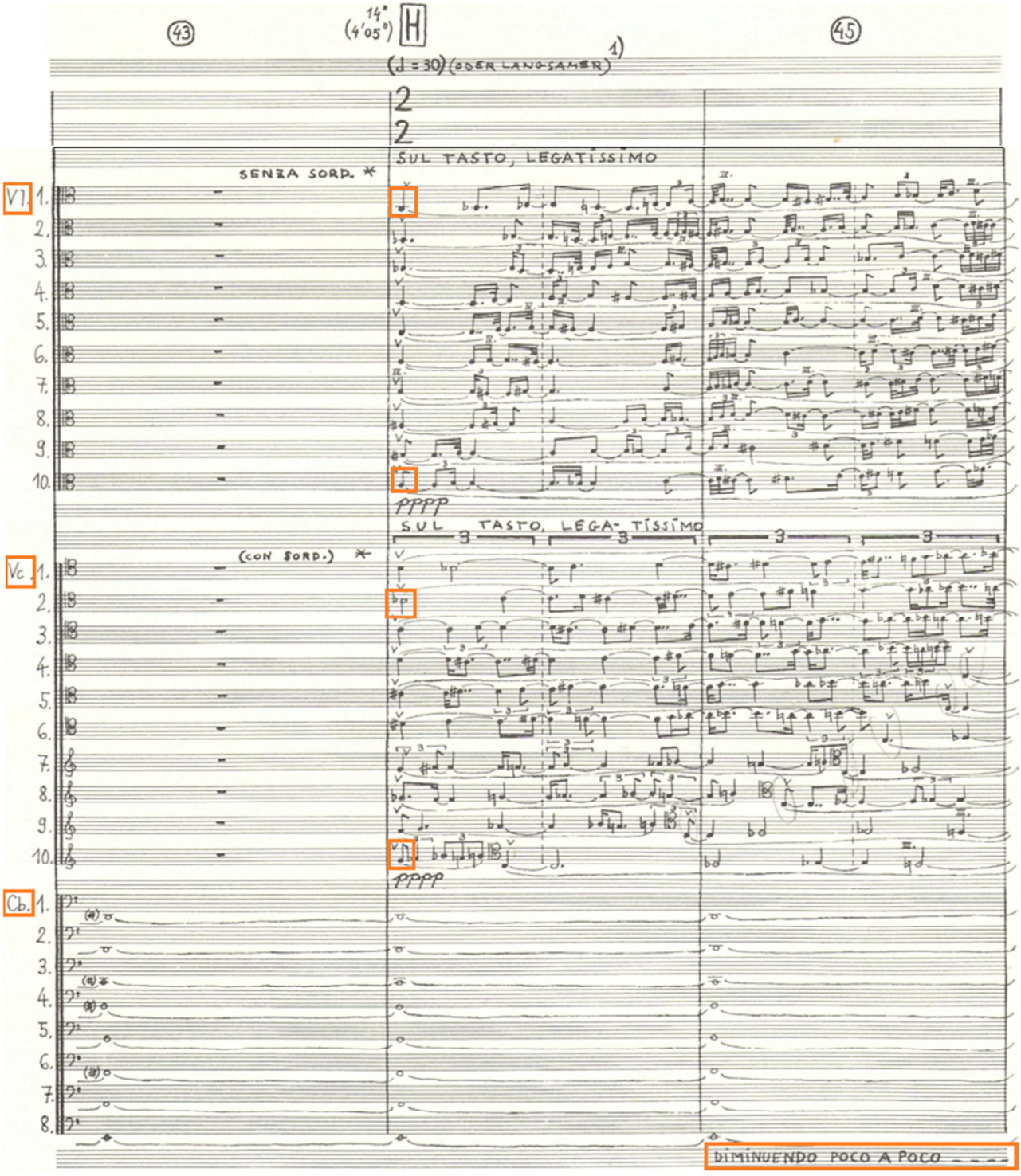

Figure 59 - Violins II, Violas and Cellos and the cluster in the contrabass section.

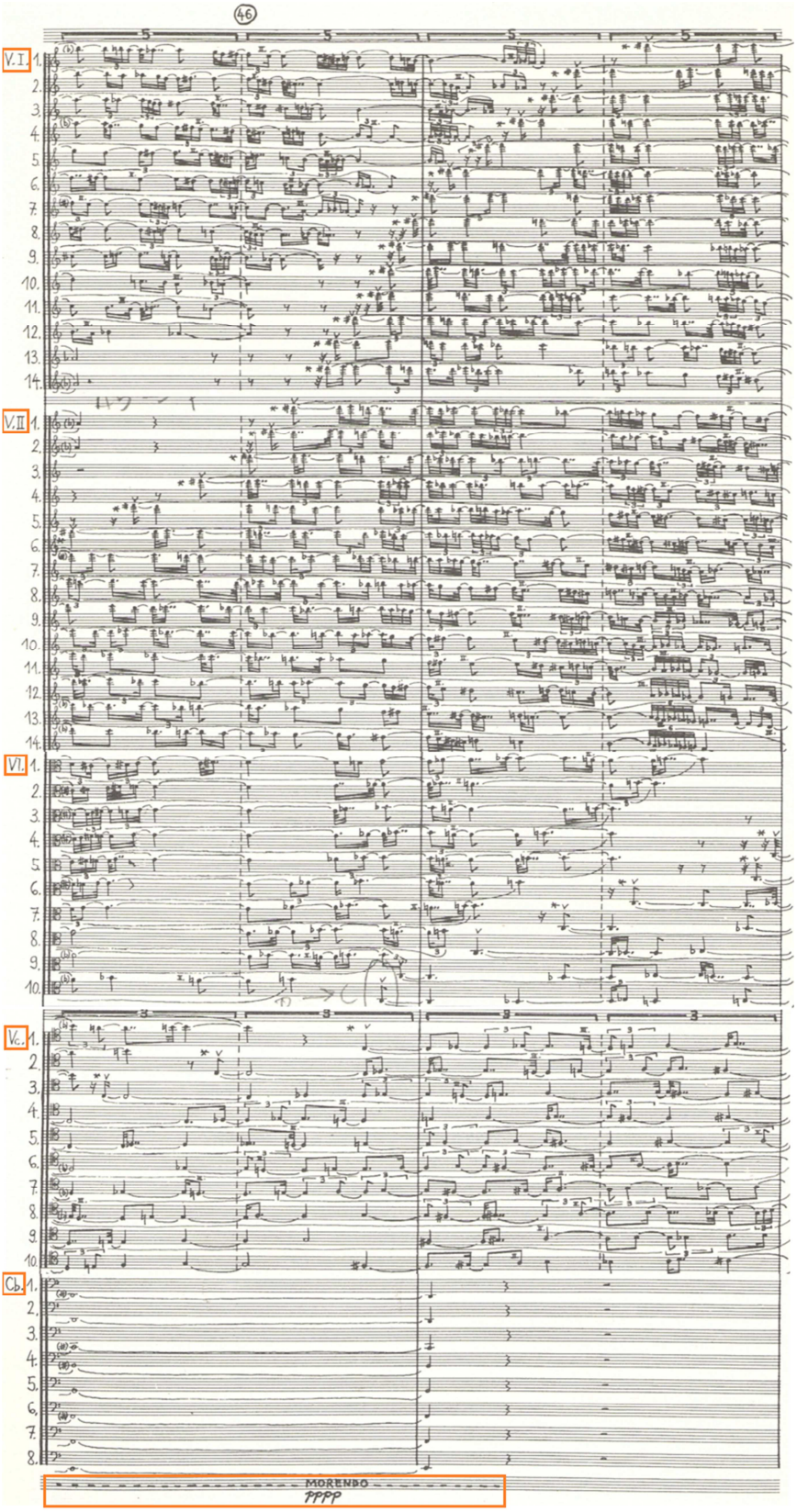

Figure 60 - Measures 46 and 47 with the complete strings section and the contrabass cluster fading away.

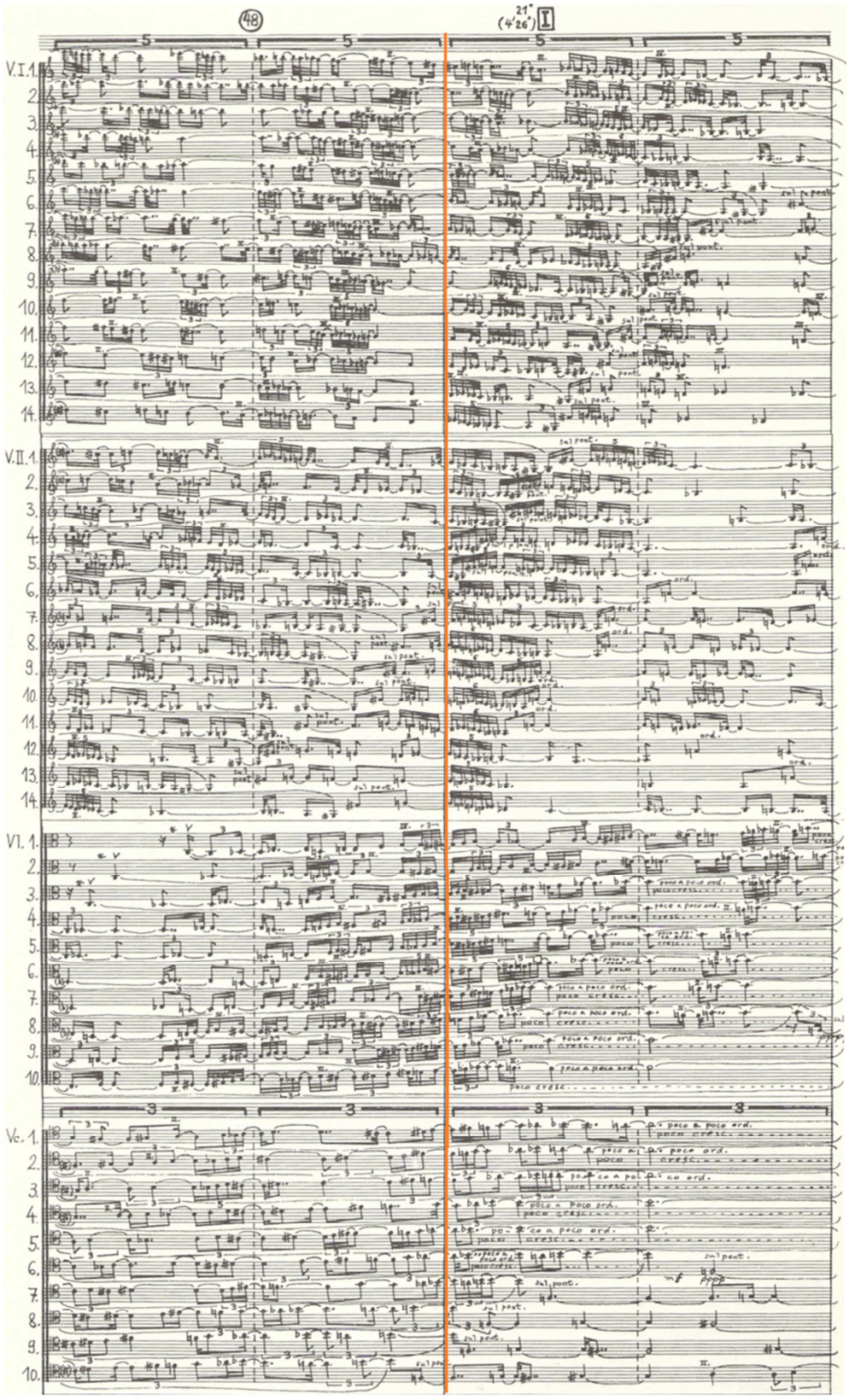

Figure 61 - *Atmosphères* m. 48 with the complete strings section.

3.3.5 Comparative Analysis

Written about 34 years apart, Dmitri Shostakovich's Symphony nº 2 (1927) and György Ligeti's *Atmosphères* (1961) both contain string passages in which instrumentation, pitch combination, rhythmic disposal, articulation and dynamics create similar sonorous effects. Musical aspects of the resulting sound will be further analyzed with special attention given to chromatic approach and homodirectional and heterorhythmic voice motion present in both excerpts. Although the musical material was crafted in different ways by the two composers the overall sonority is similar.

Rhythm Aspects

The beginning of Dmitri Shostakovich's Symphony Nº 2 presents homodirectional and heterorhythmic voices displacement. Each of the string instruments performs a distinct rhythmic pattern. This segment from the beginning of Symphony Nº 2 contains a homogeneous sounding layer in which the superposition of the lines with different rhythmic figurations disguises the perception of the beat. After the entry of the 1st violin I in m. 20, the musical lines of seven different instruments proceed in uniform homodirectional motion. Different rhythmic patterns are visible in each voice: quarter notes in the contrabass part, 8th notes in the cello, 8th note triplets in the viola, straight 16th notes in the 2nd violin II, 16th triplets plus two 16th notes in the 1st violin II, two 16th notes plus 16th triplets in the 2nd violin I and two groups of 16th note triplets in the 1st violin I part. See figure 62.

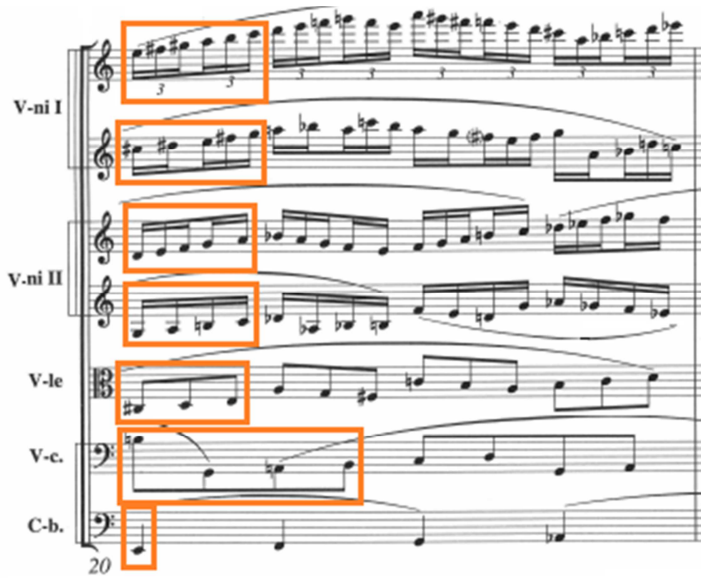

Figure 62 - Shostakovich's 2nd Symphony's different rhythm patterns.

The segment from György Ligeti's *Atmosphères* also shows a densely layered textural path. Forty-eight lines move heterodirectionally, with the violins moving downwards while the violas and cellos move in the opposite direction. However, the heterorhythmic disposal of the voices is figured such that the presence of the beat is disguised. This creates a static sounding texture. The combination of the 8th note quintuplet subdivision in the violins I, the straight quarter notes in the violins II, the straight quarter notes in the violas and the quarter note triplets in the cellos create innumerable rhythmic variations superposed on the large vertical axis. See figure 63.

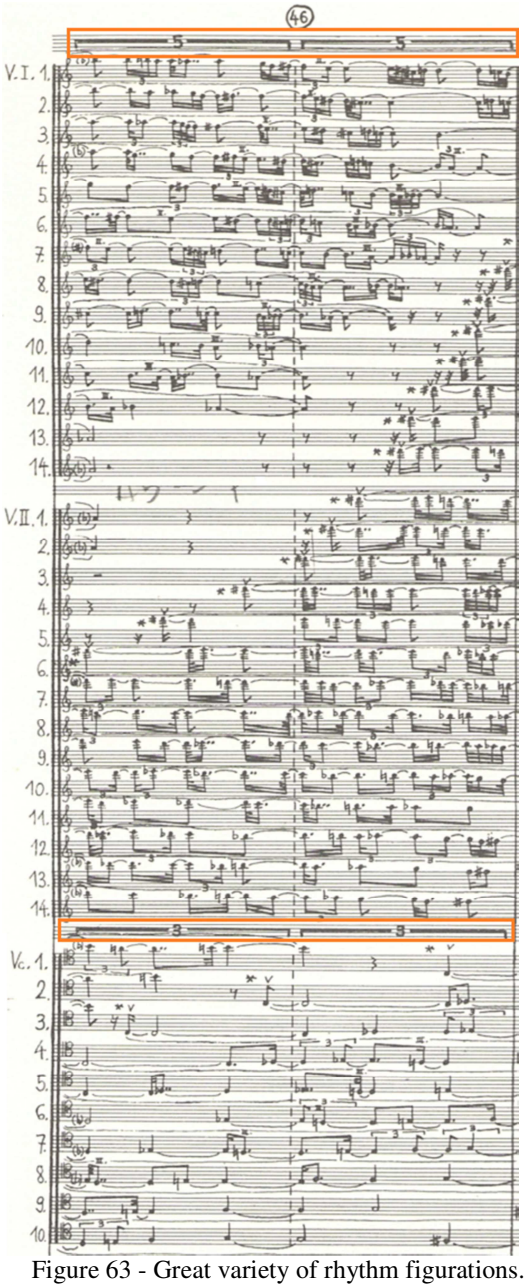

Figure 63 - Great variety of rhythm figurations.

Melodic Content

The excerpt from Shostakovich's Symphony Nº 2 presents each instrument in the string section performing a different diatonic line and the result of this is a large layer of dense texture. The superposition of modal, major and minor scales in different keys in addition to the symmetric dispositions within the voices creates an environment that is so chromatic that it becomes impossible to identify the lines individually. See Figure 64.

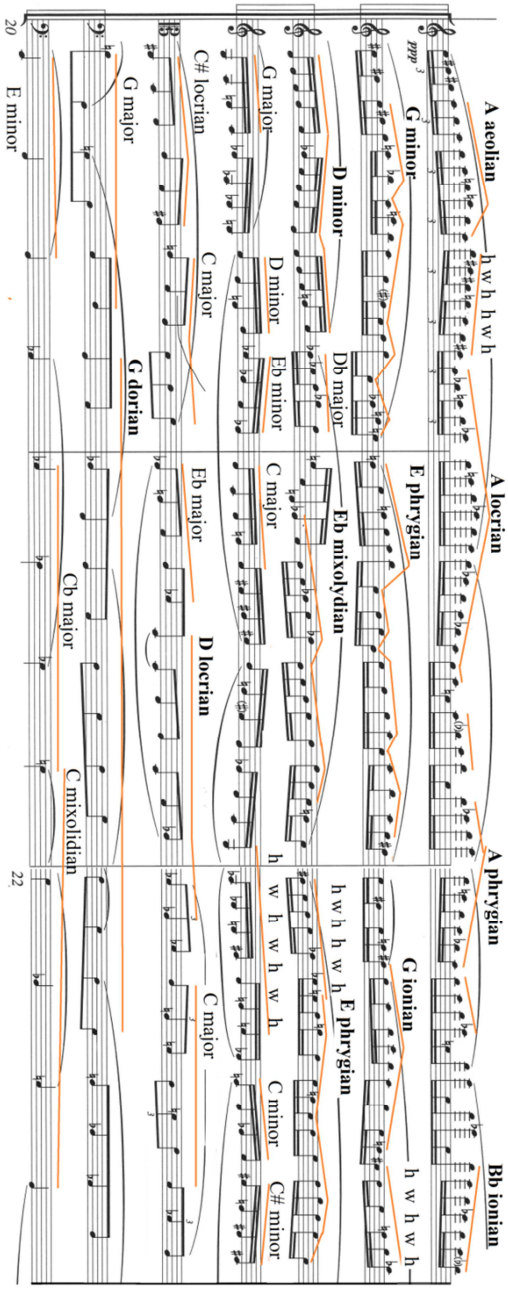

Figure 64 - Modes, fragments of scales and symetric dispositions in Shostakovich's segment.

The segment from *Atmosphères* presents a large vertical range filled with the chromatic superposition of the forty-eight lines. This creates a static mass of highly compressed and dense sonority in which it is impossible to perceive individual melodic features. The resulting sound is similar to the previously mentioned excerpt from Symphony Nº 2. Figures 65, 66, 67 and 68 provide an example of the chromatic movement in the four string sections in m. 48.

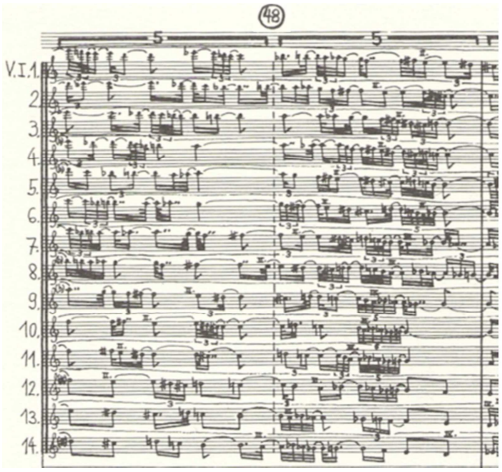

Figure 65 - Violins I in m. 48 of *Atmosphères*.

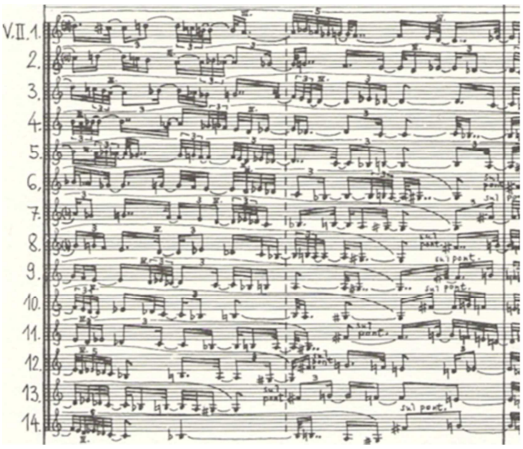

Figure 66 - Violins II in m. 48 of Atmosphères.

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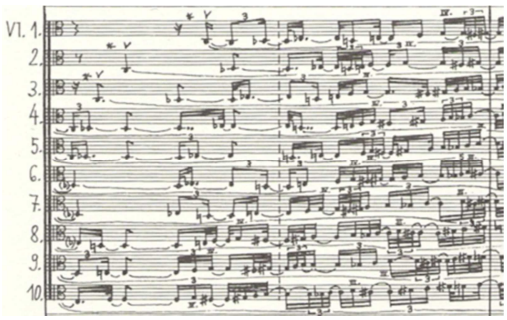

Figure 67 - Violas in m. 48 of Atmosphères.

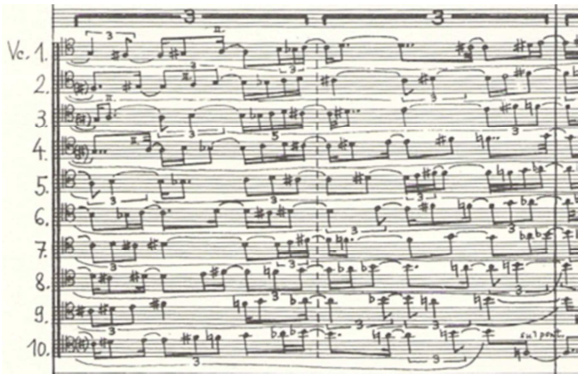

Figure 68 - Cellos in m. 48 of Atmosphères.

Harmonic Approach

The sum of all the different instrumental lines in both examples along with their homodirectional and heterorhythmic disposition creates a dense sounding environment. Nothing reminiscent of tonal harmony is present. The resulting sound is, instead, a sound mass emerging from the tight superposition of pitches and their multiple rhythmic dispositions which enhances the amount of density and compression (W. Berry, 1987). Additionally, a fully chromatic sonorous environment is created. The vertical range in both excerpts is almost completely occupied over its whole textural space.

The excerpt from Shostakovich's Symphony nº 2 has a 4/4 time signature with the metronome marking set at 46 bpm. This makes the whole segment last for about 15 seconds. On the other hand, Ligeti's excerpt has a 2/2 time signature and a 30 bpm metronome marking. Ligeti's sounds for approximately 10 seconds. There would be time enough to perceive the heterorhythmic and chromatic combination of pitches in both examples. Shostakovich's excerpt presents superposed diatonic lines; however the *Atmosphères* segment is completely chromatic. The result in both examples is a sonorous texture suggesting the perception of a single layer of dense sound. Despite having been the product of quite different compositional techniques and having been written thirty-four years apart, the two excerpts present quite perceptible sonorous similarities.

See audio score on DVD track 03.

3.4 Béla Bartók's *Non Troppo Lento* and György Ligeti's Cello Concerto 1st Movement

3.4.1 Béla Bartók's Fourth String Quartet

Béla Bartók's Fourth String Quartet was written from July to September of 1928 and was performed for the first time on March 20th, 1929, by the Waldbauer Quartet. That same year, Bartok learned about a Belgian Quartet called Pro Arte. Gaston Verhuyck-Coulon, Pro Arte's manager, proposed that Bartok's composition be dedicated to the Quartet, since it had already established a firm international reputation. On October 21st, after a short period of negotiation, the piece was dedicated and Pro Arte performed the Fourth String Quartet in Vienna. From that point on, Bartok's string quartets were added to Pro Arte concert programs. This helped Béla Bartók widen his audience (Karpáti, 1975).

Considered the epitome of Béla Bartók's experimentation, the Fourth String Quartet is a composition in arch form. The first and fifth movements are related to each other and the second and fourth movements are related. For example, the fifth movement is constructed with material from the first and the ends of both movements are identical. The third movement – *Non Troppo Lento* – occupies the central position in the composition's symmetrical construction and represents a change in its textural aspects. (Karpáti, 1975; Antokoletz, 1990; Bayley, 2000).

As outlined by Béla Bartók himself, the third movement is divided into three distinct parts: the first part runs from mm. 1 – 34 with the melody in the Cello; the second part goes from mm. 34 and 54 with the melody starting in the Violin I part, changing to Violin II and finishing with Violin II and Viola; the third part, a free recapitulation, goes from mm. 55 to 63 and the inverted melody is played by the Violin I and Cello. These three parts demonstrate the interplay of textural layers which are commonly considered a secondary parameter. In Bartók's composition, those textural elements become a primary feature, along with its melodic and harmonic content. Throughout the *Non Troppo Lento,* the textural and timbre changes are important section-defining parameters. In the other movements of the Fourth Quartet, the counterpoint and homophonic elements prevail. The change in texture in the third movement is clearer than in the other movements because, in the third movement, the homophonies are predominant (Karpáti, 1975; Bayley, 2000). The individual pitches played by the instruments are related according to relationships of register. Harmonies are related in terms of varying concordant or discordant acoustic qualities. (Meyer, 1989 apud Bayley, 2000).

3.4.2 Third Movement of Béla Bartók's Fourth String Quartet

The excerpt that matters for this comparative analysis is taken from the first five measures of the third movement in which a superposition of six voices results in a layer of dense harmony. This serves as the introduction to the melody in the Cello, which begins on m. 6. Violin I enters on a G#3 in the 1st measure, while Violin II enters on an F#3 in the second measure and establishes a major 2nd interval below the first voice. The viola enters another major 2nd interval below the 2nd voice on an E3. Violin II enters playing a double stop C#3 in m. 3. This forms a four voice chord. At the same time, the Viola adds a double stop B2 on the third beat. The 4th measure displays the vertical superposition of six voices made up of the three instruments playing double stop intervals: Violin I plays G#3 and A2; Violin II an F#3 and C#3 while the Viola has a B2 and an E3. See Figure 69.

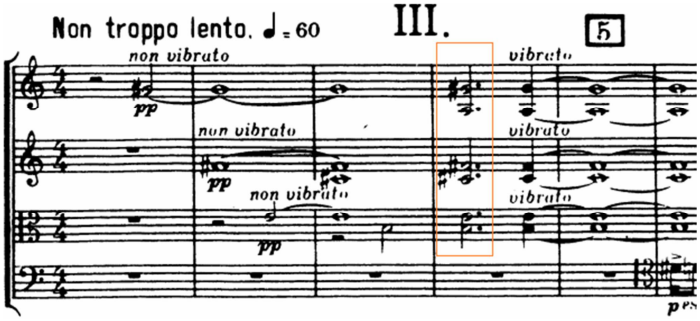

Figure 69 - First five measures of the Non Troppo Lento movement.

The intervals presented are as follows: Violin I has a major seventh (A2 – G#3), Violin II has a perfect fourth (C#3 – F#3) and the Viola has another perfect fourth (B2 – E3). The vertical superposition of the six notes results in two groups of three notes, each a minor third apart. One group is made up of the notes A2, B2 and C#3 and a second group is made up of the notes E3, F#3 and G#3. The three notes are separated by whole steps in both groups. See Figure 70.

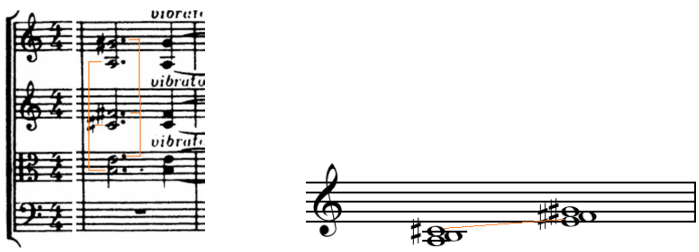

Figure 70 - Two groups of major seconds interval a minor 3rd apart.

This superposition of intervals sounds for about eight seconds between mm. 4 and 5, given the 4/4 time signature and the metronome marking at 60 bpm. The superposition also

creates a textural layer of two concurrent lines. Those lines function as a chordal accompaniment for the melody on the cello which enters alternating between the notes D#3 and D3 in m. 6 and thereby complementing the missing half steps between the two whole note groups. The chord continues sounding until m. 13. See Figures 71 and 72.

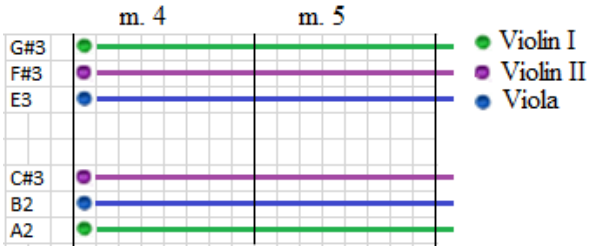

Figure 71 - Two concurring lines of three pitches each which form a chordal structure.

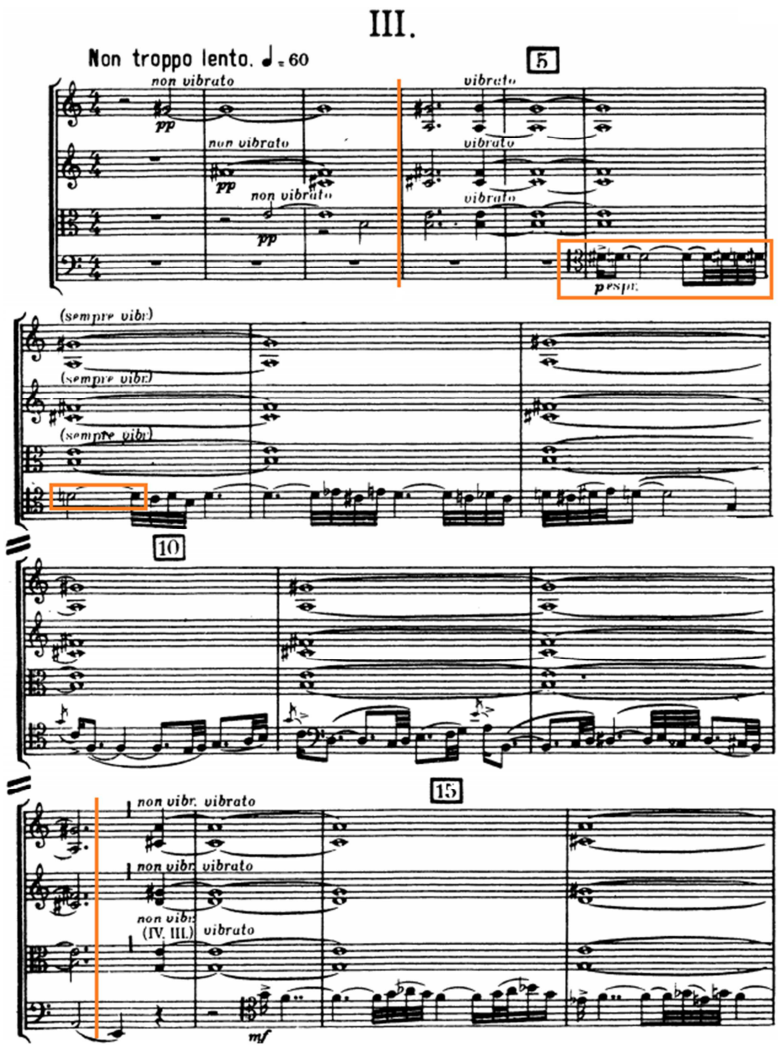

Figure 72 - Upper voices forming chord which lasts up to the 3rd beat of measure 13.

3.4.3 György Ligeti's Cello Concerto

> The solo cello, to be sure, becomes the pedestal for a monument of the most cunning virtuosity; a player of less skill than Siegfried Palm would have to despair before such a parade of finger-technical, intonational and dynamic artistry. (Stuckenschmidt apud Floros, 2014, p. 111).

Written from July to December of 1966, the Cello Concerto was premiered on April 19th, 1967, by German cellist Siegfried Palm and the Berlin Radio Symphony Orchestra. Ligeti's Cello Concerto was actually dedicated to the gifted cellist. The two movement piece was intended for a chamber-like orchestra with the following instrumentation: solo cello, flute (doubling piccolo), oboe (doubling on English horn) two clarinets (the 2nd doubling on bass clarinet), bassoon, horn, trumpet, trombone, harp and a string section. According to assertions of the composer, the music was not conceived in the romantic style of the symphonic concerto and should not be understood as the soloist and the orchestra being two independent units competing with each other (Floros, 2014). As stated by György Ligeti, the concerto-like character permeates the entire composition "[…] with the solo cello steadily serving as the foundation of the varying instrumental combinations;" (Ligeti apud Floros, 2014, p. 111). The Cello Concerto was first planned as one single movement consisting of 27 merging sections, however one of the sections became independent and formed the first movement while the remaining 26 sections formed the second movement (Floros, 2014).

It is important to note the extreme technical mastery demanded of the instrumentalists for the music to be properly executed. Each instrumentalist is necessarily a soloist in his or her own right. Constantin Floros points out that "[…] all have to contend with exorbitant technical difficulties, especially in the second movement, where virtuoso play is foregrounded." (Floros, 2014, p. 112). Cadence-like figurations appear not only for the cello soloist, but also occur in other instruments. Ligeti clearly demonstrates his mastery of the idiomatic demands of various instruments, alone or in combination, in the Cello Concerto (Nordwall, 1969).

3.4.4 György Ligeti's Cello Concerto First Movement

> It starts with a long note which the solo cello has to sustain for 11 long slow bars, during which detailed instructions have to be followed about how the quality of the note is to be inflected. Moreover, the player is asked to attack the note inaudibly, as if conjuring the music out of nothing. (Plaistow, 1974, p. 380).

The first movement of Ligeti's Cello Concerto begins with the solo cello playing an E3 for six measures prior to the entries of the two violins and the viola. The cello E3 is marked to be

played so softly that is essentially imperceptible until m. 4 when a crescendo is marked to grow towards m. 6. The first movement starts in a 4/4 time signature with the tempo marked at 40 bpm. See Figure 73.

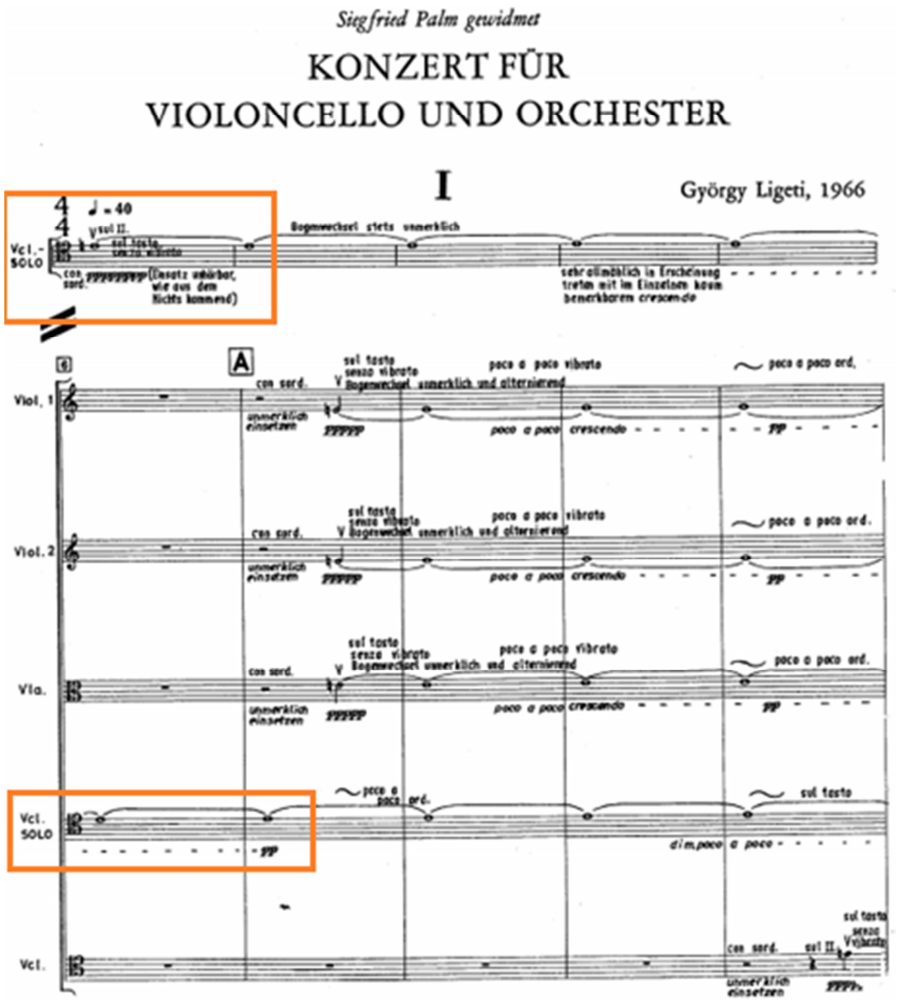

Figure 73 - First 10 measures of the 1st movement of the Cello Concerto.

A chromatic superposition of lines among the string section, trumpet, oboe, 1st and 2nd clarinets, flute and the solo cello begins on m. 27 of the F section until the first measure of section G. This superposition creates a homodirectional layer and a uniform timbre field (Berry, 1987). On the first beat of m. 27, the cello solo has a D3, 2nd violin an Eb3, viola an E3, contrabass and trumpet an F3, cello an F#3 and 1st violin, flute and oboe a G3. This superposition remains static until m. 28 when trumpet rests and while oboe and flute step up a minor second to an Ab3. From the 3rd beat of m. 28 until the end of m. 30, the sounding notes are the harmonic notes F#3 on the contrabass, E3 on the cello, a perfect fifth D3-A3 in the cello solo and a G3 in

the viola. The 2nd violin steps up to F3 and the 1st violin descends a major 3rd to Eb3. The 1st clarinet enters on A3 while the 2nd clarinet enters on an Ab3. See Figure 74.

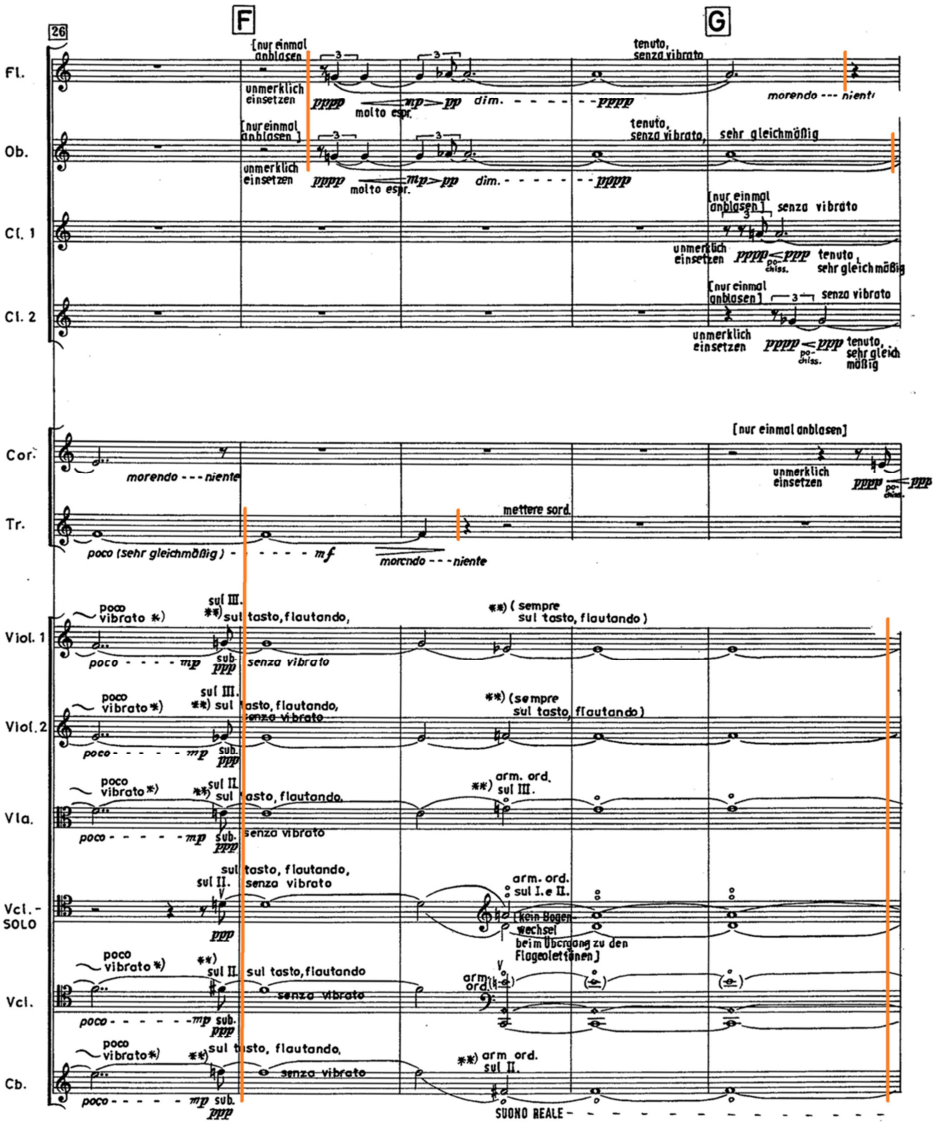

Figure 74 - Measures 27 to 30 of the Cello Concerto's first movement.

At a metronome marking of 40 bpm, one quarter note would last for one and a half seconds. The entire four measure segment would sound for about 24 seconds. The strings articulate their parts *sul tasto*, *flautando* and *senza vibrato,* except when playing harmonics. The flute and oboe parts are both marked to be played *molto expressivo*. From the 1st beat of m. 27 to the 2nd beat of m. 28, the homorhythmic vertical superposition of D3 in the cello solo, Eb3 in the 2nd violin, E3 in the viola, F3 in the trumpet and contrabass, F#3 in the cello and G3 in the 1st

violin, oboe and flute forms a clustered line of six chromatic voices. The Flute and oboe go up a step to Ab3 in m.28. See figures 75 and 76.

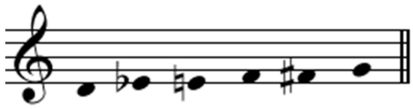

Figure 75 - Notes in mm. 27 and 28 of Ligeti's segment.

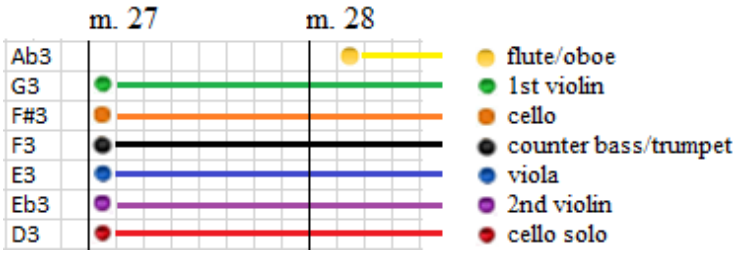

Figure 76 - Chromatic lines in mm. 27 and 28 in Ligeti's segment.

From the 3rd beat of m. 28 to the end of m. 30 density is increased with the harmonics on the contrabass, cello, viola besides the double stop on the cello solo along with the whole notes legato of the oboe and the flute, thus adding an eight chromatic line in a cluster-like superposition. All the instruments have their notes changed at this point with the exception of the oboe and the flute. From bottom to top the lines present the notes D3 (cello solo), Eb3 (1st violin), E3 (cello) F3 (2nd violin), F#3 (contrabass), G3 (viola), Ab3 (oboe and flute) and A3 double stop on the cello solo. See figures 77 and 78.

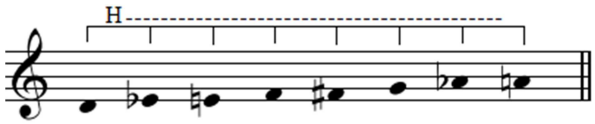

Figure 77 - Chromatic superposition among the voices from 3rd beat of m.28 through m. 30.

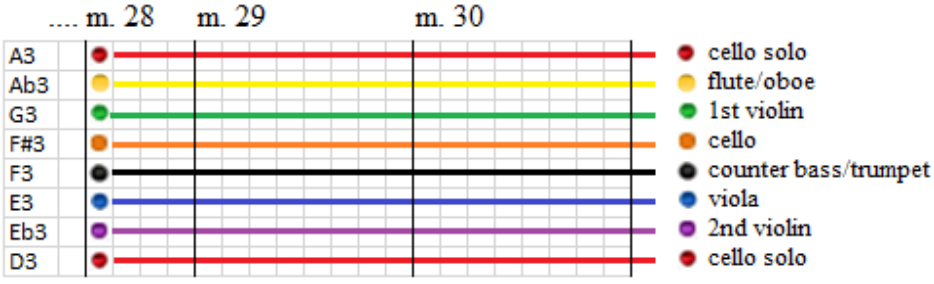

Figure 78 - Lines formed in the segment.

3.4.5 Comparative Analysis

Note Range

> At the beginning of the 1990s Ligeti told me that during this time he had a quite ambivalent relationship with Bartók. On one hand he felt a deep devotion to the lead representative of modern Hungarian music. On the other, he was trying to free himself from his influence, (Floros, 2014, p. 125).[10]

Before doing a comparison between the two excerpts, it is very important to note that a slight difference exists in the timbre coloration. Bartók's piece devotes itself to the sonority of the four strings instruments. Ligeti's segment has the contrabass and cello solo added to the string section but also includes the presence of the trumpet and various other wind instruments. In spite of their instrumentational differences, the homorhythmic and homodirectional lines prevail in both cases.

The note range formed in the 4th measure of Bartók's example goes from G#3 as the highest note to A2 as the lowest, both on 1st violin, with the six voices forming a major 7th vertical axis. In the first part of Ligeti's segment in mm. 27 and 28, the string section together with the trumpet compose a vertical axis between G3 in 1st violin and D3 in cello solo. They enclose a perfect fourth. From the end of m. 28 to the end of the segment in m. 30, the highest pitch is an A3 in the double stop on the cello solo. The range extends a perfect 5th. A3 appears in the 1st clarinet and Gb3 in the 2nd clarinet at the end of m. 30. Compare figures 79, 80 and 81.

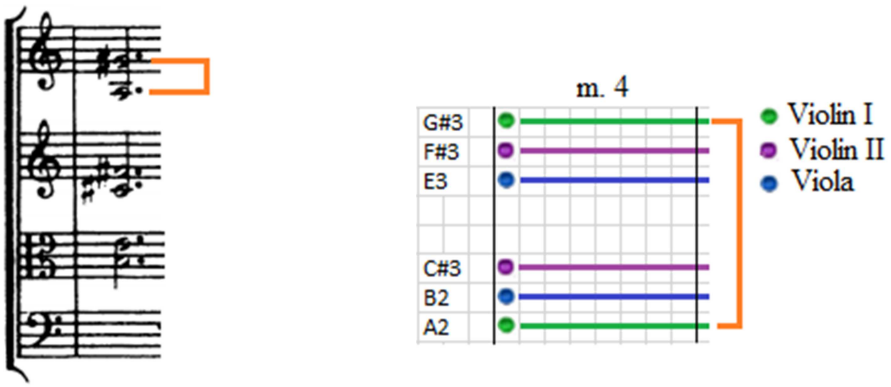

Figure 79 - Note range in Bartók's segment: the six lines within the range.

[10] The expression *during this time* used by the author refers to the post-1945 communist regime in Hungary.

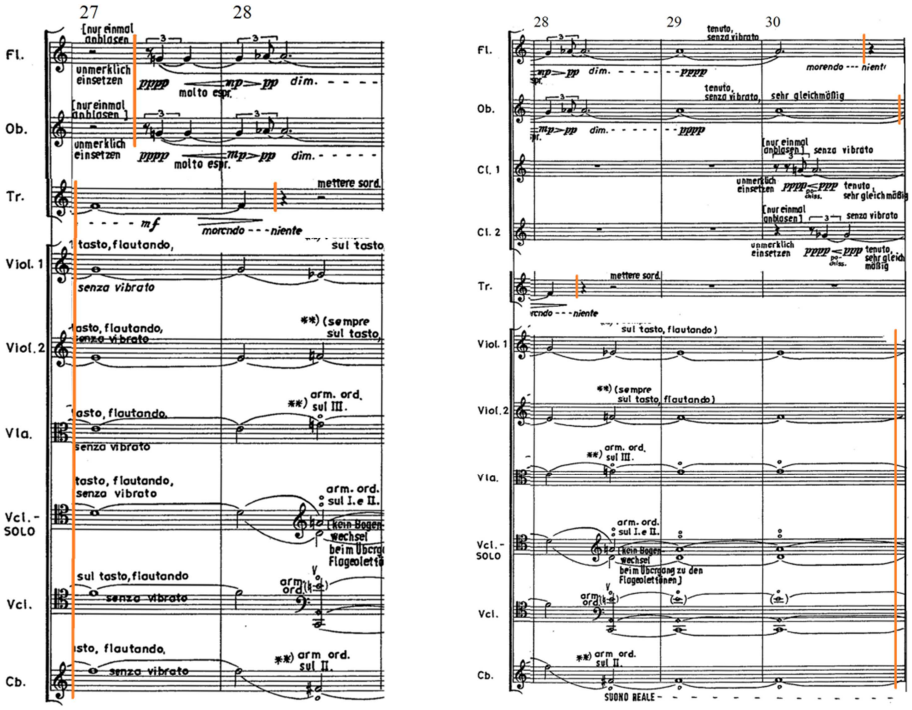

Figure 80 - Note ranges of Ligeti's segment mm. 27-28 and mm. 28-30 respectively.

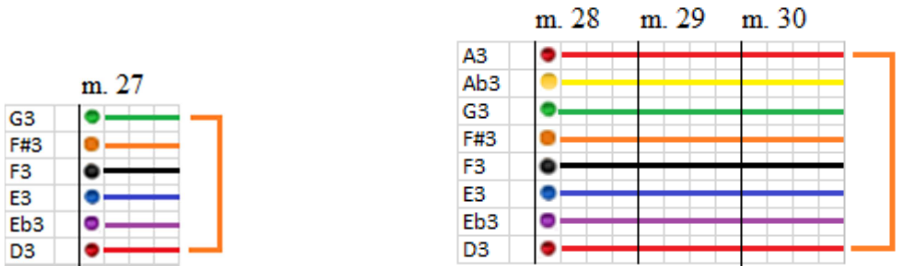

Figure 81 - Lines within the range in mm. 27-28 and mm. 28-30 respectively.

Both pieces are similar in instrumentation although, as mentioned before, in the Cello Concerto segment there is a small difference of timbre due to the presence of the trumpet, oboe and flute. The vertical axis resulted in both excerpts is shorter than an octave since the outer lines in m.4 of Bartók's piece represent an interval of major 7th, from the lowest A2 to the highest G#3, while the range in Ligeti's example covers the perfect 5th from D3 to A3. The upper voices in both cases are almost in the same register, differing only by one half-step, G#3 and A3 respectively. In addition to the fact that the two pieces occupy a similar interval range, both present four equal notes, three of which are the same pitch: E3, F#3 and G#3 (Ab3). The note A appears as the low A2 in the Quartet and the highest A3 in the Cello Concerto. The prevailing homophonic characters along with the homorhythmic displacement of the voices are attributes which create the similar sounding texture. See figure 82.

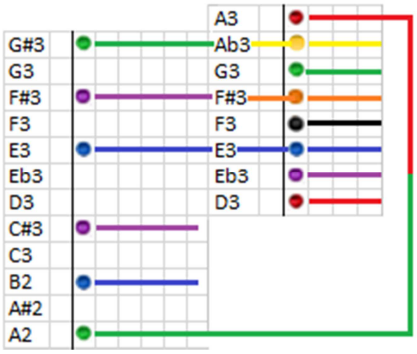

Figure 82 - Comparison between the vertical range in both pieces.

Expression

> The music often conveys the impression of coming from far away. Its domain is the *piano* and *pianissimo* sphere. In the first movement [of the Cello Concerto] that sphere is practically never left. (Floros, 2014, p. 111).

In both excerpts, Ligeti's and Bartók's, there is a noticeable predominance of the softly whispering ambitus in the two music segments. In the beginning of Bartók's *Non Troppo Lento,* the *pp* dynamic marking is shown for the three instruments. In the first movement of Ligeti's Cello Concerto, a *subito ppp* is suggested for the whole string section - including the cello solo - when entering in m. 27. The oboe and flute play a slight crescendo, although the overall dynamics remain *pianississimo*.

In addition to the *non-vibrato* proposed up to the 3rd beat of m.4 and the change to *vibrato* on the 4th beat of the same measure, the ordinary bowing in the Fourth String Quartet segment allows for a full resonance of the three instruments' notes even when *pianissimo* dynamics are indicated. On the other hand, in the Cello Concerto passage the strings perform *sul tasto* and *flautando* from the 1st beat of m. 27 up to the 2nd beat of m. 28. This adds less partials to the tone and results in a rather opaque timbre. Furthermore, there is the change to ordinary bowing when playing the harmonics in the contrabass, cello, cello solo and viola, which lasts until the end of the section. Yet the trumpet which has the *mf* mark fades out on the 2nd beat of m. 28 and the wind instruments are marked *molto expressivo* and later *tenuto non vibrato* in m. 29 to the end of m. 30. There is a severe divergence between the two music excerpts in terms of the way notes are articulated. See figures 83, 84, 85, and 86.

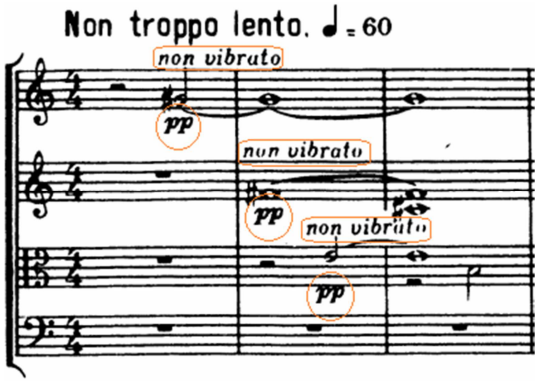

Figure 83 - Expression marks on Non Troppo Lento.

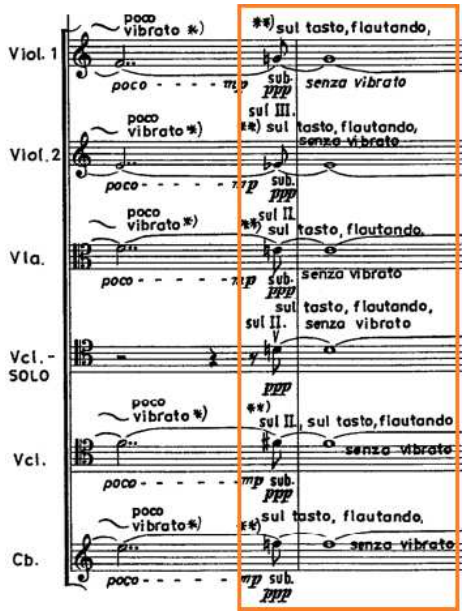

Figure 84 - Strings on m.27 of Ligeti's piece.

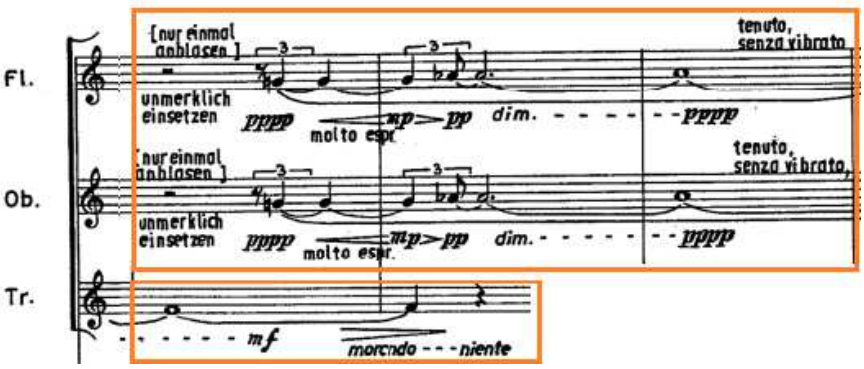

Figure 85 - Trumpet, Oboe and Flute expression marks on m. 27.

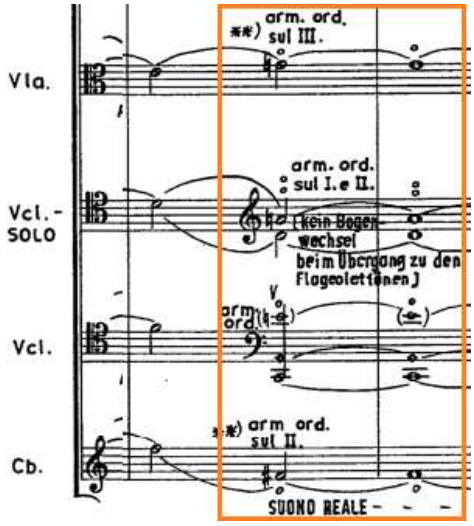

Figure 86 - Change of articulation on the strings.

Three string instruments perform six simultaneous sounding lines on mm. 4 and 5, extending over a major 7th. In the most densely occupied passage, beginning with the 3rd beat of m. 28, a chamber-like formation of 6 string instruments plus oboe and flute perform eight concurrent lines for two and a half measures. If the parameters of quantity and quality are taken into account for a comparison of textural densities, the lesser number of instruments in the Bartók's excerpt (although performing two lines each with ordinary bowing) are very similar to the dense sounding texture in Ligeti's music (in the eight voiced perfect 5th range) when played using the *ppp* and *flautando* expression marks.

Density

> Density may be seen as the quantitative aspect of texture – the number of concurrent events (the thickness of the fabric) as well as the degree of "compression" of events within a given intervallic space. (Berry, 1987, p. 184).

Considering the rather short vertical range in both structures - Bartók's major 7th and the predominant perfect 4th and later perfect 5th in Ligeti's – the six lines of the former as well as the eight lines of the later contain enough elements to fulfill each textural space. The small interval distance existing between the lined voices in both creates a tightness of space. This, together with the shortness of the vertical range obscures distinguishable individual pitches. In mm. 4 and 5 of the Fourth Quartet's third movement, six lines occupy six out of the eleven possible chromatic semitones. Although the chromatic space is not completely fulfilled, the majority of the streams are taken and the intervallic relation between the lines is of two whole steps, a minor third and

another two whole steps. That alone does not configure a recognizable tonal or modal type of chord and is analyzed as such. The sounding context is more like a two part whole-tone compound line a minor third apart, thus proposing a dense textural formation which denotes one single thick layer of static sound.

In the section from mm. 27 to 30 of the first movement in Ligeti's Cello Concerto, the six to eight semitone vertical axis is constructed completely of superposed chromatic lines. The highly compressed environment created in this section makes it easier to perceive a dense one-voiced complex moving homodirectional.

Although the two excerpts present a similar type of texture and contain a high degree of density and dissonance, they both come from different backgrounds. While the Bela Bartók excerpt proposes a kind of modal harmonic approach, György Ligeti's piece presents dense chromatic passages which are related mostly to the development of the atonal and later dodecaphonic and serial forms of interval organization.

See the audio score on DVD track 04.

CONCLUSION

The excerpts were chosen because of and based on extended auditory research which covered the music composed in the beginning of the 20th century as well as compositions by György Ligeti's during the decade of 1960. The investigation began with the first appearance of the term texture in the article entitled *Some Considerations of the Effect of Orchestral Colour upon Design and Texture in Musical Composition* written by H. P. Allen in 1908. The parameters of texture were studied in depth according to the technical characterizations organized by author Wallace Berry in his book *Structural Functions in Music*. The parameters were also studied related to more recent writings on the subjects of timbre and texture.

Those studies helped to achieve the technical basis for the comparative analyses present in chapter three and served to demonstrate graphically the texture and timber similarities existing in the music excerpts used in the comparisons. It is important to observe that the auditory process represented the main research tool used as means of perception of the sonority details. The analyzed excerpts and segments were all selected through attentively listening appreciation.

An extended overview has been made of what has been written about György Ligeti. Focused on interviews and conversations with the author, precise information was obtained with regards to the influences Ligeti received from antecedent composers from the first half of the 20th century. In those conversations and interviews, the Hungarian-Austrian composer emphasized not only his knowledge of specific compositions such as the *Lyric Suite* written by Alban Berg and the 4th String Quartet composed by Béla Bartók, but he also emphasized the extent to which those pieces and others by Igor Stravinsky had had an effect upon his work.

Chapter one presented a brief historical overview and discussed textural parameters and their significance for 20th century music composition. Chapter two presented an overview of György Ligeti's compositions starting with his arrival in Cologne in early 1957 up to the writing of the Chamber Concerto between 1969 and 1970. Chapter three developed four comparative analyses regarding similar textural sonorities present in Ligeti's compositions and in Igor Stravinsky, Alban Berg, Dmitri Shostakovich and Béla Bartók's compositions.

By the second half of the 20th century, evidence points towards a focus on textural parameters in composition as a general means of expression in music. Composers from that period developed very distinct compositional styles in which timbre and texture represented a definite structural element. Joseph Auner commented that

> While pursuing very different expressive and stylistic ends, composers of texture music share a fascination with how we experience sounds as they move through time, building and fading, coalescing into stratified layers or thick clouds, or dissolving into particles. (Auner, 2013, p. 235).

The composer György Ligeti had imagined the static type of sonorous outcome while still in Hungary, as he commented in conversation with Josef Várnai "[…] I first began to think about a kind of static music you find in Atmosphères and Apparitions in 1950" (Eulenburg, 1983, p. 33). This statement makes it clear that static sounding structures were already among György Ligeti's conceptual ideas. His ideas matured with the help from his experiments in electronic music and direct contact with serialism from the 1950's. Ligeti openly addressed the fact that he had been influenced by composers from the first half of the 20th century, as demonstrated in chapter two. The comparative analyses which were made clearly show that Igor Stravinsky, Alban Berg, Dmitri Shostakovich and Béla Bartók influenced György Ligeti's compositional tendencies and that he reflected the previous shift in compositional styles towards textural characteristics and away from the previous tonal parameters of melody, harmony and metric rhythm in the 20th century.

The new ideas implemented by György Ligeti in his music were not only a result of his laborious work, but the result of his vast knowledge. The composer had extensively studied and practiced traditional music of all periods from the middle ages up to the first half of the 20th century. As Arnold Schoenberg has affirmed in his essay *Teaching and modern trends in music*

> Only a thorough knowledge of the styles makes one conscious of the difference between 'mine and thine'. And accordingly, one cannot really understand the style of one's time if one has not found out how it is distinguished from the style of one's predecessors. (Arnold Schoenberg, 1938, p. 377).

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EXCERPTS ON DVD:

Track 1
Arnold Schoenberg – Farben: Quoted from Analyse de l'op.16 n°3 d'Arnold Schoenberg par F. Nicolas, https://www.youtube.com/watch?v=tFT6NIYMF1I.

Track 2
Igor Stravinsky - The Firebird: Valery Gergiev - Vienna Philharmonic, Salzburg festival.

György Ligeti - String Quartet no. 2: Dudok Quartet, live at the Concertgebouw.

Track 3
Alban Berg - Lyric Suite: Juilliard String Quartet - Robert Mann (violin), Earl Carlyss (violin), Samuel Rhodes (viola), Claus Adam (cello).

György Ligeti - Concerto de Chambre: Ensemble Intercontemporain - Tito Ceccherin.

Track 4
Dmitri Shostakovich - Symphony No.2: Thomas Sanderling conducts RSB Berlin.

György Ligeti - Atmosphères: Claudio Abbado - Viena Philharmonic.

Track 5
Bela Bartok - **String Quartet Nr. 4**: Quatuor Ebène Festival Wissembourg.

György Ligeti - Cello Concerto: Alexis Descharmes, solo cello & Ensemble C Barré, conducted by Sébastien Boin.

All the charts used in this dissertation were conceived and designed by the author.