Musical Memory, Cultural Memory, and Digital Technologies: Perspectives and Analytical Approaches

by

Annette Brosin
Mag.[a] Artium, University of Music and Performing Arts Vienna, 2009

A Dissertation Submitted in Partial Fulfillment
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A radical transformation is taking place in today's society with the rapid developments in digital technology. The digital dispersion of information occurs globally at an unprecedented speed, altering innumerable aspects of cultural memory to the extent that the experience of cyclical time of ritual culture is gradually replaced by the prevalence of linear time of progress and chaotic time of computerized processes. As a result, both formation and experience of meaning are changed.
With that, an important question arises with regards to music: how does musical meaning transpire in contemporary culture?

As a theoretical companion to my compositional work, this doctoral dissertation addresses this question from the perspective of memory. Based on the idea that musical meaning is informed through its contextualization within the manifold intersections of memory, cultural memory, and digital technology, its first three chapters explore the relationships between memory and identity, externalized memory and culture, time and meaning in music, and how these relationships can inform musical analysis. The fourth chapter provides analytical approaches to compositions by Luciano Berio, Helmut Lachenmann, John Cage, and Pierluigi Billone informed by the conclusions gained from the previous chapters.

The last three chapters focus on the added complexity of the relationships between musical memory and cultural memory as impacted by digital technologies. It will be explored how digital processes affect various aspects of musical memory and musical time. Correspondingly, the final chapter offers musical analyses of compositions with live electronics by composers Brian Ferneyhough and Jonathan Harvey, and the dissertation will be concluded by an analysis of my dissertation composition *#ffffff* which is appended.

Central to the investigation are the post-structuralist ideas of philosophers Bernard Stiegler, Jacques Derrida, Gilles Deleuze and Félix Guattari, as well as theories regarding cultural memory brought forth by Jan and Aleida Assmann. In order to apply these concepts to an examination of music, they will be reconciled with the musical philosophy of Gunnar Hindrichs, the musical semiotics of Jean-Jacques Nattiez, the cultural semiotics of Roland Posner, and the critical media studies of Wolfgang Ernst.

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Acknowledgments

The present dissertation – from the very early stages of its conception to the long period of writing – has taken on its current form only thanks to the many wonderful people that I am lucky enough to have in my life. I am grateful for the patience and support that was given to me throughout the years of writing. Numerous encouraging and inspiring conversations have always guided me to believing in this project. With this, I was not only allowed but also supported to investigate a topic that is dear to me on many levels, a topic which, bit by bit, has enabled me to reevaluate many aspects of music and life in general that are meaningful to me.

The most important people during this time were my friends Darren Miller, Lori Hamar, Megan Quigley, Mick Mallon and Alexina Kublu. Their undying support and presence in my everyday life were vital to my maintaining persistence and to gaining a deeper understanding of what I was actually trying to accomplish with this work. Furthermore important were my friends and family from Victoria and afar, particularly Lam Tran Dinh, Shannon Mann, Kristy Farkas, Carol Bilson, Dave Riedstra, Mark Rowsom, Paul Bates, Katy Roden, Anna Berkmann, Monika Wiedemer, Sebastian Schrepffer, my parents Hans-Günther and Fe Brosin, and my sisters Viviane Brosin and Ramona Schlewek.

Only thanks to the UVIC Students of Colour Collective (especially with the wonderful folks who were around in the years 2013-14) was I able to gain access to important questions that allowed me to embark on an exciting quest to find identity, meaning, and community, all of which has paved the way for the present dissertation eventually.

I owe thanks to my supervisory committee for having guided me through this degree, and particularly to Professor Christopher Butterfield for having committed to getting everything together smoothly, and to Dr. Arthur Kroker as well as Mitch Renaud for having suggested a reading list without which this research would have remained unthinkable.

I would like to thank the many talented musicians that have supported me by committing endless hours of their days to rehearsing, playing, and conducting, but also proof-reading and various other things essential to getting the work done. Among these people, fellow composers Nathan Friedman and Alex Jang really stood out and deserve my eternal gratitude and reverence.

Finally, I would like to acknowledge that all of the above – all of my relations and the entirety of the present work – owes its existence to the fact that, for the past six years, I have been an uninvited visitor to the unceded territoires of the Lekwungen, W̱SÁNEĆ and Coast Salish Peoples.

Dedication

In love and admiration, I dedicate this dissertation to my father Hans-Günther Brosin and my thesis composition *#ffffff* to my friend Dr. Darren Miller.

Chapter 1: Introduction

Motivations

> A technique appears, […] that radically transforms the way all spirits transmit and are transmitted from generation to generation, and the way spirit transmits itself from generation to generation through them […]. It is this mnemotechnics that [...] involves a massive transformation of the social group that raises a thousand questions. It overturns, for example, the relation to tradition, to spirits, and, more precisely, the articulation between the city and religion, the relation between the profane and the sacred, the place of the clans inside the city-states or territories [*demes*], and so on. It raises, in short, questions that are not entirely foreign to what we are experiencing today, on a global scale, with respect to contemporary forms of technology (however novel our current situation might otherwise be).[1]

In this statement, French post-structuralist philosopher Bernard Stiegler[2] describes the complex metamorphosis of culture as a result of the introduction of orthography – the technology of written text as a medium to transmit cultural memory. According to Stiegler, a similar yet even more radical transformation is taking place in contemporary society with the developments of digital technology as the digital dispersion of information occurs globally at an unprecedented speed, altering innumerable aspects of cultural memory to the extent that both formation and experience of *meaning* are changed. With that, an important question arises: how does musical meaning transpire in today's culture?

This fundamental question prompted the present dissertation, which aims at formulating an analytical paradigm that considers musical meaning as necessarily informed through its contextualization within the manifold intersections of digital

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[1] Bernard Stiegler, "Technics of decision an interview," trans. Sean Gaston, *Angelaki: Journal of the Theoretical Humanities* 8, no. 2 (2003): 154.

[2] Bernard Stiegler (born April 1, 1952 in Seine-et-Oise, France) is a French philosopher who has focussed on questions of technology and time, while turning to philosophers like Henri Bergson, Edmund Husserl, Jacques Derrida and Roland Barthes. He has published three volumes of *La Technique et le temps* (Technics and Time), and was Director General at the Institut de Recherche et Coordination Acoustique/Musique from 2002 until 2006. In 2010, he opened the Ecole de philosophie d´Epineuil-le-Fleuriel in France and is currently the director of the Institut de recherche et d'innovation (IRI), which is associated with the Department of Cultural Development at the Centre Georges-Pompidou.

technology, cultural memory and memory. The specifics of the initial motivations are manifold and essentially based on the following personal circumstances:

1. My academic pursuits in the sound engineering program (*Tonmeisterei)* at the University of Music and Performing Arts in Vienna having initially led to questions regarding musical reproduction via mechanical and digital technologies. Most importantly, my studies led to an awareness of the temporal and spatial deferral of musical sound as a result of such technological processes.

2. The move from Vienna to Victoria, BC in 2009 – in order to commence the Ph.D. program in music composition at the University of Victoria – set in motion a series of hitherto hidden questions about cultural identity. Grappling with mixed race heritage, I began to interrogate my abilities to identify symbolic content from given cultural practices and to interpret these symbols in meaningful ways without appropriating their cultural contexts. Ultimately, this led to an enquiry into both musical production and musical perception as cultural practices, inseparably connected to cultural identity and, therefore, to cultural memory.

In combining the above questions, more succinct questions can be formulated: if music is understood to be a form of cultural memory, then how can musical memory be analyzed in light of the drastic societal changes that recent developments of digital technology have triggered? What is today's meaning of music in the context of a progressively globalized, assimilated culture which is increasingly determined by temporal and spatial de-contextualization?

In the introduction to his book *Musical Meaning. Toward a Critical History*, American composer and musicologist Lawrence Kramer begins his in-depth discussion of musical meaning by emphasizing that

> [t]he underlying point of this book is that the apparent dilemma of musical meaning is actually its own solution. [...] the question of whether music has meaning becomes, precisely, the meaning of music. [...] music has generally operated on the basis of a series of contradictory tendencies: on the one hand toward the projection of autonomy, universality, self-presence, and the sublime transcendence of specific meaning, and on the other hand toward intimations of contingency, historical concreteness, constructed

> and divided selfhood, and the intelligible production of specific meanings.[3]

The latter aspect is a central focus of the present enquiry in which musical meaning will be investigated in the context of contemporary musical culture as impacted by digital technology. The complex interplay of music's autonomy and its cultural and historical dependence is complicated further by the current condition of contemporary society as permeated by digital technology. Today, various computerized processes function to store and transmit data on a global scale, bridging spatial and temporal differences. With globalized networks for communication and information storage, high amounts of information may be transferred intercontinentally with infinitesimal delay. Such mastery of geographic space and time, however, inevitably entails a neutralization of "political, economic or cultural"[4] differences. This observation will inform the following study of musical meaning particularly with regards to prevalent models for the analysis of Western art musics. As Kramer importantly suggests, musical autonomy cannot be the sole perspective from which music is analyzed since this autonomy is always tied to its historical and cultural contingency,[5] an aspect which reflects music's inherently social aspect: its cultural function as ritual, which conditions "the symbolization of experience."[6]

This dissertation is a study of the complex effects of digital technologies on music. It is based on the understanding that music fulfills a social function, that it contributes to the formation of cultural identity, and that it acts as a carrier of cultural memory. As such, the investigation will begin with a description of the formation of social and cultural identity. Cultural memory will be explained in the second chapter. The

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[3] Lawrence Kramer, *Musical Meaning. Toward a Critical History* (Berkeley: University of California Press, 2002), 2.

[4] Jan Assmann, "Globalization, Universalism, and the Erosion of Cultural Memory," in *Memory in a Global Age. Discourses, Practices and Trajectories*, eds. Aleida Assmann, and Sebastian Conrad (New York: Palgrave Macmillan Memory Studies, 2010), 121.

5 Ibid., 2-3. In fact, Kramer points out that "[o]ver the course of the past two centuries, as variously defined dualities of autonomy and contingency have tended to define the understanding of music, the terms of autonomy have increasingly tended to be upheld as primary or superior; subtractability trumps imprintability." Ibid., 4.

6 Ibid., 7.

findings of these chapters will inform the framework within which the various connections between memory and time will be investigated in their relation to music in the third chapter. The fourth chapter will synthesize the diverse concepts discussed in the previous chapters into coherent analytical approaches to music. Similar to Kramer's project,[7] the intention behind this dissertation is to investigate music within the context of historical and cultural contingency and thereby to "argue for a reversal of this value [between musical autonomy and contingency] inclination".[8] The last three chapters (five to seven) will specifically address the complexity added to the relationships between musical memory and cultural memory based on the impact of digital technologies. Chapter five will provide a theoretical examination of computerized cultural memory, and chapter six will investigate digital processes of memory and time in music. The final chapter will offer an application of the theoretical findings to the analysis of musical compositions, which employ technological processes in notable ways. The concluding analysis will examine the dissertation composition *#ffffff* (Appendix) to which the present dissertation serves as the theoretical complement.

Methodology

In the attempt to formulate an analytical approach to music which considers music's cultural context involving memory, cultural memory and digital technology, the following investigation will primarily reconcile the philosophical concepts by Bernard Stiegler and the various theories of Aleida and Jan Assmann[9] regarding *cultural memory*.

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[7] In the introduction, Kramer expresses his intention to counter the lack of balance between the notion of musical autonomy versus musical contingency and to offer analytical approaches that instead embrace both aspects. He contends that "musical meaning consists of a specific, mutual interplay between musical experience and its contexts." Ibid., 8.

8 Ibid., 4.

[9] Having studied and habilitated in Egyptology, German scholars Aleida and Jan Assmann are leading researchers in the field of memory studies and have established important theories of cultural and communicative memory. They have published their work in several books and journals, in collaboration and individually, since the 1990s. The term *cultural memory*, which they coined in 1988 ("kulturelles Gedächtnis"), is central to their theories.

Seminal works by Jan Assmann include *Das kulturelle Gedächtnis: Schrift, Erinnerung und politische Identität in frühen Hochkulturen*, Fourth Edition (Munich: C.H. Beck, 1992) translated as *Cultural Memory and Early Civilization: Writing, Remembrance, and Political Imagination.* (Cambridge University Press, 2011);

While current memory studies comprise a plethora of various aspects – such as neurological, psychological, and social – the phenomenon of memory as a cultural parameter will be at the centre of the present study. The research is connected to cultural aspects of music composition as it relates to creation, performance and reception. As argued by Kramer, music cannot be analyzed outside cultural contexts. Furthermore, a given culture can only be fully understood when its musical practice, as a cultural means for reflection, is taken into consideration.[10] The premise of this dissertation is therefore that culture, memory and music have been dramatically impacted by the developments of twentieth century industrial technology. Bernard Stiegler sees critical connections between technology, time and culture, which – as will be explained – provide the foundation for a particularly radical transformation of contemporary culture through technology. Stiegler's analysis will serve as the philosophical foundation of this dissertation. He suggests:

> There is today a conjunction between the question of technics and the question of time, one made evident by the speed of technical evolution, by the ruptures in temporalization (event-ization) that

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Religion und kulturelles Gedächtnis: Zehn Studien (Munich: C.H. Beck, 2000) translated as *Religion and Cultural Memory: Ten Studies (Cultural Memory in the Present)* trans. Rodney Livingstone (Standford University Press, 2005).

Important works by Aleida Assmann are

Geschichte im Gedächtnis: Von der individuellen Erfahrung zur öffentlichen Inszenierung. (Munich: C.H. Beck, 2007), and *Erinnerungsräume. Formen und Wandlungen des kulturellen Gedächtnisses*. (Munich: C.H. Beck, 1999, 3rd edition, 2006).

[10] German composer Helmut Lachenmann describes Western culture in its relationship with avant-garde music in the context of post-tonality and establishes important connections between history, memory, culture and musical composition: "A technique of critical analysis should be developed, since the compositional detail and its relationship to the whole reveal a music's ideology. Possibly, such an analysis should be based on a comprehensive definition of what tonality means to our society as it is passed on as a surviving aesthetic centre." Helmut Lachenmann, "Zum Verhältnis Kompositionstechnik – Gesellschaftlicher Standort," in *Musik als existentielle Erfahrung. Schriften 1966-1995*, ed. Joseph Häusler (Wiesbaden: Breitkopf&Härtel, 2004), 96.

Lachenmann thematizes how music composition *and* perception have been inherently shaped by socio-political circumstance throughout history. This perspective is the centre of the present study. For more on Lachenmann's concepts, refer to all articles of the chapter "Musik und Gesellschaft" in his collected writings.

> this evolution provokes [...]. It is a conjunction that calls for a new consideration of technicity.[11]

Central to Stiegler's work is the understanding that the knowledge of the world is perceived not only empirically (*episteme*) but also technically (*tekhne*). The communication of technical knowledge is referred to as "technicity"[12] and occurs via various technologies. The dynamic interplay between such technologies with time and social circumstances is central to Stiegler's concept of *technics*: *technics* is an act or a process of memory, which allows humans to be aware of a past not actually lived and experienced individually.[13] Referring to Derrida, Stiegler argues that technicity is "originary" to humanity, which means that human memory is always "supplemented" by exteriorized memory.[14] Exteriorized memory is a projected *inorganic* memory reliant on prosthetic supplements,[15] with the function to support *organic*, internal memory. "As a 'process of exteriorization,'" so Stiegler, "technics is the pursuit of life by means other than life.[16]

A crucial aspect of technicity is that it is in constant development,[17] with which comes "a divorce, if not between culture and technics, at least between the rhythms of cultural evolution and the rhythms of technical evolution. Technics evolves more quickly than culture."[18]

Important to the present study is Stiegler's suggestion that time and space (and their interrelation) have been inherently changed by this separation of culture from technics. Memory itself is therefore transformed by technical evolution.

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[11] Bernard Stiegler, *The Fault of Epimetheus – Technics and Time, 1*, trans. Richard Beardsworth, and George Collins (California: Stanford University Press: 1998), 17.

[12] Stiegler, *The Fault of Epimetheus*, 17.

[13] See Bernard Stiegler, *Disorientation – Technics and Time, 2*, trans. Stephen Barker (California: Standford University Press, 2009), 1-11.

[14] Ibid., 4.

[15] Ibid.

[16] Stiegler, *The Fault of Epimetheus,* 17.

[17] Historically, the innovations of prosthetic supplements have involved technics such as ritual, text (orthography), photography, audio and film recording etc.

[18] Stiegler, *The Fault of Epimetheus,* 15.

In *Technics and Time, 2*, Stiegler establishes how technicity relates to memory and describes how memory becomes transformed by means of various techniques of exteriorization, as the permanent innovation of inorganic memory involves a dramatic shift from one technic to the other. In their extensive work on cultural memory, Aleida and Jan Assmann have pointed out how the development from ritual-based representation to text-based interpretation has caused the biggest historical divide in the evolution of exteriorization.[19] The transition to textual hermeneutics, Jan Assmann suggests, may have come at the expense of cultural meaning. "Meaning can only be sustained by circulation. Rituals are a form of circulation. Texts, on the contrary, are not a form of circulation themselves, they only are insofar as they are circulated."[20]

The main factor behind this radical development was the shift to another system of exteriorization entailed a substantial transformation of time in its relation to cultural memory. The cyclic time of repetitive ritual changed to a linear flow of time, which had several implications which will be discussed in depth in the course of the paper. Undergoing a constant evolution, textual as well as nontextual prostheses to memory eventually became what Stiegler describes as *analogical* and *numerical* technologies, employing an industrial mode of operation.

> In the age of analogic, numeric, and biological syntheses, retentional finitude is implemented economically, becoming the privileged object of industrial investment: the economic imperative has the initiative of its reification.[21]

The issue, as pointed out by Stiegler, is that contemporary technics transform memory and information into passive objects, which are then reproduced and circulated. While traditional technics such as written text or paintings allow for a distinction between a subject – i.e. a physical fact, an event etc. – and its memory, analogic and numeric systems synthesize memory's object and do not actually conserve the *real*.

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[19] See Jan Assmann, *Das Kulturelle Gedächtnis. Schrift, Erinnerung und politische Identität in frühen Hochkulturen*, Fourth Edition (Munich: C.H. Beck, 1992), 96.

Aleida Assmann discusses the drastic transformation of memory through the introduction of text. See Aleida Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," *Representations*, no. 56, Special Issue: The New Erudition (1996), 123-134.

[20] Assmann, *Das Kulturelle Gedächtnis*, 91.

[21] See Stiegler, *Disorientation*, 97.

Consequently, contemporary mass media technologies – employing an "industrialization of memory"[22] – have been intrinsically altering temporal dimensions of memory as well as processes of its circulation. Today, economic profitability directs both route and extent of memory circulation which no longer serve the purpose of sustaining and living one's cultural heritage. Mobility and reproducibility of information have become new motivators in the circulation of memory:

> Messages' processing and diffusion mobility, but also their mass duplicatability, thus attains the true physical limit—absolute speed. The history of memorization techniques shows that they are developed in order to augment message components' combinative mobility, their mobility across various media, the mobility of media themselves, and finally their reproducibility: circulation and duplication of memory messages continuously accelerate and intensify with time.[23]

In tandem with the invention of machinery and, finally, computerized automation, the shift to industrial technologies has been gradually removing the remnants of human (organic) physique and control from what in itself has proven to be a "means other than life."

Stiegler refers to modern technological applications as *industrial temporal objects.* They are created via technologies like photography, television, cinema, radio and recording: technological devices that capture and widely distribute image and sound. The present study will concentrate on technologies, which directly influence music composition, performance and perception. These involve recording and broadcasting techniques as well as more recent developments such as digital sound processing and synthesis, sampling, and the creation of new, virtual, instruments.

Stiegler postulates that technical developments have always led to a cultural evolution and as such cannot be disregarded in the examination of cultural developments:

> Becoming technical is originarily a derivation: socio-genesis recapitulates techno-genesis. Techno-genesis is structurally prior to socio-genesis—technics is invention, and invention is innovation—and the adjustment between technical evolution and social tradition always encounters moments of resistance, since technical change,

[22] Ibid., 9.

[23] Ibid., 127.

> to a greater or lesser extent, disrupts the familiar reference points of which all culture consists.[24]

In his analysis of the difference between modern *industrial* temporal objects (devices of modern technology) and previous temporal objects[25] (ritual, text, paintings, statues, works of architecture, music, etc.), Stiegler observes that the current disruption of familiar reference points has been impacting culture on a level of unforeseen magnitude. The resulting spiritual and social disorientation lead to an age of cultural crisis. While both types of temporal objects function as exteriorized memory, industrial temporal objects pervade culture and memory in a particularly profound and distinctive way, and exhibit a radical difference to previous temporal objects. It is this profound difference, which provides the hypothetical point of departure for the following musical investigations:

> The industrialization of memory [...] *is the industrial synthesis of retentional finitude* subjected, as pre-judgment, to the specific criteriology of calculable credit as the operator of economic development, as opposed to both theo-logico-political discredit and integrist compulsions (lay and religious) that industrialize the already-there. The programming industry, as the operator of memory's industrialization, exploits the possibilities of memory's synthesis as opened out by analogic, numeric, and biologic technologies. Through on-line communication, data processing in real time, and genetic manipulation linking the somatic and the germinal, the structure of the event in all its forms is radically modified. Contemporary technical mediation destroys the process of communication that once grounded orthographic writing. And thus arises the question of the politics of memory.[26]

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[24] Ibid., 2.

[25] Temporal objects are, in simple terms, objects that are perceived as inherently affected by time, i.e. they change over time and so does one's perception of them. Edmund Husserl explains this by describing how a melody is perceived first in its passing and second in the immediate memory of already past notes. A melody is therefore heard as a temporal flow, which is constantly in relation to its previous tones. For a more specific explication of this, as brought forward by Edmund Husserl, see below.

Within the realm of exteriorized memory, i.e. outside the human brain, pre-industrial temporal objects include technics such as writing or ritualistic performances. Such temporal objects always allow for a contextualization of the information or memory, which the temporal object retains. *Industrial* temporal objects, on the other hand, are created from and performed through an already objectified memory, "from an anonymous elsewhere, a satellite with neither here nor now […]." Hence, industrial temporal objects are based on decontextualization. Stiegler, *Disorientation*, 241.

[26] Ibid., 9.

Stiegler's analysis reveals that modern, industrial technology has generated entirely new connections between memory, exteriorization, and time. With these altered relationships, the process behind semiotics – the generation of meaning – is changed, too. Stiegler's proposition – the renewed consideration of technicity and its sociocultural impact – will be adopted and translated into musical analysis in this study.

The analytical discourse about music in this dissertation will be informed by Stiegler's critique and the ideas of cultural memory brought forward by Aleida and Jan Assmann, whose concepts echo the works of Henri Bergson and his student Maurice Halbwachs.[27] This will allow for an expanded discussion regarding music composition and performance of the last century in relation to memory and digital technology, with reference to the contemporary social and cultural critique of Bernard Stiegler. Furthermore, the work of phenomenologist Edmund Husserl and philosophers such as Jacques Derrida, Gilles Deleuze, Félix Guattari, Theodor Adorno, Walter Benjamin, Jacques Attali, and German media theorist Wolfgang Ernst will be considered.[28] The discussion will also include concepts from Jean-Jacques Nattiez's musical semiotics which will be reviewed in relation to Roland Posner's cultural semiotics.

The musical analysis will serve to investigate contemporary relationships between music and memory, wherein a phenomenological experience (or comprehension) of the modern world occurs within the context of culture and technology.[29] This approach is in

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[27] For example, Bergson *Matière et mémoire* (1896), Halbwachs *La Mémoire collective* (1950).

[28] In his post-structuralist philosophical work, Deleuze (i.e. in "The Actual and the Virtual", in *Dialogues II*, 1987) has focussed on the different connectivities (or the lack thereof) between time, space and meaning in "the Actual" and "the Virtual" which Stiegler (in *Technics and Time, 2*, 2009) applies to his critical analysis of what he sees as new technology functioning as a vehicle of the industrialization of memory and a tendency against *retentional finitude*. Attali's *Noise: The Political Economy of Music* (1985) discusses music's role as a cultural form in society, and how – as such – it is directly influenced by current means of production. Wolfgang Ernst's book *Digital memory and the archive* (2013) offers numerous essays in which the author investigates the functionalities of digital media technologies from historical perspectives of archives and memory within culture.

[29] "The point in doing so is certainly not to introduce further abstract theoretical constructs, but to investigate empirically with these conceptual tools how memories are generated on the level of individuals and groups, how they are transformed by media and reconstructed retrospectively according to present norms, aims, visions, and projects." Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*, ed. Robert E. Goodin and Charles Tilly (UK: Oxford University Press, 2006), 210-224; from the *Oxford Handbooks Online*,

http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014).

line with Henri Bergson's research into memory and time as he sought to challenge "the empiricist and rationalist assumptions through which contemporary scientists observed, measured, and described the world, replacing these with a more experiential methodology based on individual perception and metaphysical understanding through imaginative sympathy."[30] Bergson's ideas have influenced present-day memory research[31] and culture[32] to a great extent, and his philosophical thought also pervades the research of the scholars listed above. Their distinctive disciplines of study intersect at points where Bergson's concepts about time, memory and consciousness become relevant.[33]

Such particular notions of memory will inform the following discussion of memory in its relation to the creation of identity, meaning and culture. This will allow for a thorough examination of music composition and performance in a twofold relationship with memory: memory *in* music, and music *as* memory.

To review, the chapters of this dissertation will be structured as follows. The first four chapters will examine the relationships of music *in* and *as* memory within the contexts of social and externalized memory. This examination will take place outside the context of digital technology, i.e. only involving pre-industrial technical prostheses such as ritual and text. The purpose of this is to provide a fundamental understanding of how

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[30] Kent Douglas Cleland, "Musical Transformation as a Manifestation of the Temporal Process Philosophies of Henri Bergson" (Ph.D. thesis, University of Cincinnati - Ohio, 2003), 54.

[31] Following Bergson's concepts about time, French sociologist Maurice Halbwachs deployed his theories about memory in the 1920s, which were groundbreaking in the research of memory within social frameworks:

Halbwachs was the first and foremost scholar to describe memory as a social phenomenon and coined the term "Les cadres sociaux de la mémoire." This concept is at the core of Aleida and Jan Assmann's work.

[32] Gilles Deleuze's notions of the actual and the virtual are derived from Bergson's thinking. See Gilles Deleuze, and Claire Parnet, "The Actual and the Virtual," in *Dialogues II*, trans. Eliot R. Albert (New York: Columbia University Press, 2002), 150; and more particularly: Deleuze, Gilles. *Bergsonism*. (New York: Zone Books, 1991). The specific concept of the actual and the virtual will be integrated with Bernhard Stiegler's cultural critique in the music analytical discussion in the later chapters of the present dissertation.

[33] Time here is thought of "not as a spatialized medium but instead as a fundamental characteristic of existence: the interpenetration of past and present or as change itself. […] [T]ime is real, constantly flowing, unidirectional, and non-repeatable." Cleland, "Musical Transformation as a Manifestation of the Temporal Process Philosophies of Henri Bergson," 57.

Furthermore, Bergson's ideas regarding the relationship between mind and body emerge from his notion of an "image," and objects which have the potential of being perceived. In this thought, "the body becomes a center of virtual actions that constitute pure perception. Finally, he states that recognition differs from pure perception in that it must by necessity utilize memory." (Ibid.) As for internal time and temporal consciousness, see Edmund Husserl's ideas of retention and protention below.

memory has always been exteriorized into inorganic artefacts – technics – while the development of such pre-industrial technics has occured at a similar speed to that of cultural evolution. Technics in this case are in step with culture, revealing a negotiable "distance between technical systems and social organizations."[34]

Chapter one will introduce relevant terms and concepts of memory, time and identity from Aleida and Jan Assmann in constant reconciliation with Stiegler's notion of technicity and Gunnar Hindrichs' musicological writings. The transition from Aleida and Jan Assmann's theories of memory to the philosophical concepts of Stiegler will entail Gilbert Simondon's notion of *individuation.* Furthermore, it will necessitate a review of Derrida's ideas of *différance* in order to bridge the various concepts of *repetition* and *difference* that inform the works of Stiegler, Aleida and Jan Assmann to the perspectives of memory and the emergence of historical consciousness. This will involve an introduction of Deleuze's ideas on difference and repetition facilitating the application of these theoretical and philosophical findings to a musicological discussion. These various theories will enrich the following investigation and allow for a suitably complex approach to musical analysis from the intersections of cultural memory and digital technology.

Chapter two will discuss externalized memory from the perspectives of Stiegler and Aleida and Jan Assmann. The chapter will provide a detailed analysis of the transformations of oral cultures following the introduction of written text as a technology directly impacting the relationships between culture, repetition and difference. Chapter three will link memory and time in the context of music, describing how music both constitutes and is constituted by memory and time. The introduction of the semiological approaches of Nattiez and Posner will conclude the chapter, serving to project the findings of the previous chapters into a useful music analytical model. This will then inform various analytical approaches to the music of Luciano Berio, Helmut Lachenmann, John Cage, and Pierluigi Billone found in the fourth chapter. The analytical approaches will entail a consideration of those aspects of memory that inform the given physiological, social, and technical aspects that exist in the compositions.

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[34] See Stiegler, *Disorientation*, 3.

Chapters five to seven will then contextualize the theoretical findings of chapters two to four within digital media. The fifth chapter will focus on Stiegler's observations of the *widening* of the "distance between technical systems and social organizations"[35] which, Stiegler argues, have induced a thorough restructuring of temporal and spatial relations in connection with memory. Stiegler contends that, as a result, a gradual shift of cultural identification and meaning has been precipitated by the industrialization of memory through modern technics.[36] Chapter five will outline the political impact of this industrialization of memory in synthesis with the critical analyses by philosophers Benjamin and Adorno with regards to artistic and musical (re)production in the contemporary context of the internet. As in chapter two, the aspects of repetition and difference as they exist in a computerized culture will be discussed.

In chapter six, the new findings will be applied to a thorough examination of technology in musical application. Prerecorded sounds, digital instruments and processes will be investigated as distinct types of musical material.

Finally, the seventh chapter will be dedicated to a detailed analysis of two pieces of electronic music (by Brian Ferneyhough and Jonathan Harvey) from the perspectives gained from the philosophical discussion the previous chapters. An analysis of my own compositional work – thesis composition *#ffffff* – will conclude this dissertation.

Categories of Memory

As will be discussed, several types of memory exist, some of which take effect in the creation of music in more obvious ways than others that are only peripherally related to musical processes. According to Aleida and Jan Assmann's work, memory studies differentiate between personal ("I") memory and collective memory ("We"). Personal memory is composed of individual and social memory, whereas collective memory is composed of communicative, cultural, and political memory.[37] As deemed relevant to

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[35] Ibid.

[36] "[...] global memory has itself finally been subsumed into an industrialization directly affecting our psychic processes and collective identifications and differentiations; that is, individuation itself." Ibid.

[37] Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*,

musical application, the present study will be limited to the discussion of the following four formats of memory:

1) individual memory, 2) social memory, 3) communicative memory, and 4) cultural memory.

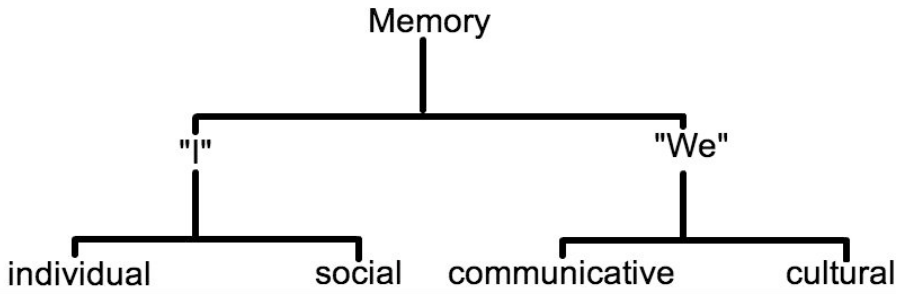

Figure 1 – Memory Formats (Graph adapted from Jan Assmann)

Individual and social memory are considered formats of memory in relation to a singular person "I", while communicative and cultural memory are part of what is regarded as collective memory, "We". Before categorizing and examining these formats and their variants in detail, it should be noted that there is no one clear line between any two kinds of memory serving to separate one format from the other. Often we are presented with an overlap of two or more formats at once. In their own ways and within their own temporal scope – i.e., spanning one life span or beyond – all dimensions of memory are involved in the creation of identity and meaning, and therefore in the creation of meaning within and around music.[38]

Identity and meaning are not fixed entities left unchanged in the flow of history, a fact which reveals itself when comparing the music of composers from different musical epochs. For example, a juxtaposition of works by Giovanni Gabrieli, Ludwig van Beethoven, Gustav Mahler, and Arnold Schönberg will only emphasize the obvious and illustrate how history has yielded very distinct musical voices and idioms, which ultimately allowed each of the composers to break with contemporary conventions, time

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http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014).

[38] Ibid.

and again.[39] This can happen only within socio-musical contexts that are inherently related to contemporary ideas of musical identity and meaning at any point in history, allowing us to speak of a particular piece of music as belonging to a specific musical style. In order for music to be meaningful, the composer needs to be conscious of musical idioms and styles within his or her own culture and time, a necessity, which Helmut Lachenmann stressed in his essay "The Beautiful in Music Today":

> Only in coming to grips with the aesthetic apparatus and the categories that determine it, can self-knowledge and musical expression come about. Only then can the experience of freedom be artistically communicated as reality (with its distinguishing contradictions) and become conscious. The experience of the Beautiful is indissolubly connected with making perceptible the social contradictions in our reality; because to make them perceptible is to make them surmountable.[40]

Musical meaning and self-knowledge on the part of individuals who are involved in the creation of music (i.e. composer, performer, listener) are based on memory. Both aspects generate meaning*fulness* as a result of the continuous reciprocity involved in the process of musical creation; on that account, a thorough understanding of how memory works in music is of substantial importance for the present study.

For the analysis of music in relation to memory then, it is of great interest to classify dimensions of memory not via an "I"-versus-"We" dichotomy, but rather according to the specific *ways* in which memory itself is manifested. Aleida Assmann proposes that

> [I]ndividual and social memory is embodied; both formats are grounded in lived experience; they cling to and abide with human beings and their embodied interaction. Political and cultural memory, on the other hand, are mediated; both are founded on the more durable carriers of external symbols and material representations; they rely not only on libraries, museums, and

[39] This will be discussed at length in the sections *Identity and Meaning via Time* and *Identity and Meaning via Differences* (chapter one) as well as in the second chapter.

[40] Helmut Lachenmann, "The 'Beautiful' in Music Today," *Tempo*, New Series, no. 135 (1980): 23.

> monuments, but also on various modes of education and repeated occasions for collective participation.[41]

In other words, individual and social memory in music can be found *in* and *around* the *creation* of music: the lived experience of music, encompassing the composition *and* performance of music. Cultural memory, however, constitutes itself as the event or *ritualization* of musical performance and the musical work: in this way, music *is* memory, cultural memory – a container filled with those externalized symbols and material representations which Aleida Assmann describes as mediators of cultural memory in the above quote.

Music as both social and cultural memory has recently been affected by technological developments on various levels. With the technical possibilities of employing live electronics on the one hand (creation), and using recording (preservation and reproduction) and broadcasting (distribution) for documenting, archiving and circulating music on the other, several aspects of musical memory have been altered by these technologies.[42] I will discuss these developments in detail in the fifth chapter.

In summary, the present study distinguishes between 1.) *internal*, *social forms of memory* and 2.) *externalized*, *mediated forms of memory* – in analogy to the differentiation between *memory within music* and *music as memory*. This division[43] will

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[41] Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*, http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014). Political memory will be neglected in this research, as it is not seen of primary importance in this context.

[42] An example of this would be the relationship of time and memory with regard to music. In general, this is where Stiegler critiques Heidegger for having neglected the following notion: the act of recording and therefore re-producing music *verbatim*, not only functions without but also denies the occurrence of *difference in repetition.* In times before recording techniques were established, the only way to hear a piece of music *again*, was to go to another recital of that same piece, which guarantees such a difference – be it in musical terms such as (individual) interpretation, or general, acoustical aspects such as venue, instrumental timbre etc. Stiegler adopted Derrida's *différance*, where the concept of *difference* is an essential determinant between the past and the present in order to create meaning. With regards to repetition in music, Stiegler said: "Each new audition affords a new phenomenon, richer if the music is good, less so if not, and that is why the music lover is an aficionado of repeated auditions – a variation of selections … From one audition to the next the ear is not the same, precisely because the ear of the second audition has been affected by the first." in Bernard Stiegler, *Cinematic Time and the Question of Malaise – Technics and Time, 3*, trans. Stephen Barker (Stanford: Stanford University Press, 2010).

[43] It is important to note again that this division is not definitive but dynamic, and cross-overs between the two kinds of memory occur continuously.

provide the theoretical foundation for the analysis of the influence of digital technology on *external* and *internal* musical memory in the fifth chapter.

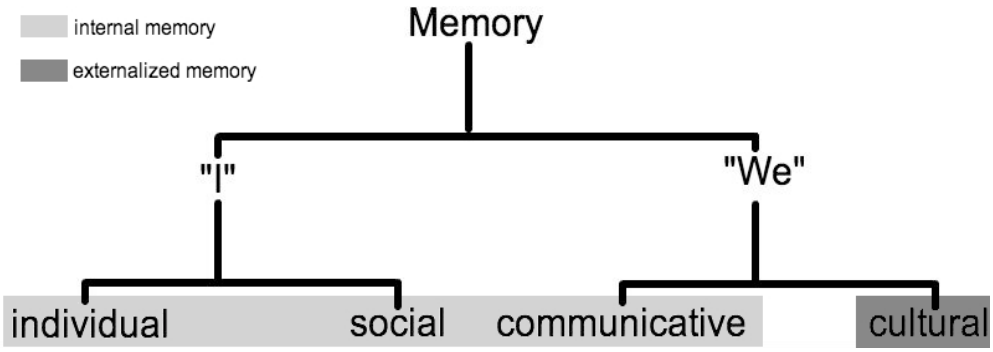

Figure 2 - Internal and External Memory (Graph adapted from Jan Assmann)

Social Forms of Memory: Communication = Community = Shared Culture

Lived experiences, as pointed out by Aleida Assmann, are the foundation of individual, social and communicative memory. Consequently, the lifespan of memory is inherently determined by the lifespan of the individual or collective group involved: social forms of memory cease to exist with the end of a person's life. However, "[I]n the shape of stories and anecdotes transmitted in oral communication, some of the episodic memories can transcend the individual person's lifespan. They are recycled within a period of 80-100 years, which is the period within which the generations of a family – three as a rule, but sometimes up to five – exist simultaneously, forming a community of shared experience, stories, and memories."[44] Individual and social memory are therefore intergenerational – in Stiegler's words, they are marked by *retentional finitude*.[45]

While individual and social memory apply to the singular person "I", or personal memory, we can find a similar temporal and experiential dynamic within collective memory. Communicative memory is the social form of collective memory, which is

[44] Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*, http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014)

[45] In his work, Stiegler opposes the *who* defined by retentional finitude and the *what* as the "industrialization of memory," the "industrial synthesis of retentional finitude." See Stiegler, *Disorientation*, 9.

"based exclusively on everyday communications," regarded as a constituent of oral history.[46]

Communicative memory is the sum total of the personal memories of several individuals via lived communication. It is important to understand that a bond exists among these individuals: they are related to each other through collective identification with a shared self-image as a group.

> Individuals' personal and collective memories interact. The term collective memory, however, is too vague and conflates important distinctions. The larger and more encompassing memory of which individuals are part of include the family, the neighborhood [sic], the generation, the society, the state, and the culture we live in. These different dimensions of memory, differing in scope and range, overlap and intersect within the individual who incorporates those memories in various ways. Humans acquire these memories not only via lived experience, but also via interacting, communicating, learning, identifying, and appropriating. It is often not easy to determine where one type of memory ends and another begins.[47]

At this point, personal and collective memories start to overlap, as "every individual memory constitutes itself in communication with others."[48]

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[46] Jan Assmann, "Collective Memory and Cultural Identity," in *New German Critique*, no. 65 (1995), 126.

It is important to consider that oral communication, or the transmission of memory via orality, operates without an externalization. With orthographic documentation (or archiving) of memory, writing systems are the forces to mediate information, which then becomes objectified memory – i.e. cultural memory.

[47] Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*, http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014).

Also see Assmann, *Das Kulturelle Gedächtnis*, 37. "The individual memory of a particular person is created through participation in communicative processes. It is a function of the integration of the person in various social groups, from family to religious and national communities. Memory lies and is preserved in communication; forgetting is a result of discontinued communication or of disappearing or changing frames of reference of the communicated reality."

[48] Assmann, "Collective Memory and Cultural Identity," 127.

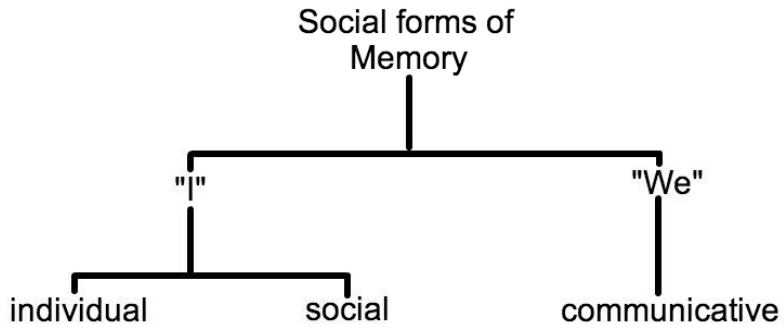

Figure 3 - Social Forms of Memory (Graph adapted from Jan Assmann)

This is important when examining the performance situation of music, which routinely involves more than one individual. Even in the case of, say, a performance of a composition for solo instrument, there is, in a concert situation, always the collective of the audience implied. One may ask: to what extent is the performance of a composition part of the work? Is the musical piece not already *real* given its existence on paper?

In comparing the emergence of music to that of language, Carl Dahlhaus said that neither music nor language are a work (*ergon*): they are an activity (*energeia*) and their true definition can thus only be genetic – indicating the importance of performance.[49] Gunnar Hindrichs discusses this condition in his recent work *Die Autonomie des Klangs (The Autonomy of Sound)*, where he suggests that while European music was born out of intellectuality ("Geistigkeit"), it did not necessarily entail a de-sensualization or an exclusive intellectualism.

> Intellectually organized sound is sensually audible sound, and its intoxicating and libidinal dimensions remain. Intellect, logos, reason in music are always sensual intellect, sensual logos, sensual reason.[50]

[49] Die Sprache.....selbst ist kein Werk (Ergon), sondern eine Tätigkeit (Energeia). Ihre wahre Definition kann daher nur eine genetische sein." Carl Dahlhaus, *Musikästhetik* (Cologne: Musikverlag Hans Gerig, 1967), 20.

[50] Der geistig geordnete Klang ist sinnlich-hörbarer Klang, und seine rauschhaften und triebhaften Dimensionen bleiben bestehen. Geist, Logos, Ratio sind musikalisch immer sinnlicher Geist, sinnlicher Logos, sinnliche Ratio."

Gunnar Hindrichs, *Die Autonomie des Klangs*. (Germany: Suhrkamp, 2014), 21.

Music may exist on paper, as an encrypted medium for the musician to decipher, but this always necessitates interpretation, wherein a sounding of music takes shape.

> Virtuosity, improvisation, pure occurrence also contribute to the sound system's logical form as virtuosic, improvised, purely occurring gestalts [*Gestalten*], just the same as its explicitly regulated gestalts.[51]

This dichotomy can be traced to Friedrich Nietzsche's distinction between the Apollonian and the Dionysian.[52]

A second distinction between music on paper and music performed on stage is ultimately related to time: Carolyn Abbate refers to music-as-performed as "real music" and in doing so implies a fundamental difference between music as a yet time-less idea and "real music" as an event rather than a (conceptual) work.

> It is real music, music-as-performed, that engenders physical and spiritual conditions wherein sound might suggest multiple concrete meanings and associations, conflicting and interchangeable ones, or also none at all, doing something else entirely. Real music, the event itself, in encouraging or demanding the drastic, is what damps down the gnostic.[53]

In simple terms, Abbate's use of the word "drastic" implies an inherent physicality (as in performance) involving experiential knowledge, whereas "gnostic" relies on a

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[51] Ibid. "Virtuosität, Improvisation, bloßes Geschehen haben als virtuose, improvisierte, bloß geschehende Gestalten im Tonysystem [sic] ebenso an dessen logischer Form teil wie seine explizit durchgeregelten Gestalten."

[52] Ibid. Nietzsche's often referenced usage of the Apollonian and Dionysian dichotomy presents an intellectual concept as it persisted in Ancient Greek tragedy. In short, the Apolline in art is found in orderly, symmetric forms where the rational – reasoning – prevails (for example in Greek scultpure), whereas the Dionysiac is represented by disorder, ritual, irrationality and exuberance. "To the two gods of art, Apollo and Dionysus, we owe our recognition that in the Greek world there is a tremendous opposition, as regards both origins and aims, between the Apolline art of the sculptor and the non-visual, Dionysiac art of music. These two very different tendencies walk side by side, usually in violent opposition to one another, inciting one another to ever more powerful births, perpetuating the struggle of the opposition only apparently bridged by the word 'art'; until, finally, by a metaphysical miracle of the Hellenic 'will', the two seem to be coupled, and in this coupling they seem at last to beget the work of art that is as Dionysiac as it is Apolline – Attic tragedy."

Friedrich Nietsche, *The Birth of Tragedy.* Trans. Shaun Whiteside (London; New York : Penguin, 1993), 14.

[53] Carolyn Abbate, "Music – Drastic or Gnostic?," *Critical Inquiry* 30, no. 3 (2004): 532.

knowledge gained via familiarity with semiotic systems and what Abbate calls "disclosed secrets, reserved for the elite and hidden from others."[54]

With regards to the experiential aspects of music, she emphasizes the importance of moment and place, and how these aspects always underly our individual and unique engagement with the music: a work is heard differently each time it is performed:

> The carnal and the material are, it would seem, immensely desirable, even in their displaced form as mechanisms and inscription machines. Yet the carnal and material in their evident and common form, as actual live performances, seem somehow too hot to handle. Music in performance affects us physically, but, as Jankélévitch points out, its physical action can engender spiritual conditions, grace, humility, reticence. Anyone with allergies to words like spiritual will reject this point like a bad transfusion. For Jankélévitch, however, the relationship between real music and its action upon performers and listeners—at a nonrepeatable moment and place, in a context that will exist only once and not again—becomes so fundamental, so viscerally powerful and ephemeral, so personal, contingent, fugitive to understanding, that it elicits the unfashionable.[...] Jankélévitch's argument acknowledges music's precious humanity and social reality, not by insisting that musical works trace historical facts or release specific sanctioned cultural associations, but by emphasizing an engagement with music as tantamount to an engagement with the phenomenal world and its inhabitants. For instance, playing or hearing music can produce a state where resisting the flaw of loquaciousness represents a moral ideal, marking human subjects who have been remade in an encounter with an other.[55]

On multiple levels, one is confronted with communicated knowledge and experiences, where the performance of music conveys music sensually from composer to audience, from performer to audience, but also back from audience to composer: i.e., in the form of audience reactions or with regards to how the composition does or doesn't enter the canon of musical culture. These two instances are direct and indirect ways in which the audience communicates with the composer – given that the composer is still

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[54] Ibid., 510. While her writing is relevant for the present study to formulate a foundation of music performance which is "real" and "carnal," Abbate ignores the fact that music composition itself involves a similar reality and carnality. Before completion of a work, music composition involves labor as well; Gunnar Hindrichs discusses this and speaks of "compositional labour," a process necessary for musical material to be determined and formulated. (See Hindrichs, *Die Autonomie des Klangs*, 52-53) The process of composing itself is therefore a carnal event within music.

[55] Abbate, "Music – Drastic or Gnostic?," 529-530.

alive. The significance of the musical canon – both in terms of formation and cultural implications – will be discussed further in this study. However, one thing can be said about communicative, experiential and intellectual aspects in music: they all operate on a communal plane of cultural practice, where community is nurtured.

Primary and Secondary Memory in Music

While music performance with its communicative and social aspects is one system in which memory is at work, it is important to consider how memory actually functions in one person's mind in moment-to-moment situations – musical or not. Edmund Husserl's observations exhibit one of the aspects of temporality immanent in memory, as it relates to an individual. Husserl proposes a qualitative distinction between *primary* and *secondary retention* and *protention*:

> The content of retention and protention belong just as necessarily to the givenness of what is presently experienced – e.g. the sounding tone – as the spatial background belongs to the givenness of an object seen. Space and time are originally the horizons of experience, and it is as horizons that past and future surround and set off the present, extending in their different ways from the determinate, immediate background into the indefinite and indeterminate 'distance'. Secondary memory, or recollection, is quite different: here something from this wide horizon of the past singles itself out for re-presentation. Primary memory belongs to the temporality of the present and belongs to *all* experience. Secondary recollection is a special *kind* of experience in which we relive in the present what is not present.[56]

Both retention and protention constitute the present of a temporal object. At every point[57] of its passing, the temporal object is "conceived as a process of modification" and leaves an "'originary' impression."[58] Husserl explained this idea through the example of the melody and reveals how "memory and expectation […] cooperate in the perceptive construction of a melody,"[59] as Stieger summarizes:

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[56] David Carr. *Interpreting Husserl: Critical and Comparative Studies*. (Dordrecht: Nijhoff Publishers, 1987), 200.

[57] Husserl characterized each of these moments as one note of a melody.

[58] Stiegler, *The Fault of Epimetheus*, 246.

[59] Jan Assmann, "Music and memory in Mozart's *Zauberflöte,*" in *Performing the Past. Memory, History, and Identity in modern Europe*, Eds. Tilmans Karin, Frank van Vree, and J. M. Winter (Amsterdam: Amsterdam University Press: 2010), 187.

> A melody is a temporal object in the sense that it constitutes itself only in duration. The phenomenon of this temporal object is a flow … the properly temporal object is not simply in time, it constitutes itself temporally, it weaves itself into the thread of time – as that which appears in passing, as that which passes, as that which manifests itself in disappearing, as a flux vanishing as it is produced. When I listen to a melody, the object is presented to me in a flow. In the course of the flow each of the notes which presents itself now has retained in it the note which preceded it, this note retained in it all the notes which preceded it, it is the "now" [*maintenan*t] as persistence [*mantien*] of the presence of the object: the present of the temporal object is its persistence.[60]

A melody only exists as a *melody* by means of its constant self-constitution as a discrete temporal object; this is possible because of its perception through time via primary and secondary memory.[61] Understanding this interrelation between temporal perception and memory is important for the comprehension of the functionality of musical memory. Importantly, Husserl's ideas of retention and protention deal with a kind of *short-term memory*: Jan Assmann insists that this is

> a form of memory that accompanies and enables cognition, but not 'remembering' in the proper sense. Remembering requires a kind of 'past' to refer to by an act of remembering. Short-term memory and the interplay of retention and protention have nothing to do with the past, rather, they constitute the present.[62]

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[60] Stiegler, *Cinematic Time and the Question of Malaise*, 36-37, as quoted in a modified translation by Ben Roberts, "Cinema as mnemotechnics: Bernard Stiegler and the industrialization of memory," *Angelaki. Journal of the Humanities* 11, no. 1 (2006): 57.

[61] This system of retention and protention is dynamic, which means that the notes heard previously are not simply stored into one fixed modified form into retention throughout the duration of the melody. What happens is that each of these moments, or notes, are constantly modified:

"And each retention is already a continuum. The tone begins and 'it' steadily continues. The now-tone changes into a tone-having-been; the impressional consciousness, constantly flowing, passes over into ever new retentional consciousness. Going along the flow or with it, we have a continuous series of retentions pertaining to the beginning-point. Beyond that, however, each earlier point of this series is adumbrated in its turn as a now in the sense of retention. Thus a continuity of retentional modifications attaches itself to each of these retentions, and this continuity itself is again an actually present point that is retentionally adumbrated. This does not lead to a simple infinite regress, since each retention is in itself continuous modification that carries within, so to speak, the heritage of the past in the form of a series of adumbrations." Edmund Husserl, *On the Phenomenology of the Consciousness of Internal Time*. Trans. John B. Brough. 1991 (Boston: Kluwer Academic Publishers, 1966), 31.

[62] Assmann, "Music and memory in Mozart's *Zauberflöte*," 187.

Essentially, primary and secondary memory work within the limits of a single piece of music, where musical matter may "be perceived, enjoyed, and understood",[63] without an actual reference to a *proper* past.

The notion of musical short-term memory leads back to the idea that music performance as a form of communicative and social memory provides the conditions for moment-to-moment musical experiences by a given performer and audience: music is constituted by its performance, while short-term memory is employed generating momentary signification and meaning within the boundaries of a composition.

Time and Memory

There are various ways in which time and memory interrelate: as described above, communicative memory involves temporal dimensions within which cognitive perception and short-term memory are at work. Long-term memory, on the other hand, reaches back to a more distant past and alters the notion of temporal depth and therefore requires different carriers of that memory.

Short-term memory and long-term memory interrelate with time in different ways while each of these interrelations yields distinct consequences for how individuals perceive themselves as independent beings or as members of a given culture. Modes of self-awareness (individual or group-based) are informed differently by communicative memory as opposed to externalized memory and are correspondingly shaped by culture and, in turn, influence culture as well as that culture's musical conventions: theoretical and philosophical concepts about music as well as its cognitive comprehension are directly related to individual and collective perception of time and memory. Musical meaning is engendered by way of its temporal flow, as it is experienced and remembered along a timeline that differentiates between the past, the present, and the future. This meaning expands within a singular piece but also as part of a broader music-historical context.

The following discussion will introduce philosophical concepts which describe the development of social identity and meaning in relationship to 1) the mere perception

[63] Ibid.

of time (past, present, future) and to 2) the perception of difference within these temporal realms.

The philosophical investigation will involve temporal frameworks larger than those of short-term memory (as described above). Within such temporal structures, as to be demonstrated, memory necessarily becomes outsourced and operates beyond day-to-day communicative models. Here, the function of such externalized memory becomes more complex as it interpolates with individual and collective recollections, culture, identities and collective imagination, and hence also with an enhanced concept of difference. This shift from communicative memory to externalized memory reveals a direct correlation with music: musical memory as a time-bound, distinctive experience of the past, present and future.

Identity and Meaning via Time: The Perception of Past-Present-Future

Our understanding of time, in the simplest terms, entails a differentiation and classification of distinctive appearances of present, past and future. It seems clear that each moment in time is at one point present, after it has likely, but not necessarily, been anticipated as an imagined future. Next it necessarily becomes the past, for time is moving forward, transforming the "just now" into an immediate and then more distant past, which eventually may or may not be forgotten. This understanding of time is often taken for granted, but in order to discuss the correlations between memory, identity and meaning, it is necessary to examine time itself – its appearance and passing, as one perceives it. Jan Assmann succinctly explains:

> We may define human memory as the specific capacity of human beings to bring about a synthesis of time and identity in the form of what may be called 'diachronic identity'. This process of 'chrono-synthesis', by which time is worked into the fabric of identity, is a specifically human faculty because it involves autonoesis; that is, the capacity of recognizing oneself in the past and projecting oneself into the future (Tulving 2002).[64]

Henri Bergson's comprehensive theories about time and duration encompass Assmann's theory and describe the interconnectedness between time, identity and memory as an ineffable phenomenon. Time and the perception of duration cannot simply

[64] Assmann, "Globalization, Universalism, and the Erosion of Cultural Memory," 122.

be described by mathematic and scientific formulae. In *Bergson*, Leszek Kołakowski condenses the theories of Bergson's *Creative Evolution* and presents the four arguments:

> To say that time is real is to say, first, that the future does not exist in any sense. This is by no means a trivial point, according to Bergson, since for a determinist every event merely unfolds the ready-made reality hidden in existing conditions; the course of events consists, as it were, in displaying a destiny written in advance for all eternity, as if time were only a machine to unwind a film reel which has been there all along, with its entire story. For Bergson, on the contrary, the life of the universe is a creative process, whereby something new and thus unpredictable appears at every moment.
>
> This implies, secondly, that no physical equations—whether of classical or relativist physics—deal with, or give us access to time proper; the time of physics is not real. Both in science and in our daily life we perceive time as if it were another kind of space: a set of homogeneous segments placed next to each other and together composing an indefinitely long line. This time is an artificial, abstract concoction that we need for practical purposes... Real time ... is neither homogeneous nor divisible; it is not a property abstracted from movement but it is in fact what each of us is: we know it intuitively, from direct experience.
>
> Thirdly, real time is therefore possible only through memory, in which the past is accumulated in its fullness. In the abstract time of physics, nothing of one segment is preserved in the subsequent ones; they are juxtaposed in an indifferent succession. In the actual *durée* nothing is lost, but nothing is reversible either: each moment carries within it the entire flow of the past and each is new and unrepeatable. Since the matter of the past perishes, but the memory of it does not, and since memory is not an aspect of matter, it is likely that the human mind is largely independent of body and can survive its destruction.
>
> Fourthly, if real time has the characteristics of memory, if its nature is psychological, it appears that, to the extent that we may speak of a timebound universe, the evolution of the universe displays mind-like properties. [Thus], evolutionary processes, in particular the evolution of organic matter, are actually the work of mind.[65]

[65] Kołakowski, *Bergson*, 2-4.

While the first two theories explain Bergson's thinking about the phenomenology of time as directly experiential, it is the two observations of the third theory which are relevant for the investigation of the past:

First, there exists the concept that time can only be real because of memory: time is interpreted as a psychological space where all moments of the past accumulate, and where every momentary particle is unique and and unrepeatable. This thinking is also present in Jan Assmann's ideas about "diachronic identity" and "chrono-synthesis," in which time is understood as an empirical entity, always in reference to human perception of it.

Secondly, Bergson understands that the past may lose its "material" but not its memory: even if the body perishes, memory can survive. The sustenance of memory occurs in form of an accumulation of past moments and can thereby outlast death. This is made possible by way of recollection[66] and is largely dependent on elements outside of the individual realm:

Bergson's student Maurice Halbwachs developed relevant theories, introducing his ideas on collective memory. In the introduction to his influential work, *On Collective Memory*, Halbwachs pays tribute to his teacher and writes:

> For Bergson the notion of time was at the very core of philosophical reflection. For him, intuitive and subjective perception of inner time is the source of knowledge about the self. Compared to the richness and variety of inner subjective time, objective time, as it is measured by scientists and positivistic philosophers, is a poor and pitifully limited notion. The major source of philosophical reflection is immediate experience. Mechanistic, objective clock time cannot cope with human creativity and spontaneity. Only 'duration,' the intuitive perception of inner time, provides access to philosophical and spiritual knowledge.[67]

Halbwachs was the first and foremost scholar to describe memory as a social phenomenon in the 1920´s. His theory of collective memory places individuals with their

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[66] The word *recollection*, with its Latin root *recolligere*, implies a *recovering* and a *renewed gathering* of such past moments within memory. See Oxford Dictionary Online: "recollection." *Oxford Dictionaries*. http://www.oxforddictionaries.com/definition/english/recollection (accessed July 15th, 2015)

[67] Maurice Halbwachs, *On collective memory*, trans. Lewis A. Coser (Chicago: The University of Chicago Press, 1992), 7.

perception and recollection of time within a social context and defines the limits and content of memory as conditioned by its relevance to a given social framework: There exist no memories when there is no consciousness. This consciousness is primarily focused on the past, since memory merely references the past.[68]

At this point, the dividing line between individual and collective memory (see below) becomes increasingly more blurred; overlapping between social and communicative and cultural memory occurs more frequently, as a culture is born out of individuals interacting with one another, experiencing the same present, the same past, and thus meeting the most fundamental requirement for the formation and development of culture – sociogenesis – namely sharing a common past and incorporating this into their lives.

In regard to such questions of individual and collective memory, Aleida Assmann's observations become relevant again and illuminate this relationship:

> Individuals' personal and collective memories interact. […] These different dimensions of memory, differing in scope and range, overlap and intersect within the individual who incorporates those memories in various ways. Humans acquire these memories not only via lived experience, but also via interacting, communicating, learning, identifying, and appropriating. It is often not easy to determine where one type of memory ends and another begins.[69]

Here, the theories about experienced time via memory – as presented by Bergson, Halbwachs and Jan Assmann – accumulate. In passing, Aleida Assmann introduces her theory of identity within this extended context of memory, wherein which individual memory is in a mutual relationship with collective memory – implying how individual identities are significantly contingent on social constructs of identity: formulated via inter-personal interactions, shared experiences, etc. At the same time, cultural identity accrues from collective individual identities.

Sociogenesis is therefore a founding principle of identity, and it is important to inquire into "the correlation between social self-image and social memory, i.e., historical

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[68] Jan Assmann describes memory as "Vergangenheitsbezug".

[69] Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*, http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014).

consciousness,"[70] as Jan Assmann suggests. This correlation hints at the significance of time in the formation of identity, since it situates social self-image – which could emerge as a momentary, temporally discrete occurrence – apart from social memory, which is inherently part of the past.

This differentiation between self-image and social memory is encapsulated in concepts of philosopher Martin Heidegger: in the context of the *question of being* (*Seinsfrage*) he discussed the connections between time and identity at length in his work *Sein und Zeit* (*Being and Time*).[71] As the title of this work implies, Heidegger's understanding of a *Dasein* ("Being") is based on the notion that the fact *that* something is goes hand in hand with *what* something is. This concept – Heideggerian ontology – inherently considers aspects of time, specifically how each human being uniquely conceives his-/herself in a temporal reality; this approach goes beyond the mere idea of an *object*, which would factually only exist in itself, isolated from context as a substance.[72] This calls to mind Husserl's concept of primary and secondary memory, in which the distinct points on a timeline are constitutive of each previous one, merely because of the flow of time: "the 'now' […] as persistence […] of the presence of the object."[73]

Husserl's phenomenology of time therefore connects with Heidegger's ontology and can be translated into a social context: the temporal object, as per Husserl, may then be understood as either individual or social group whose self-constitution – the formation of identity – works via time.

In relation to the connections between individual and collective identity, Jan Assmann discusses:

> The interaction with others is simultaneously an interaction with ourselves. Only through communication and interaction can a

[70] Assmann, *Das Kulturelle Gedächtnis*, 132.

[71] Note that about twenty years later, Heidegger revised and reformulated his ideas in *Brief über den Humanismus* (1947). These ideas display a shift towards Thinking as the most important aspect about *Being*, rather than *Being* or the *Isness* of beings, as he had proposed in *Sein und Zeit* (*Being and Time*).

[72] Heidegger explains the suffix "logos" of the word ontology as "a discourse, which reveals what is being discoursed in the discourse" [*λόγος als Rede besagt vielmehr soviel wie δηλούν, offenbar machen das, wovon in der Rede 'die Rede' ist*] Martin Heidegger, *Sein und Zeit* (Tübingen: Max Niemeyer Verlag, 1967), 32.

[73] Stiegler, *Cinematic Time and the Question of Malaise*, 36-37.

> *sense of self*, i.e. personal identity, be secured. Personal identity is an awareness of oneself, which is an awareness of the others at the same time […]. In order to be able to develop a personal identity in the interaction with others, one has to be living in a shared 'symbolic world of meaning'.[74]

Jan Assmann's concept – identity develops on account of an interaction with others – may be fused with Heidegger's and Husserl's idea that something *is* and is constituted as such through time and discourse: identity could then be understood as rendering an object into a subject by providing a type of meaningfulness which is time-bound and also directly informed by its social surroundings, conditions and interactions with other identities.

The development of individual identity is therefore never conceivable in isolation, on a purely individual level and outside the context of others. Individual identity always arises and develops in relation to collective or group identity. Collective identity, on the other hand, needs to be understood as founded on the sum of individuals within the group, their individual knowledge and conscience. Collective or group-identity cannot exist without constituent members who bring their individual personal identity to the collective.

At this point, it is of great importance for the present study to turn the discussion on how identity itself – individual as well as collective – is in a state of temporal flux, rather than its representing a static entity. Not only are individuals and social groups constituted via time, as just demonstrated, but self-constitution itself is constituted via time:

Bernard Stiegler's work is greatly concerned with this notion. Within his writings, he summarizes the interconnections between individual and collective identity by actually focusing on their *becoming* through time by the concept of *individuation.* This concept was originally explored by French philosopher Gilbert Simondon who did not examine identity as a fixed state of being but rather individuation as a perpetually incomplete

[74] Assmann, *Das Kulturelle Gedächtnis*, 135.

process. His idea of the "pre-individual" therefore describes the individual as a temporal being – in analogy to the temporal object.[75]

This presents an interesting connection between memory, which is directed rearward towards the past, and the idea of individuation and *becoming*, which is intrinsically directed forward, towards the future, along the lines of the present. From this perspective, identity becomes a matter not only of the past (memory), but also of the future – in its perpetual *becoming*.

In their philosophical work *A Thousand Plateaus*, Gilles Deleuze and Félix Guattari illustrate this theory by using an arborescent image representing the relationship between *memory* and *becoming*: while, in their example, any

> [m]an constitutes himself as a gigantic memory, through the position of the central point, […] [t]he line-system (or block-system) of becoming is opposed to the point-system of memory. Becoming is the movement by which the line frees itself from the point […].[76]

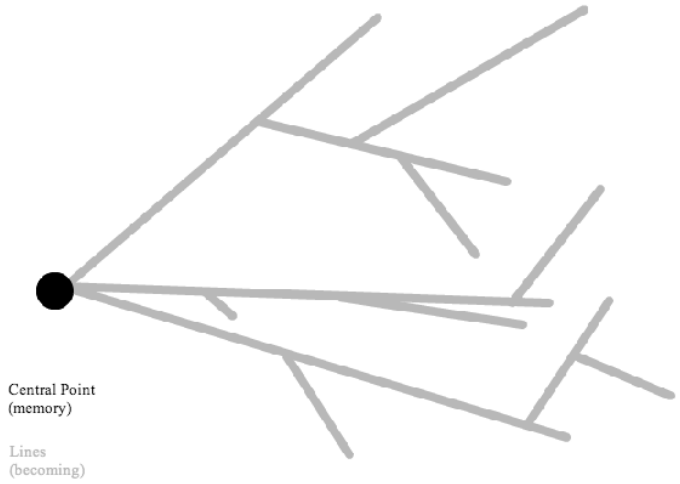

Figure 4 - Arborescence of Memory and Becoming

This image also substantiates visually the first of Bergson's argument (see above), in which the French philosopher explains that the future had no actual existence but only

[75] Bernard Stiegler, "Bernard Stiegler: Culture and Technology" (lecture, Tate Modern Art Gallery, London, UK, May 13th 2004) http://www.tate.org.uk/context-comment/video/bernard-stiegler-culture-and-technology (accessed June 15th, 2014).

[76] Gilles Deleuze, and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (Minnesota: University of Minnesota Press, 1987), 293-295.

came into being through a "creative process," involving unforeseeable events to occur and unfold.

By including Simondon's concept of individuation into the present discussion of time and meaning, it is possible to finally connect the dots of the intricate web of temporal dimensions as they are interrelated with the creation of meaning: adopting Simondon's theories of individuation processes, Stiegler provides a reconciliation of the concepts of Heidegger and Husserl with Halbwachs and Jan Assmann: according to the concept of individuation, "I" only exists in relationship to "we", while individuals are always collective individuals, never isolated individuals. The identity of the "I" is constituted over time – from the past via a present now, becoming a future. This constitution entails a collective inheritance, which consists of a set of collective *traditions*. Tradition here is meant in the most literal sense, derived from its Latin origins *tradere (*– to deliver), and *trans* (– across) plus *dare* (– to give), and relates to values, rules, rituals, memories etc.; it describes the *process* of individuation and explains how identity and meaning *become* by means of memory: this concept is the theoretical foundation for the examination of externalized memory and how this relates to cultural memory.

Identity and Meaning via Differences

Within sociogenesis, the collective awareness of sharing a common past as a group or society plays a critical role in the process of self-definition. It is the experiences of former times, which support the concept of unity and distinctiveness. As historian Johann Gustav Droysen explains, the past for any given group is "the explanation and the awareness about themselves – a collective possession of all participants, which strengthens and endows their community with even more intimacy, the more prosperous it is."[77]

We may conclude that sociogenic identity can therefore only emerge out of a sense of the past of the collective. "The imagination of national community relies on the imagination of a continuity which reaches back to the depth of time."[78]

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[77] Johann Gustav Droysen, *Historik* (Stuttgart-Bad Cannstadt: v. P. Leyk, 1977), 10, 45, as quoted in Assmann, *Das Kulturelle Gedächtnis*, 133.

[78] Assmann, *Das Kulturelle Gedächtnis*, 132.

This is also true for the shared experience of a past which constitutes a culture of memory when the shared experience of the past is remembered not via communication but by means of externalized testimonial, such as books, buildings, monuments, dances, music etc.

In this manner a number of questions can be asked: How, exactly, does the present relate to the past? What kinds of forces stimulate the perception of the past and how does memory come into play?

Only at the moment of looking back in time, when a former time is in a defining relationship with the now, can the past itself come into existence: reference to the present is the key.[79] The past cannot exist as a thing in itself. Remembering is the *tool* required by individuals as well as by societies for reconstructing their past, always within the ever-changing present as its frame of reference. Today and yesterday are in a perpetual dialogue with each other. However, Jan Assmann insists,[80] the reconstruction of the past is only possible when the following two criteria are met:

1. There needs to be testimony from that point in time.

2. This testimony must reveal a significant difference between the past to the "now".

The first criterion refers to a circulation of the knowledge of the past, since the mere existence of a piece of evidence of the past does not guarantee a transmission of this information. This circulation describes a *communication* of the past in the lived present – a "testimony" given via social interaction within social and communicative memory.

The second criterion needs further clarification: Jan Assmann alludes to natural changes as they occur in living, existing languages. Typically, such changes only come to the surface when older forms of language persist through time and exist simultaneously with the spoken language: they display a *difference* between the past and the present. This is the case, for example, when an old language is used in the literal transmission of beliefs or sacred stories – a situation which can best be observed through the juxtaposition of language(s) used in sacred and/or classic texts with the spoken language

[79] Ibid., 31

[80] Ibid., 31-32.

of the present. Such subtle yet continuous metamorphoses of language can be most readily perceived in written cultures, but can also be noticed in some oral traditions.[81]

Fundamentally, the above-explained situation presents a historically conditioned linguistic dissociation which – depending on the degree of modification – impedes the individuation of meaning, semantics, as a consequence. A person – or an entire group – who is unacquainted with a given historical form of their own language may then not be able to identify with that language and might ultimately be unable to derive much or any meaning from it.

More importantly, such dissociation is also an example of how, in general, the difference between the old and the new reveals a fracture in historical continuity and tradition. As a result, attempts at *new beginnings* are initiated and, naturally, perceived notions of a historical past become strengthened.[82]

This particular aspect – about the distinction between historical moments via difference – is important as similar situations can be observed in the realm of music: the above-mentioned melody of Husserl is an example of possibly the most straightforward illustration of a given temporal object continuously exhibiting differences between the old and the new: each new note is heard as *a new beginning* set against *the old*, or *the past*. Retention and protention allow for the constitution of melodic progress through cognitive perception of successive notes and therefore reveal music's characteristic as a temporal form of art.

Correspondingly, Walter Frisch states in the introduction to his analysis to Franz Schubert's string quartet in G Major, D. 887:

> It has long been acknowledged that memory plays a critical role in our perception and comprehension of the art forms that Suzanne [sic] Langer called 'discursive'. That is, formal structures that unfold successively, in time.[83]

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[81] As an example, Assmann alludes to the fact that high-school students need to familiarize themselves with the specific language of sacred or classic text, before they can actually study them, as singular words as well as grammatical aspects such as syntax may be unfamiliar and thus *meaningless* to them.

[82] Ibid., 32. Interestingly, Assmann points out, that the idea of tradition obscures the perception of split time, as the emphasis is placed on the concept of continuity and perpetuation.

[83] Walter Frisch, "'You Must Remember This': Memory and Structure in Schubert's String Quartet in G Major, D. 887," *Music Quarterly* 84, no. 4 (2000): 582.

This relates directly to Jan Assmann's concept about "short-term memory"[84] within a single piece of music, which, again, pertains to Husserl's theories about the cognitive nature of musical perception generated by primary and secondary memory. To listen to a piece of music and to perceive its developmental characteristics as they occur throughout its durational time – such cognitive processes are possible only by way of such short-term memory.

While Husserl's example is concerned with melodic progress and the differences between individual notes of a melody, John Sloboda observes with regards to harmonic relations a similar function of memory:

> The way one hears music is crucially dependent upon what one can remember of past events in the music. A modulation to a new key is heard only if one remembers the previous key, a theme is heard as transformed only if one can remember the original version of which it is a transformation. … To perceive an event musically is to relate to past events.[85]

The concept of the old and the new within singular musical pieces materializes by virtue of specific compositional methods, which create the perception of change between musical moments. As pointed out, such methods involve melodic or harmonic aspects and occur always in combination with various forms of recurrence[86] – as will be explained in detail further below. The employment of recurrence, or repetition, intrinsically affects the organizational skeleton of the composition: its temporal structure.

Another type of dynamic interplay between new beginnings and the past can be found in reviewing historical developments of musical practice. This projects the idea of memory into a larger temporal scope and involves what Jan Assmann describes as a "'past' to refer to by an act of remembering,"[87] spanning over several years, decades, centuries. In this case, memory transcends the boundaries of a single composition and

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[84] Assmann, "Music and memory in Mozart's *Zauberflöte,*" 187.

[85] John Sloboda, *The Musical Mind: The Cognitive Psychology of Music* (UK: Claredon Press, 1965), 174-175, as quoted in Thomas Butler, "Memory: A Mixed Blessing." in *Memory: History, Culture, and the Mind*, ed. Thomas Butler (Oxford: Blackwell, 1989), 13.

[86] Assmann, "Music and memory in Mozart's *Zauberflöte*," 188. The employment of recurrence in music is generally referred to as *repetition* or *variation.* The latter method implies a modified repetition. This will be explained in detail below.

[87] Ibid.

usually operates via stylistic or aesthetic references to particular reservoirs of musical convention, which are then perceived as *historical* styles and aesthetics exactly because they exhibit a difference to the given contemporary musical convention.[88] This presents a kind of *long-term* memory taking effect outside a single piece of music, in analogy to the contrasting short-term memory at work *within* a musical work.

An example of new beginnings of such a historical development in music, marking the historical past as distinct from the present, would be the changing musical landscape in the sixteenth century and the resulting movement away from sacred to secular music, which thereby allowed for the emancipation of vocal music from the sacred word, the establishment of different temperaments, pitch relations and chord progressions, and eventually the development of an instrumental music with an increased sense of compositional freedom and independence from the confines of sacred music.

The following question may arise: what is the relationship between the composer and his/her social environment and the respective musical culture that so often has provoked them to make compositional choices which deviated from the musical norm to the extent that the result were the departure from the old and the beginning of a new musical era?

The arborescent image of Deleuze and Guattari might lend itself to a plausible description as to how artistic motivations may be rooted in a philosophy of music as necessarily subverting conventions: throughout *A Thousand Plateaus* Deleuze and Guattari present the term *arborescent* as opposed to their concept of the *rhizome*. The idea of the tree-like system serves to represent a unidirectional process, while "[w]hat constitutes arborescence is the submission of the line to the point."[89] Within this concept, Deleuze and Guattari establish an ontological vocabulary, according to which a matter that simply *is* is "molar," while another matter which is in the process of becoming is

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[88] Another, very specific instance of historical memory makes use of musical quotation, which employs a type of verbatim memory. While such a detailed – *literal* – recall of musical material may elicit recognition of one particular compositional work, certainly the piece's historical identity in terms of broader scale aesthetic properties is contained within that recollection as well. Depending on the stylistic gap between the composition and the piece quoted within that piece, the perception of the aesthetic difference will have specific consequences.

[89] Deleuze, and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, 293.

"molecular."[90] As a consequence, memory is "[t]he constitution of a 'majority' as redundancy," and *becoming* represents "the movement by which the line frees itself from the point, and renders points indiscernible. […] *Becoming is antimemory.*"[91]

Hence, *becoming*, or individuation, constitutes the opposite of arborescence – the rhizome – which presents a non-hierarchical system, where any line could go in any direction and connect to any other point or line. "There is no becoming-man because man is the molar entity par excellence, whereas becomings are molecular."[92]

As it has been pointed out above, music, as a discursive art, does not represent a molar entity but is inherently molecular, for a musical composition becomes constituted only by its unfolding through time – music is always only becoming, in the sense of Abbate's concept of "real music."[93] In reference to Western music, Deleuze and Guattari go on to discuss the becoming of music[94] and explain that musical content and its expression are inseparably connected while musical becoming is inherently molecular.

> a block of becoming at the level of expression, or a block of expression: this block of becoming rests on transversals that continually escape from the coordinates or punctual systems functioning as musical codes at a given moment. It is obvious that there is a block of content corresponding to this block of expression. It is not really a correspondence; there would be no mobile 'block' if a content, itself musical (and not a subject or a theme), were not always interfering with the expression. What does music deal with, what is the content indissociable from sound expression?[95]

Music is molecular, and one may say that musical culture with regards to its historical developments is similarly molecular: as a collection of numerous compositions which are part of a musical chronicle of a given culture, music history has been constituted by every

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[90] Ibid., 292.

[91] Ibid., 294.

[92] Ibid., 292.

[93] In support of that view Carl Dahlhaus said: "Paradoxically speaking, as long as it is form, music attains its actual existence just in that moment in which it has passed. Still retained by memory, it moves into a distance which was not there in its immediate presence." Dahlhaus, *Musikästhetik*, 22.

[94] See Deleuze, and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, 298-309.

[95] Ibid., 299. Also: "Music has a thirst for destruction, every kind of destruction, extinction, breakage, dislocation."

single piece of music of that particular musical canon. In this sense, music history – the development of musical language from the past until the present – must not be regarded as molar and unchanging but as perpetually becoming and thus molecular. Deleuze and Guattari suggest that musicians should be striving to write a music which moves towards the rhizome, since

> [a] punctual system is most interesting when there is a musician, painter, writer, philosopher to oppose it, who even fabricates it in order to oppose it, like a springboard to jump from. History is made only by those who oppose history (not by those who insert themselves into it, or even reshape it). This is not done for provocation but happens because the punctual system they found ready-made, or themselves invented, must have allowed this operation: free the line and the diagonal, draw the line instead of plotting a point, produce an imperceptible diagonal instead of clinging to an even elaborated or reformed vertical or horizontal. […] The musician is in the best position to say: 'I hate the faculty of memory, I hate memories.' And that is because he or she affirms the power of becoming.[96]

This statement refers to both the inner construction of a composition as determined by the composer and to music culture within a larger social and historical context. It reveals a paradoxical quality of music: music embraces memory for the fact that it can only be constituted by its own immediate past as well as by the historical past surrounding it. At the same time it must free itself from these memories in order to become.[97]

In their statement, Deleuze and Guattari suggest that the separation from an old present by breaking with contemporary musical conventions is the result of a deliberate act by the composer who tries not to prolong a given convention but instead to instigate a departure from musical redundancy. "When this is done it always goes down in History but never comes from it."[98]

Therefore, when history is *made*, music history is not merely a matter of the past, but actually stems from its own *becoming.* As per Deleuze and Guattari, individual

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[96] Deleuze, and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, 295-297.

[97] Composer Pierre Boulez admits to that contradiction: "Certainly, there is no absolute forgetting, as one is embedded in traditions and stocked with indelible experiences, after all. But without forgetting, invention is impossible today." Boulez, Pierre "...ohne Vergessen ist Erfindung nicht möglich ...- Ein Gespräch mit Armin Köhler," *Positionen. Beiträge zur Neuen Musik*, no. 72 (2007): 15.

[98] Deleuze, and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, 296.

composers have the capacity to start such new beginnings and create a history, which then constitutes a new era of musical styles and conventions. These will consequently constitute another reality for following composers, performers and audiences.

Such a break with musical history is exemplified by the advent of modernism: in *Nineteenth-Century Music*, Carl Dahlhaus observes that modernism constitutes

> an obvious point of historical discontinuity.[…] The 'breakthrough' of Mahler, Strauss, and Debussy implies a profound historical transformation.[…] If we were to search for a name to convey the breakaway mood of the 1890s (a mood symbolized musically by the opening bars of Strauss's Don Juan) but without imposing a fictitious unity of style on the age, we could do worse than revert to Hermann Bahr's term 'modernism' and speak of a stylistically open-ended 'modernist music' extending (with some latitude) from 1890 to the beginnings of our own twentieth-century modern music in 1910.[99]

While Deleuze and Guattari discuss music and the creation of historical breaks philosophically, Helmut Lachenmann appeals to the social responsibility that comes with writing music. He stresses that composers must in fact be aware of historical shifts in the realm of music for this is how music history has continually been constituted:

> In practice, the composer who is concerned to express himself [sic] is obliged to take account of the 'aesthetic apparatus'-that is, the sum total of categories of musical perception as they have evolved throughout history to the present day; of the 'instrumentarium' which comes with them; of the techniques of playing and of notation; and last but not least, of the relevant institutions and markets in our society.[100]

According to Lachenmann's specifications, the composer needs to be familiar with and critically examine musical conventions that comprise not only the musical text but also performative aspects like instruments and performance practices. When this is a given, Deleuze and Guattari see that there is the potential that

> the point now assumes a new and essential creative function. It is no longer simply a question of an inevitable destiny reconstituting a punctual system; on the contrary, it is now the point that is

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[99] Carl Dahlhaus, *Nineteenth-Century Music*, trans. J. Bradford Robinson (Berkeley: University of California Press, 1989), 334.

[100] Lachenmann, "The 'Beautiful' in Music Today," 22.

> subordinated to the line, the point now marks the proliferation of the line, or its sudden deviation [...][101]

In sum, the perception of new beginnings may be induced by fundamental changes in musical themes, form and overall structure, polyphonic and homophonic texture, harmony, in the acceptance of dissonance, noise or silence as musical parameters, or by changes in musical material and style.[102]

Within these parameters, the formation of musical meaning is greatly influenced by memory and identity: as discussed, musical meaning emerges in a single composition via short-term memory, but is also affected by a larger, social context – a given "aesthetic apparatus" which draws upon a far-reaching past. At the same time, the meaning of a given composition is greatly determined by the personal and group identities of composer, performer and audience.

The "aesthetic apparatus," along with the nature of each particular social identity (of composer, performer and audience), discloses a particular reservoir of memory – social and cultural – which then determines which musical elements may be recognized and how they are comprehended. But the changing "aesthetic apparatus" also reveals how musical meaning itself is affected by change: change entails difference and therefore commits to music's own *becoming*, while the recognition of this difference – as it is exhibited through time – is facilitated by memory: a given musical element may exhibit difference in relation to a previous presentation of that element; i.e. a *musical motif* as established within the same piece may recur and reveal difference, or an entire *composition* may be perceived as demonstrating difference to a specific, historically established musical style.

In both cases, social identity is an important factor for the creation musical meaning, as the knowledge of composers, performers and listeners of their respective past will enable – or disable – recollection and identification with given musical elements. Based on this understanding, the following section will set out to describe how musical

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[101]Deleuze, and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, 297.

[102]Jacques Attali goes so far as to attribute to music the power of prophecy, which "makes audible the new world that will gradually become visible, that will impose itself and regulate the order of things; it is not only the image of things, but the transcending of the everyday, the herald of the future." Jacques Attali, *Noise: the political economy of* music, trans. Brian Massumi (UK: Manchester University Press, 1985), 11.

meaning in relation to memory is always marked by the emergence of *différance* and repetition, as conceptualized by Jacques Derrida.

Différance and Repetition

Assmann's theorizing of a perceivable difference between the now and the past, which is also applicable to a musical context, describes not only historical rifts but, more importantly, the constitution of temporal perception itself. As shown, this is closely related to Heidegger's ontological difference and Husserl's concepts of retention and protention, but has a more tenuous relationship to Derrida's term *différance.*

Différance can be translated as "to defer" or "to differ." Both meanings are essential for Derrida's claims concerning the formation of meaning. In his essay "Différance", Derrida explains that the meaning *to differ* "indicates difference as distinction, inequality, or discernibility." Conversely, it also

> expresses the interposition of delay, the interval of a *spacing* and *temporalizing* that puts off until 'later' what is presently denied, the possible that is presently impossible. Sometimes the *different* and sometimes the *deferred* correspond [in French] to the verb 'to differ.' […] In the one case 'to differ' signifies nonidentity; in the other case it signifies the order of the *same*. Yet there must be a common, although entirely different [*différante*], root within the sphere that relates the two movements of differing to one another. We provisionally give the name *difference* to this *sameness* which is not *identical*: by the silent writing of its *a*, it has the desired advantage of referring to differring, *both* as spacing/temporalizing and as the movement that structures every dissociation.[103]

In short, *différance* implies the interplay of temporal delay and dissimilarity between elemental oppositions which, in combination, create meaning.[104]

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[103]See "Differance" by Jacques Derrida, as it appeared originally in the *Bulletin de la Société française de philosophie, LXII, No. 3*, and was then translated by David B. Allison. The translation appeared as *Speech and Phenomena and other essays on Husserl's Theory of Signs*, trans. David B. Allison (Evanston: Northwestern University Press, 1973).

[104] *Différance* advances semiotics: "[...] [I]n a word, the relationship to the present, the reference to a present reality, to a being – are always deferred. Deferred by virtue of the very principle of difference which holds that an element functions and signifies, takes on or conveys meaning, only by referring to another past or future element in an economy of traces. This economic aspect of *différance*, which brings into play a certain not conscious calculation in a field of forces, is inseparable from the more narrowly semiotic aspect of *différance*." Jacques Derrida, "Semiology and Grammatology: Interview with Julia Kristeva," in *Positions* (Chicago: The University of Chicago Press, 1981), 28-30.

In the context of memory, Derrida's specification of sameness within the nonidentical is of special importance in the analysis of meaning in music, as the concept offers philosophical perspectives that look into the fundamental construction of music. This will become relevant in the discussion of musical memory in relation to technology. The following section will describe how *différance* is fundamental to music, by definition, and discuss two distinct ways in which *différance* produces musical meaning: within the confines of one musical work and as part of a larger musical canon. Both instances, as will be shown, are intrinsically conditioned by the occurrence of repetition.

Différance in Music

A compositional work as a single piece of music is *composed* of musical materials which are arranged in particular ways and, in these arrangements, eventually produce – as shall be explained – *musical moments*. The following investigation will explore music as a "discursive,"[105] time-bound art, based on the concept that a musical work may be considered as a sequence of musical moments which are themselves smaller musical units, irreversible in their progress through time. Within this concept, musical moments are temporal containers filled with acoustic materials that have been musically conceptualized and are perceived by the listener with "the intention of listening to music."[106]

These temporal containers of musical moments occur in succession, i.e. they are temporally deferred – which is in line with Derrida's definition of *différance*. Such sequential processes in music exhibit varying degrees of sameness or difference.

As an example, in her masters thesis *Liberating Sounds - Philosophical Perspectives On the Music and Writings of Helmut Lachenmann*, Abigail Heathcote draws pertinent connections between the work of Feldman and Derrida's *différance*. She quotes Herman Sabbe:

> Feldman's music, in deconstructionist terms, is composed of no recurring, no irreversible significations; it is composed of

[105] See Susanne K. Langer, *Philosphy in a New Key*, third edition (Cambridge, Mass.: Harvard University Press, 1971), chapter 4, as quoted in Frisch, "You must remember this," 582.

[106] This is taken from Luciano Berio's lecture "Translating Music," in which he defines his ideas of what music is. In Luciano Berio, *Remembering the Future*. (Cambridge, Mass.: Harvard University Press, 2006), 49.

> 'modulations', differences which are not oppositions but shiftings, on-going displacements, de-centerings, un-fixings: a chain of differences, not a system of (reciprocally related) oppositions of fixed, constituted, essentialized meanings. […] Just as Derrida questions the one-to-one relationship between the (verbal) notational sign and the definite mental context it would 'express' or 'represent'... Feldman's music, to my mind, refuses the ultimate identification of idealized (sound) objects.[107]

These observations are essentially echoing Jan Assmann's ideas of difference and are also rooted in Husserl's retention and protention: easily exemplified by the melody concept, a series of tones is perceived as melodic progress – the previous pitch (retained as such through primary retention) is followed by the next one (anticipated by protention).

In his important book *Fundamentals of Music Composition*, Arnold Schoenberg explains the "Treatment and Utilization of the Motive" in a way which shows close similarity to Husserl's concept but, more importantly, elaborates on the utilization of repetition as a compositional method to create motivic coherence. "A motive is used by repetition. The repetition may be exact, modified or developed."[108]
According to Schoenberg, a motive assumes a "memorable shape or contour" through the combination of intervals and rhythms. He admits that while the motive may originate from the composer's unconscious, its full effect is only guaranteed to unfold when used purposefully:[109] a memorable motive lends coherence and comprehensibility to the piece and creates a connection between the elements. The motive, after its first establishment, continues to reappear throughout the piece, "*it is repeated.*"[110]

Repetition in the Schoenbergian sense involves unvaried or varied restatements of a motive, while "variation […] is repetition in which some features are changed and the rest preserved." Variation, says Schoenberg, helps keep repetitions from wearing out and

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[107] Herman Sabbe, "The Feldman Paradoxes: A Deconstructionist View of Musical Aesthetics," in *The Music of Morton Feldman*, ed. Thomas DeLio (Westport: Greenwood, 1996), 11-12, as quoted in Abigail Heathcote, "Liberating Sounds - Philosophical Perspectives On the Music and Writings of Helmut Lachenmann" (Master's thesis, Durham University - UK, 2003), 190.

[108] Arnold Schoenberg, *Fundamentals of Musical Composition*, eds. Gerald Strang, and Leonard Stein. (New York: St. Martin's Press, 1967), 9.

[109] Ibid., 8.

[110] Ibid.

becoming exhausted, while variation itself can take place in several different ways and degrees.

Applied to Husserl's most simplified construction of a melody, Schoenberg's ideas would imply that a tone-by-tone progression is still constructed by means of repetition, no matter if the following pitch is the same as the previous pitch ("exact repetition"), or if the pitch is changing ("varied repetition"). In the latter case, one still deals with a kind of varied repetition since "the rest [is] preserved" which refers to the fact that mere sound production is maintained.

Schoenberg demonstrates how the development of motives and themes – involving repetition or variation – can be assessed by means of relative determinants such as *transposition*, *inversion, retrograde*, *diminution* and *augmentation*, implying a quantifiable relationship to the "original". Schoenberg's understanding of "exact repetitions" prescribes that "features and relationships" remain unchanged. In the following example, the use of transposition, inversion or retrograde only alter harmonic levels and melodic direction but preserve contour and intervallic relationship. Diminution and augmentation similarly maintain rhythmic outline and relationships and are thus considered techniques of exact repetition.

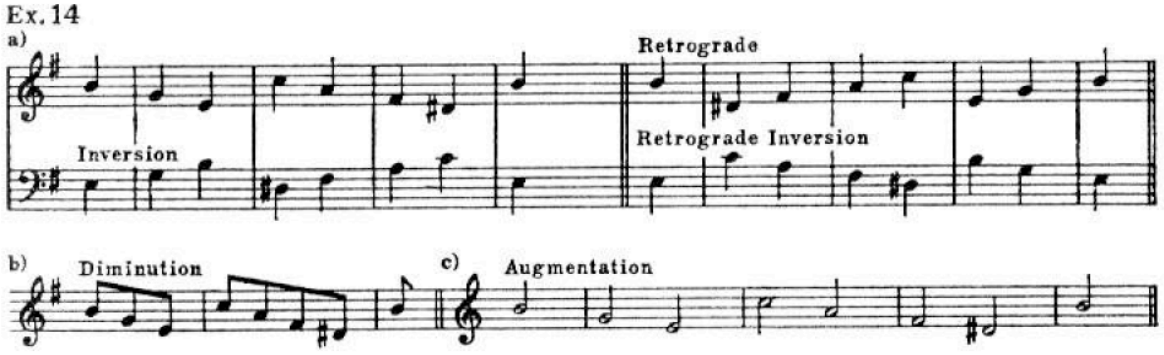

Figure 5 - "Exact Repetition"

The next example illustrates how variational repetition uses modification through transposition, embellishments or rhythmic changes, while at least one feature (intervallic or durational relationships, melodic contour) always remains unchanged.

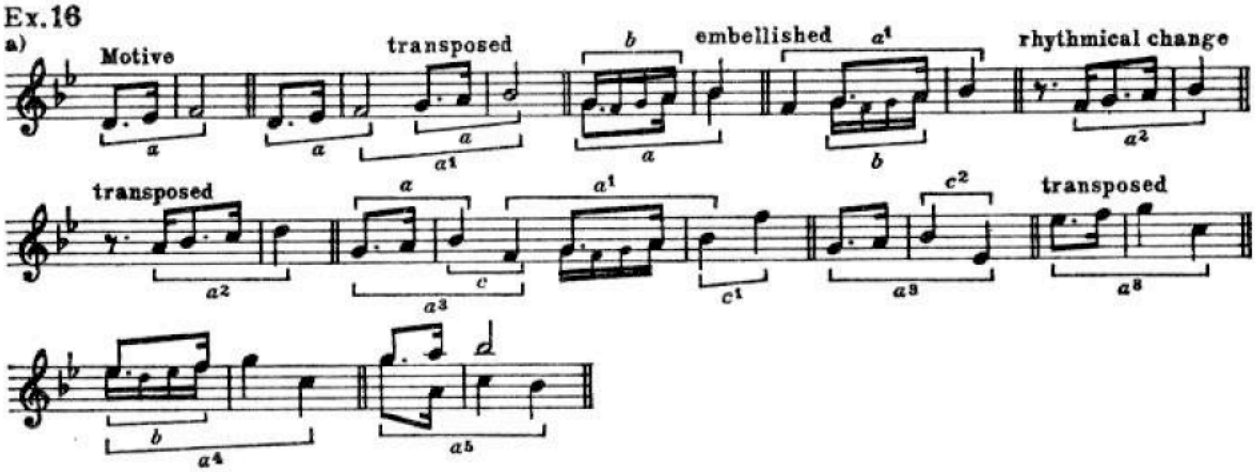

Figure 6 - "Repetition with Variation"

For the project of the present study, it is interesting to consider Schoenberg's concern about the degree of variation and his insistence that "such changes [of a variation] must not produce a motive-form too foreign to the basic motive."[111] According to him, if a motive was too foreign it could no longer be classified as repetition. "Variation means change. But changing every feature produces something foreign, incoherent, illogical. It destroys the basic shape of the motive."[112]

As a consequence, *transposition*, *inversion, retrograde*, *diminution* and *augmentation* would be deemed analytical terms which are no longer applicable if every feature was changed, as these terms describe proportional relationships that would not exist in this situation; the motives or themes[113] within the particular piece would have to be analyzed as independent entities, and the piece itself would presumably lack motivic coherence and logic. This deduction implies that difference and repetition are in pure opposition – they do not intersect but are in fact opposite poles.

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[111] Ibid., 9.

[112] Ibid., 8.

[113] A musical theme is defined as a "musical material on which part or all of a work is based, usually having a recognizable melody and sometimes perceivable as a complete musical expression in itself, independent of the work to which it belongs. It gives a work its identity even when (as is frequently the case with a theme and variations) it is not original to the work." William Drabkin, "Theme." *Grove Music Online*. *Oxford Music Online*,

http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/27789q=theme&search=quick&pos=1&_start=1#firsthit (accessed November 19th, 2014).

In *Difference and Repetition*, Gilles Deleuze discusses at length the relationship between these two forces. In fact, the first two chapters provide both a definition of "difference in itself" and "repetition for itself". Inverting the beliefs of previous philosophies, Deleuze frees the idea of difference from the constraints of describing two opposites where *x* is considered "different" from *y*. Instead, difference is

> produced by a prior relation between differentials (dx rather than not-x). Difference is no longer an empirical relation but becomes a transcendental principle that constitutes the sufficient reason of empirical diversity (for example, it is the difference of electrical potential between cloud and ground that constitutes the sufficient reason of the phenomenon of lightning).[114]

Deleuze's ideas of differential geometry are a useful description for this. Referencing Gottfried Wilhelm von Leibniz, Deleuze proposes: the derivative of dy/dx (known as *Leibniz's notation*) describes the slope of a tangent to a function f(x) and its curve.

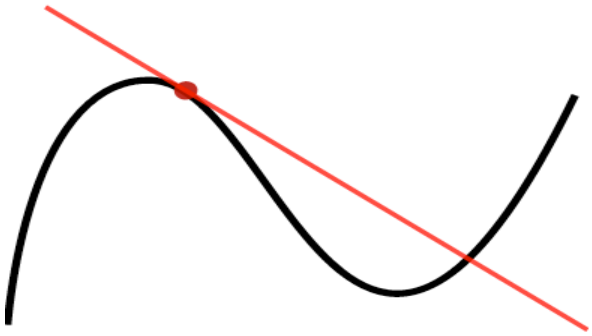

Figure 7 - Tangent (red) to function f(x) (black)

This graph shows that, with the curve's angle perpetually changing, the derivative dy/dx determines the curve's structure constantly anew while still being outside of the function f(x). By projecting the always dynamic relationship from differential geometry to the philosophical problem of difference, Deleuze concludes that difference is essentially a

[114] Daniel Smith, and John Protevi, "Gilles Deleuze," *Stanford Encyclopedia of Philosophy*, eds. Edward N. Zalta, Uri Nodelman, and Colin Allen, http://plato.stanford.edu/entries/deleuze/#DifRep (accessed July 20th, 2014).

vector of constitution instead of opposition.[115] His "critique of identity-based thought" is supported by his suggestion of a "philosophy of difference […] in its place."[116]

Deleuze goes on to explain "repetition for itself" and presents his idea of repetition of difference. With this, he challenges previous philosophical concepts of repeated self-reference. Philosophers Daniel Smith and John Protevi explain Deleuze:

> Following the formula of Deleuze's reading of Nietzsche's eternal return, repetition is the return of the differential genetic condition of real experience each time there is an individuation of a concrete entity. Ultimately, then, *Difference and Repetition* will show that the individuation of entities is produced by the actualization, integration, or resolution (the terms are synonymous for Deleuze) of a differentiated virtual field of Ideas or 'multiplicities' that are themselves changed, via 'counter-effectuation,' in each individuating event.[117]

Importantly, Deleuze's theory suggests that difference within repetition is in fact affirmative.[118] Difference, within the "virtual field"[119] differentiation, is therefore not a signification for deviation but rather for convergence; difference causes *becoming*.

At this point, Deleuze's and Guattari's theory about the non-hierarchical rhizome becomes important again, as within such a molecular context repetition is

> no longer subject to identity and sameness, but rather to difference and variation […], a return of the same which is ever different [...], and in which each return is a unique manifestation of a virtual, which is inexhaustible in its possibility, and which has no primary term.[120]

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[115] Gilles Deleuze, *Difference and Repetition.* (New York: Columbia University Press, 1994), 46.

[116] Edward Campbell, *Music after Deleuze* (UK: Bloomsbury, 2013), 7.

[117] Daniel Smith, and John Protevi, "Gilles Deleuze," *Stanford Encyclopedia of Philosophy.* http://plato.stanford.edu/entries/deleuze/#DifRep (accessed July 20th, 2014)

[118] Deleuze, *Difference and Repetition*, 13.

[119] The *Actual* and the *Virtual* are part of the ontological terminology used in Deleuze's and Guattari's *A Thousand Plateaus*. In simple terms, they describe another dichotomy within the question of punctual and linear systems (arborescence) and the "chaotic", non-hierarchical, multi-directional tendencies of the rhizome. For further readings, see Deleuze, and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, and Deleuze, "The Actual and the Virtual".

[120] Campbell, *Music after Deleuze*, 9.

According to this thought, repetition involves difference and variation in relation to a primordial concept, which has not come to realization – it is *virtual*.[121] Philosophically, Deleuze's understanding of difference within repetition undermines Schoenberg's viewpoint about variation and change within motivic repetition in music. An attempt to translate Deleuze's concept to the musical realm seems plausible, as relevant applications have already been made, thus in his book *Music after Deleuze*, Edward Campbell describes Pierre Boulez' analysis of the work of Schoenberg and Webern, as well as of his own compositions. In reference to Boulez, Campbell points out how musical thematicism and athematicism in the twentieth century has been directly related to thoughts about difference and repetition: Schoenberg's ever-evolving concepts of repetition reveal a genuine commitment to the exploration of his musical material.

> [...] many commentators agree that the truly revolutionary step taken by Schoenberg was 'the renunciation of thematic form', first accomplished with the early monodrama *Erwartung* in 1909. […] The decisive nature of this move stemmed from the fact that hitherto, the repetition of themes and the intelligible treatment of motifs had provided the clearest means of articulating musical form.[122]

With the development of his dodecaphonic system, Boulez notes, Schoenberg inadvertently returns to literal thematic repetition, now somewhat concealed within the repetition of the series of twelve tones – an "ultra-thematicisation."[123] As Campbell reads Boulez, Anton von Webern was more successful in the exploration of his musical forms, which can be seen as truly athematic. Referring to Boulez' *Leçons de musique*, Campbell states:

> [...] Webern does not, however, use literal repetition, but rather seeks to deduce all of his material from 'a single Idea', which

[121]Deleuze created his concept of the *actual* and the *virtual* on Bergson's writings, wherein the virtual is the un-actualized occurrence of an actual object:

"You get to an inner circuit which links only the actual object and its virtual image: an actual particle has its virtual double, which barely diverges from it at all; an actual perception has its own memory as a sort of immediate, consecutive or even simultaneous double. [...] For, as Bergson shows, memory is not an actual image which forms after the object has been perceived, but a virtual image coexisting with the actual perception of the object. Memory is a virtual image contemporary with the actual objects, its double, its 'mirror image'[...]. Deleuze, "The Actual and the Virtual," 150.

[122] Campbell, *Music after Deleuze*, 12.

[123] Ibid., 12.

> exists at the precompositional level. […] For Boulez, 'Webern's principal contribution remains … in having overturned the notion of the theme from the real to the virtual' […]. In his Op. 27 *Variations for Piano*, for example, we no longer find a set of variations beginning in the traditional way from a recognizable theme, such as Schoenberg provides in his Op. 31 *Variations for Orchestra*, but instead variations based on what Boulez terms a virtual theme. In the first movement of the Op. 27 *Variations*, the 'images' which Webern engenders from his materials are not linked uniformly to a primordial idea, as with traditional variations. They are, rather, diverse occurrences of an idea which never itself becomes perceptible and which is only ever perceived in its multifarious manifestations […]. The idea is therefore said to be virtual, meaning that it preexists all themes and acts as the condition for 'the definition of real images and their developments' […].[124]

These applications of Deleuze's theories about difference and repetition demonstrate how musical form and the idea of musical material can be conceived and conceptualized as molecular constructs. Deleuze's theories affect musical perception in the context of a now transformed ontology of music: from the perspective of a molecular musical thematicism, a musical piece may be considered as being entirely composed of repetitions of differences. This perspective offers the possibility of applying Husserl's theories to musical constituents other than individual notes formulating a melody. This way, one may see how memory and meaning are affected in their connection to difference or *différance* not only in what Schoenberg and Webern had perceived as thematical musical materials. Instead, it is possible to connect Husser's and other memory concepts with several, virtually any, musical elements.

Earlier in this chapter, the suggestion was made that if the mere recurrence of sound production is regarded as a valid instance of repetition (of a musical moment), then recurrence itself becomes the primary procedural force within a melody. A series of melodic notes can therefore be defined as a repeated occurrence of musical moments. And, as explained before, these moments outline musical instances in time perceived *as* and *through* music.

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[124] Ibid., 14.

In succession, every musical moment reveals a specific degree of difference or similarity to the previous one – while high degrees of similarity still never make them identical, which is a direct consequence of the temporal delay as described in Derrida's *différance*. The succession of musical moments is then a processual form of musical individuation; musical procedure is the creation of musical meaning itself.

Schoenberg and Webern approached the question of repetition and variation by means of transforming formal and developmental processes in their music. For the present study, it is important to extend the perspective of difference and repetition in order to develop a analytical paradigm which contextualizes the transformed musical ontology of today: such an analytical method situates the contemporary polystylistic and technologically enhanced musical culture within the context of memory and, more specifically, cultural memory. As a consequence, such an analytical approach might ideally allow for a more meaningful understanding of contemporary music, as has been suggested by Luciano Berio – "[...] music is everything we listen to with the intention of listening to music, and that anything can *become* music."[125]

In his essay "Music and memory in Mozart's *Zauberflöte*" Jan Assmann talks less about philosophical connections between repetition and memory, and more about how musical form – the macrostructural arrangement of all of a piece's musical moments – is only perceived because of memory as cerebral capacity. According to Assmann, form is the foundation of music within time and as such presents another aspect about repetition. "Music as form relies strongly on memory. Form is made audible mostly by recurrence. Cognition implies recognition."[126]

In this sense, repetition within music is a force, which not only governs a motive, a melody, or a theme on a small-scale level. It greatly influences, if not conditions, the entirety of a musical piece and affects it in its complete formal development.

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[125] In Berio, *Remembering the Future*, 49.

[126] Assmann, "Music and memory in Mozart's *Zauberflöte*," 188. Assmann refers to a short-term memory in the sense of Husserl's primary and secondary memory.

As shown, repetition can occur at various degrees of variation and, as the discussion has revealed, allows for the appearance of *différance* in music. The idea of *virtuality* – as presented by Deleuze – presents new perspectives on variations in a musical context, without a preconceived material functioning as a point of reference. Within this rhizomatic musical construct, varied repetition ensures the perception of the linear – even if multi-directional – connections between molecules: *becoming* is central to this kind of repetition, and what *becomes* is perceived as musical form – as explained by Jan Assmann. Here, repetition becomes fundamental in shaping ever-changing musical meaning within a given composition.

The second way to perceive repetition and difference is related to a particular understanding of music in general, wherein musical moments, or musical time, present themselves as progressively *différant* than the previous moments. This perspective entails the notion of *différance* within musical history and allows for a projection of the idea of repetition and difference beyond the scope of a single piece of music – a *différance* between musics on the basis of the memory of past musical moments and experiences.

Différance between Musics

Derrida's concept of *différance* and the immanent presence of repetition pertain to music in a second way: repeated performances of musical compositions[127] continually re-shape the perception of a piece and sustain the ongoing formation of musical meaning in this way. Luciano Berio expressed this in one of his Charles Eliot Norton Lectures at Harvard University:

> Music is performed, is constantly in motion, forever 'in progress,' especially since there is nothing really permanent to guarantee continuity between the mind of a composer and the hands of a performer, between the musical structure and the levels of articulation, as they are heard.[128]

By means of repeated performances, *différance* arises between the differing and deferred realizations of a piece of music. *Différance* transpires between composer, performer and audience members as impermanence between performances generates

[127] The use of (self-)quotations is a special case of musical repetition in which *différance* and repetition appear. This will be discussed further below.

[128] Berio, *Remembering the Future*, 62.

semiotic discontinuity between creator, musician and listener within the same piece of music: this reflects Abbate's and Jankélévitch's ideas of music performance to cause a "nonrepeatable moment and place" to happen for performers and listeners. This allows for a musical experience that actually connects the performed piece to the present – no matter how long ago it was composed.[129] But meaning and identity of compositional works individuate not only as a result of their own repeating in isolation. Repeated performances of music always imply the existence of a canon, which a given composition becomes a part of once it has been put on concert programs post-premiere due to a certain amount of success and recognition. Within that canon, a piece of music establishes its specific identity within a cultural context, oftentimes affected by a larger historical background.

> A musical work is never alone – it always has a big family to cope with, and it must be capable of living many lives; it can be left to its own past, and it must be capable of living in the present in a variety of ways, at times forgetful of its origins.[130]

New or altered musical meaning is therefore generated on a cultural and sometimes historical level, outside the restricted scope of the piece itself. The performance of music as a cultural matter is, as will be discussed in detail below, a form of externalized memory.

Conclusions

As has been discussed, repetition in music works on two distinct levels: on a structural level involving the recurrence of musical elements *within* pieces of music, and by way of repeated performances *of* a piece of music within a music-historical and cultural context. Therefore, the presence of repetition in music generates a relationship of quasi-oppositional elements which bear *différance* and, consequently, meaning. Herein it is important to understand that repetition itself is what constitutes memory: memory is stored information, which is retrievable and therefore repeatable. In retrieving (or repeating) it, it always yields *différance*.

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[129] Abbate, "Music – Drastic or Gnostic?," 529-530.

[130] Berio, *Remembering the Future*, 71.

Lawrence Kramer refers to Derrida's concept of *différance* and explains succinctly:

> [...] the musical […] 'Revenants' simply gather their variations piecemeal, assembling them – to borrow one of Derrida's images for the effect of *différance* – into a sheaf. […] Like all sheaves, this one – either one – is loose, so loose it continually threatens to fall apart and scatter. Like all sheaves, too, this one has no noncontingent identity, no 'itself' or 'per se'; it can be uttered, but it is not an utterance. It is, rather, a set of interstices through which both music and history are reanimated in spectral form, a site where memory, or perhaps only the intention of memory, is summoned to appear despite its stubborn subterfuges and persistent denials.[131]

Accordingly, it can be said that musical meaning is individuated by memory *in* music (by means of compositional methods) and by musical memory as a cultural matter (as cultural memory, or exteriorized memory). This emphasizes a significant relationship as present in the dichotomy of *internal* memory, which is social and communicative, and *externalized* memory, which is mediated, as has been introduced at the beginning of this thesis. The conditions for internal memory have by now been applied to the inner-structural configuration of music. It is now important to explore mediated memory in order to complement the understanding of the dichotomy of memory and to apply it to musical analysis.

It is here that digital technology creates the most radical changes to repetition in its relation to *différance*: memory, which is digitally supplemented as computized memory, affects the process of individuation of musical meaning on both levels of memory, internally and externally – within the musical composition and in relation to musical performance practices of a given culture. In both cases, the aspect of repetition is impacted greatly by technology. This will be discussed in great detail in chapters five and six.

Bernard Stiegler's philosophy is primarily concerned with externalized memory and how *différance* appears in this context specifically. While confirming Derrida's theory that meaning is created by deferral and difference, Stiegler's work is devoted to

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[131] Kramer, *Musical Meaning. Toward a Critical History*, 283-284.

explain a type of *différance* which is techno-logical,[132] a deferral of life by means of a "supplementation"[133] of memory, a deferral which is inherently marked by difference itself: techno-logos implies externalizing memory[134] – the process of individuation, the process of *becoming*. According to Stiegler, this process constitutes the pre-individual[135] and is thereby one of the conditions of *différance* and meaning. The process of individuation itself is called "transindividuation"[136] and bridges social and cultural memory, the individual and the collective. For this, supplemental technics are required in order to externalize the human or organic into organized *in*organic artefacts.[137] Such artificial "prostheses consist [...] as tertiary retentions supporting transindividuation as its crutches."[138] Tertiary memory is not lived through communication and socialisation and is not – as opposed to primary and secondary memory – marked by a short-lived temporal scope. To the contrary, tertiary memory, as will be shown, includes the past proper inasmuch as the future – in the sense of the forwards moving idea of *becoming*.

Music is tertiary memory and has the capacity to gain meaning beyond the limits of a singular composition. Under such circumstances, it has the potential to sustain cultural significance and even cultural identity – as cultural memory. The following chapter will discuss tertiary memory as cultural memory.

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[132] Stiegler, *Disorientation*, 28.

[133] Stiegler, *The Fault of Epimetheus*, 133.

[134] See Bernard Stiegler, "Relational Ecology and the Digital Pharmakon," *Culture Machine* 13 (2012): 1-13, www.culturemachine.net/index.php/cm/article/download/464/501 (accessed June 16th, 2014).

[135] See Bernard Stiegler, "The Theater of Individuation: Phase-Shift and Resolution in Simondon and Heidegger," trans. Kristina Lebedeva, *Parrhesiajournal.com*, no. 7 (2009): 55.

http://www.parrhesiajournal.org/parrhesia07/parrhesia07_stiegler.pdf (accessed June 30th, 2014)

[136] Ibid.

[137] See Stiegler, *Disorientation*, 4.

[138] Stiegler, "The Theater of Individuation: Phase-Shift and Resolution in Simondon and Heidegger," 55.

Chapter 2: Externalized Memory – Memory Culture

Memory can exist and circulate independently from lived experiences: without any contemporary witnesses to carry forth a knowledge or experience, however, a process of externalization is necessary. That is, there must be a carrier other than the collective, a collective whose shared past is to survive the decay of its material in the form of memory (to recall Bergson). This kind of memory is called *cultural memory,*[139] and such externalization occurs in the form of outsourcing: "[...] cultural memory is an externalization and objectivation of memory, which is individual and communicative, and evident in symbols such as texts, images, rituals, landmarks and other 'lieux de mémoire' [...]"[140]

In the context of cultural memory, Jan Assmann presents his concept of a "connective structure" [*konnektive Struktur*]: it is a connector, two-dimensionally, in social and temporal dimensions,[141] and it generates identity by creating an environment of trust and orientation: a human being relates to other fellow human beings within a symbolic world of meaning – a space of shared experiences, expectations and prospects, and actions. Within this world, the "connective structure" of memory links the past to the present, essentially forming the memory of defining moments and experiences. It is the force that transports cultural memory and endows a community with hope and memory by embedding images and stories from a different time within the constant flow of the progressing presence.

At the basis of every "connective structure," as Jan Assmann explains, is the principle of repetition.[142] One of the most essential carriers of cultural memory is ritual. Here, the "connective structure" is reinforced by ceremonial events within a community. These occasions are held regularly, for example a Mass as part of the Catholic Church, are repeated and thus

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[139] See Jan Assmann, "Kollektives Gedächtnis und kulturelle Identität," in *Kultur und Gedächtnis*, eds. Jan Assmann, and Tonio Hölscher (Frankfurt: Suhrkamp, 1988), 9-19; and Jan Assmann, "Stein und Zeit. Das 'monumentale' Gedächtnis der altägyptischen Kultur," in *Kultur und Gedächtnis*, eds. Jan Assmann, and Tonio Hölscher (Frankfurt: Suhrkamp, 1988), 87-114.

[140] Assmann, "Globalization, Universalism, and the Erosion of Cultural Memory," 122.

[141] Assmann, *Das Kulturelle Gedächtnis*, 16.

[142] Ibid., 17.

> bin[d] the members of the community together and mak[e] it possible to reconnect what has become separated, both temporally and socially. In ritual the gap between past and future, which creates discontinuity in time and separation between people in the social network, is 'bridged'. This is what Assmann calls the connective structure.[143]

The symbolic world of meaning, within which the "connective structure" functions, is expressed in various forms. One of these forms is music. In many cultures, music has a ritualistic function: the regular performance of musical works serves to store and transmit cultural knowledge within given societies, either in the form of liturgical music for worship or as canonized works of musical art.[144] With the "connective structure" continuously changing, music's functions and meaning as externalized memory has shifted as a consequence.

The idea of displacing memory into symbolic, i.e. representative, containers relates back to Bergson's fourth argument, as quoted above, where "to the extent that we may speak of a timebound universe, the evolution of the universe displays mind-like properties."[145] While Bergson refers to "evolutionary processes" and specifically "the evolution of organic matter" as "the work of mind," Stiegler describes externalization as "inorganic"[146] and, in doing so, implies a stringent differentiation between "organic" and "inorganic" memory in his work. Interchangeable with this polarity is the dichotomy between the *who* and the *what*. Stiegler suggests:

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[143] Thomas Quartier, *Bridging the Gaps: An Empirical Study of Catholic Funeral Rites*. (Münster: Lit Verlag, 2007), 37.

[144] In the occident the liturgical function of Gregorian chant was gradually replaced with the development of musical styles along with the changes in intellectual thought, which came about with the Age of Enlightenment. While music's role in religious practices is distinctly ritualistic and cultish, secular music until today "has not forgotten the old dream of magical collective unification." This steadiness of music's function as a ritual, however, primarily applies to the practice of music performance, while – as Helmut Lachenmann points out – the objective of music has shifted from sustaining collective bonding to the production of "beauty." See Helmut Lachenmann, "Musik als Abbild vom Menschen – Über die Chancen der Schönheit im heutigen Komponieren," in *Musik als existentielle Erfahrung*, 111-12.

[145] Kołakowski, *Bergson*, 2-4. According to Kołakowski, "mind-like properties" are "characteristics of memory." Such traits have the capacity to transmit and sustain information and knowledge over long periods of time.

[146] To Stiegler, techno-logy is what makes "inorganic matter […] organized." Stiegler, *Disorientation*, 4.

> That which anticipates, desires, has agency, thinks, and understands, I have called the *who*. The supplement to the *who*, its pros-thesis, is its *what*. The *who* is nothing without the *what*, since they are in a *transductive* relation during the process of exteriorization that characterizes life […].[147]

Stiegler contends that with exteriorisation comes the "character," the meaning, of life: the organic requires the inorganic in order to acquire existential integrity. This connects to his notion that individuation is a process, while the process itself entails tertiary retention, or in Assmann's terms, cultural memory.

One of the crucial characteristics of inorganic matter, i.e. technics, is that it functions transgenerationally. Whereas social or communicative memory is temporally finite, inorganic memory exhibits a temporal scope that seems infinite: retentional infinity as a kind of perfect memory. However, Stiegler observes a critical fallacy in this assumption:

> Does this mean, […] that, consequently, technics should become infinite retentionality (that is, in fact, God's memory) faced with the finitude of failings? […] [T]echnical supplement itself, whatever its advances, is itself finite. As supplement, it opens out a gap that can be seen as in-finite, but that in fact is not infinite but rather, more precisely, indefinite [...] and, relative to retentional finitude, quasi-infinite; the technical supplement is the substance of the transductive relation between the *who* and the *what* as

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[147] Ibid. 6. Importantly, within the *who* and the *what* there is an implied presence of *différance*, as their relationship is defined via time (individuation). "[T]ime is deferred. There is time only as this deferral that generates difference(s).This *différance* is a referral, a reflection of the *who* in the *what* and reciprocally." Stiegler, *The Fault of Epimetheus*, 237.

This view is not only a continuation, but a confirmation of Marshal McLuhan's early critique of modern media, where he coined the aphorism "the medium is the message."

"In a culture like ours, long accustomed to splitting and dividing all things as a means of control, it is sometimes a bit of a shock to be reminded that, in operational and practical fact, the medium is the message. This is merely to say that the personal and social consequences of any medium-- that is, of any extension of ourselves -- result from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology." Marshall McLuhan, *Understanding Media.The extensions of man* (New York: McGraw Hill, 1964), 7.

McLuhan's early visions and anticipations about the effects of communications media on participatory aspects in society and issues of fragmentation will be reviewed in the fifth chapter, in the discussion of automation and mass media technology.

> distributed in the places constituting irreducible singularities: as events.[148]

This embraces the idea that inorganic matter itself is not a fixed and rigid entity that has a one-sided relationship with organic matter: rather, cultural, or tertiary, memory – the *what* – is just as much part of a transformational connection of memory as is the *who*, and is therefore not immune to change.[149]

Each quasi-infinite technic of memory reveals a particular relationship of transformation between organic and inorganic matter: depending on a technic's mode in which it circulates memory it affects the "connective structure." For example, Jan Assmann describes how the change from orality to textuality has profoundly impacted both the social and temporal dimension of the "connective structure" with the advent of another, very different form of transmitting cultural memory.[150]

In the following, I will examine the "indefinite" connection between organic and inorganic memory, the *who* and the *what*, and the consequences for the "connective structure." This examination will be directed by the observation that quasi-infinite prostheses entail a fundamentally different modus operandi of memory than that of social and communicative memory. In the context of Heideggerian ontology, Husserl's retentionality, Derridian *différance* and Stiegler's individuation, it will be explored how aspects of meaning and identity are affected through supplemental prostheses.

The sections thereafter will discuss the implications of externalized memory in general, its processes and the significant role of forgetting in the context of individual and collective memory. An examination of various technics as processes of exteriorization will allow for a better understanding of how given technics influence the development of the "connective structures" of memory as well as on cultural memory in relation to

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[148] Stiegler, *Disorientation*, 11. Stiegler criticizes Heidegger's assumption that technology is humanity's escape route out of its own mortality and retentional finitude and that technology provides the tools and capacities to sustain human memory and extend it into infinity. According to Stiegler, however, humanity's finitude is primarily determined, at the very moment in which the *who* and the *what* connect. Since the *who* – humanity – is marked by temporal limitations by default, the *what* can never actually be infinite within this reciprocal interdependence. See Kristina Lebedeva, "Review Article of Technics and Time, 2: Disorientation," *Parrhesiajournal.com*, no. 7 (2009): 82.

http://www.parrhesiajournal.org/parrhesia07/parrhesia07_lebedeva.pdf (accessed August 20th, 2014).

[149] Stiegler talks about "originary supplementarity", often in reference to Derrida, and implies that prosthetization is a default condition of life. See for example Stiegler, *Disorientation*, 27, 30, 78.

[150] Assmann, *Das Kulturelle Gedächtnis*, 91-97.

music. This discussion will allow for an understanding of how aspects such as cultural contextualization, participation and individuation are distinctly affected by given technics and what particular role is fulfilled by the act of *forgetting.*

This exploration and the study of music as a carrier of cultural memory in particular will inform the discussion of the connection between time and meaning in music, and the specific musical analysis of specific compositional works. It will also set up the foundation for the theoretical argument in chapter five, where the social and temporal dimension of the "connective structure" are profoundly changed as well as the relationship between the *who* and *what*: in the context of digital technology providing a high-speed, ever-present, quasi-inifinite mnemotechnique, the "connective structure" is transformed and the dichotomy between the *who* and the *what* is becoming more complex.

Individuation, Grammē, Tertiary Memory

While internal, social memory operates on grounds of immediacy, direct experience and communication, cultural memory is reliant on exteriorisation. Herein, immediacy is split open and a *medium* is inserted – an external carrier of memory. The following discussion is primarily centred around Bernard Stiegler's work, for which it is important to review Simondon's concept of individuation briefly, as Stiegler adopts it as the basis for his comprehensive theories about exteriorized memory. Simondon's ideas will also provide the foundation for an extended analysis of music as cultural memory. In *L'individuation psychique et collective*, Simondon describes the process of individual and collective individuation as involving both psychic and collective individuation. Stiegler explains this by summarizing Simondon's thesis:

> 1. A psychic individual is neither a stable state nor an identity but a phase in a process through which she never ceases to transform herself.

> 2. This process of psychic individuation is only truly accomplished to the extent that it is inscribed in a process of collective or social individuation.[151]

From this concept, Stiegler develops various inter-related ideas, all of which are important in examining externalized memory. First, he articulates his theory of co-individuation as a default process occurring within individual and collective individuation:

> The I and the we are inadequate to themselves (incomplete, evolving) precisely in so far as they are both inadequate to but also inseparable from each other. They are in a state of co-individuation, and I only individuate myself to the degree that I participate in this way in the individuation of the group, no less than in my own individuation.[152]

At the root of these claims is the concept of individuation as a *process*, as related to the theory of *becoming*, while the individual experiences him-/herself in the group as a non-identical difference. Since this process occurs through time, pre-individuals are individualised as temporal objects within a social context, which reiterates Derrida's ideas of temporal deferral and differentiation. This where Stiegler specifies his ontological reasoning:

> Here I need to explain what I call transindividuation. My thought was much influenced by the philosophy of Gilbert Simondon […]. Simondon says that if you want to understand the individual, you need to inscribe the individual in a process of which he is only a phase. As such, the individual has no interests. The individual is only an aspect, or phase of a process, but the process is what is important. So what is this process? It is the process of individuation, that is of transformation, and for Simondon, everything is a [sic] caught up in and brought into a process of individuation. For example, the passages of life are a process of individuation, but 'technics' are also processes of individuations.[153]

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[151] See Stiegler, "Relational Ecology and the Digital Pharmakon," *Culture Machine* 13 (2012): 2, www.culturemachine.net/index.php/cm/article/download/464/501 (accessed June 16th, 2014).

[152] Stiegler, "Technics of decision an interview," 162.

[153] Bernard Stiegler, and Irit Rogoff, "Bernard Stiegler and Irit Rogoff – Transindividuation," (interview) *e-flux Online Journal* 3, no. 14 (2010), http://www.e-flux.com/journal/transindividuation/ (accessed May 25th, 2014).

Technics as exteriorized memory are therefore a fundamental component for the process of *becoming*.

Transindividuation, technics, the technical or prosthetic supplement, the *what*, exteriorized and cultural memory: these are all terms describing the process through which individual and collective individuation take place and meaning is formed. This necessarily implies that the relationship between the *who* and the *what* (between organic and inorganic memory) is inherently temporal, as it is understood as a process – that of transindividuation.

Another implication is that transindividuation can be seen as a matter of the future in that it is a process of *becoming*.[154]

> This signifies that my individuation can only be as effective as is my socialisation. But the latter can take a lot of time: belonging constitutes itself here as difference, that is to say as différance – as time. And there is co-individuation in so far as the I shares with the we a pre-individual milieu.[155]

While this observation is a reminder that individuation itself constitutes the temporal aspect of Derrida's *différance* – in this case it is a social constitution – it is worth noting how Stiegler expands the concept of *différance*: Stiegler's concept draws essential connections between the history of humanity and that of technics – here in the particular form of alphabetic writing. He quotes Derrida's reformulation of French paleoanthropologist André Leroi-Gourhan:

> Leroi-Gourhan no longer describes the unity of man and the human adventure thus by the simple possibility of the *graphie* in general; rather as a stage or an articulation in the history of life – of what I have called différance – as the history of the *grammē*.[156]

Here, Derrida's *différance* is applied to life and, more importantly, to the history of inscription as an articulation of life – the *grammē*. Departing from that, Stiegler goes on to claim: "At issue is the specificity of the temporality of life in which life is inscription

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[154] This connects to Bergson's first argument, where he explains that the future gradually unfolds and reveals itself, manifesting that "[…] the life of the universe is a creative process, whereby something new and thus unpredictable appears at every moment [...]." Kołakowski, *Bergson*, 2-4.

[155] Stiegler, "Technics of decision an interview," 162.

[156] Jacques Derrida, *Of Grammatology*. (Baltimore & London: Johns Hopkins University Press, 1998), 84, as quoted in Stiegler, *The Fault of Epimetheus*, 136.

in the nonliving, spacing, temporalization, differentiation, and deferral by, of, and in the nonliving, in the dead."[157]

While conceiving all forms of *grammē* as technics, Stiegler proposes the history of life as the history of grammatization, or the *history of the supplement*,[158] for it is governing the history of life itself. With this, Derrida's *différance* can be understood as truly demonstrating a differing within and deferral of life – in form of life externalized and inscribed onto non-living carriers. This constitutes Stiegler's idea that *tertiary memory* bears *différance* as retentional supplement – "the supports of […] [the] process of individuation,"[159]

> One must then ask what the closure of the cortical evolution of the human implies from the vantage of a general history of life, the closure of the cortical evolution of the human, and therefore the pursuit of the evolution of the living by other means than life – which is what the history of technics consists in, from the first flaked pebbles to today, a history that is also the history of humanity – a statement that will lead us to the unusual concept of 'epiphylogenesis.'[160]

"Epiphylogenetic memory," he describes, is "essential to the living human being, [it] is technics: inscribed in the non-living body."[161]

While technicity reveals an opposition to the human and the living, it is still indispensable to living memory, and, as such, it must not be regarded as a phenomenon which has emerged only recently with technological developments in the twentieth century. In fact, technicity, as a mnemo-technical tool for outsourcing collective memory, has historically comprised inorganic, non-living technics such as books, libraries, ritual, oral traditions (myths) and modern technological devices such as photography, sound and film recording. It delineates a historical development of various externalization technologies.

Leroi-Gourhan divided the history of grammatization into five distinct eras:

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[157] Stiegler, *The Fault of Epimetheus*, 139-140.

[158] Stiegler, *Disorientation*, 3.

[159] Stiegler, "The Theater of Individuation: Phase-Shift and Resolution in Simondon and Heidegger," 46.

[160] Stiegler, *The Fault of Epimetheus*, 135.

[161] Stiegler, *Disorientation*, 4.

> 'that of oral transmission, of written transmission with tablets or indices, with simple filing systems, with mechano-graphics, and with electronic seriation, ...while the group's body of knowledge is the fundamental element of its unity and of its personality and the transmission of intellectual capital is its necessary condition on both the material and social levels.'[162]

In all these forms, technics embody "an originary supplementarity of this form of life,"[163] and every culture has developed their own distinct set of technics to imagine their past and future as a means to continue their cultural identity.[164] As will be demonstrated, each mnemotechnique has impacted culture in a distinct way and has generated particular "connective structures."

The next section will discuss these various forms of supplemental technics by way of which memory is externalized and becomes cultural memory.

Processes of Externalization

> Technics, so difficult to identify from the beginning, is a formidable acceleration in the production of the new. What frightens us in this 'new' that we also want to maintain? The disappearance of the human, and with it, of the new.[165]

The history of the supplement, or the history of the *what*, reveals not simply the development from one prosthesis to the next, but, more importantly, how specific changes affect cultural memory and the "connective structure":

In the following, I will discuss the distinct social and temporal aspects as they are transformed differently with every supplement. The investigation will begin with an examination of the first two eras of grammatization – oral transmission followed by written transmission, as presented by Leroi-Gourhan – so as to make explicit the implications of the given technological supplement on a culture and the specific historical consequences of the introduction of orthographic writing into a system that was previously dependent on oral and ritual-based transmission. This discussion will inform a

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[162] André Leroi-Gourhan, *Le geste et la parole – Le mémoire et les rythmes*, vol. 2, New Edition (Paris: Broché, 1975), 65, as quoted in Stiegler, *Disorientation*, 78.

[163] Stiegler, *Disorientation*, 4.

[164] Assmann, *Das Kulturelle Gedächtnis*, 18.

[165] Stiegler, *Disorientation*, 160.

thorough examination of music as cultural memory for it characteristically embraces both, technics of ritual and writing (notation). It will become evident how music as a cultural carrier of memory has taken an ever-changing position along the lines of this type of hybrid functionality.

Orality to Textuality

> A technique appears, that of linear writing, that radically transforms the way all spirits transmit and are transmitted from generation to generation, and the way spirit transmits itself from generation to generation through them – but this time as a unified spirit, precisely through the unification of language enabled by literalisation. It is this mnemotechnics that makes possible the writing of laws, the founding of cities, the construction of geometric reasoning (Thales embodies the origin of geometry), the practice of philosophy. It involves a massive transformation of the social group that raises a thousand questions. It overturns, for example, the relation to tradition, to spirits, and, more precisely, the articulation between the city and religion, the relation between the profane and the sacred, the place of the clans inside the city-states or territories [*demes*], and so on. It raises, in short, questions that are not entirely foreign to what we are experiencing today, on a global scale, with respect to contemporary forms of technology (however novel our current situation might otherwise be).[166]

Aleida and Jan Assmann agree with Bernard Stiegler when they declare that the history of technics is marked by a remarkable rift in cultural memory, a change, which occurred when written text was introduced to oral cultures.[167] This change, as they point out, was a consequence of the shift from repetition – the basis of ritual – to written text as the carrier of cultural knowledge and traditions. In text, the circulation of this information takes place via letters – engraved words and sentences. Gradually, text became the primary carrier of cultural memory.

Presenting two inherently distinct ways of sustaining cultural memory, orality and textuality give rise to different "connective structures":

> The textualization of traditions entails a gradual transition from a dominance of repetition to a dominance of representation (Vergegenwärtigung), from 'ritual' to 'textual coherence.' With

[166]Stiegler, "Technics of decision an interview," 154.

[167] Assmann, *Das Kulturelle Gedächtnis*, 96.

> this, a new connective structure has come into being. Their cohesive powers are not imitation and conservation, but interpretation and memory. Hermeneutics substitutes for liturgy.[168]

Aleida Assmann gives an account on the historic perception of written text as being able to withstand the test of time, having the (supposed) advantage of durability and longevity:

> The conviction that written texts may outlast the ruins of civilizations is, of course, a topos much older than the Renaissance. The ancient Egyptians, looking back over more than a thousand years of their own culture, could not help noticing that, while colossal buildings and monuments had fallen to pieces, texts from the early period were still being copied and praised. Minimal traces of ink on a brittle papyrus provided more lasting monuments than tombs and pyramids.[169]

Another alleged benefit, as Assmann points out, was conceived in that letters were apt to represent the past more adequately than mimetic mnemo-technical arts such as images or figures, "present[ing] a diminished copy of the original:"[170] written text as *instruments of reproduction*. This presents the direct opposition of ritual versus text in the dichotomy between *repetition* versus *reproduction*.

The above characteristics made writing considerably more appealing during the Enlightenment, "[a]s the deceit of religion gives way to the truth of science, the magic of letters replaces the magic of rituals. False priests give way to the scholars of a new discipline called philology. Instead of canonized saints, now there are canonized texts […]."[171] This, again, puts emphasis on the idea that text was a device to capture a perceived truthfulness of a thought or an idea. With text, the record of this content was thought to be immune to any manipulation based on the freedom of interpretation which is inherent to performance-based rituals.

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[168] Ibid., 135.

[169] Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 124.

[170] Ibid., 125.

[171] Ibid., 126. Of course, individual texts don't simply join a canon: their survival throughout the ages is exclusively dependent on their circulation. This matter will be investigated in a dedicated section on canonicity.

Above all, it is important for this study to consider how, at the time of secularization, the possibilities of writing and printing in particular cleared "the way […] for a progressive accumulation of knowledge, for a linear advancement of learning.'"[172] This aspect of linearity becomes relevant in relation to the "connective structure." Aleida and Jan Assmann discern specific temporal and social properties as they appear distinctly in oral and written cultures. The sense of time in ritual is of a *cyclic* nature,[173] with the repetition of events being at the centre. An example for this would be religious worship wherein the liturgic services abide by a specific order of procedures every time. It is therefore a regular, repeated event.

The nature of repetition itself allows for the emergence of symbolic meaning of the event – events become ceremonies or ritual procedures. With regards to the social dimension, ceremonies and rituals intrinsically rely on a participatory structure, which involves regular attendance of the members of a given social group.[174]
Alphabetic writing, however, reveals a profoundly different "connective structure" with a linear temporal outline (see above) while the aspect of participation does not necessarily require an involvement of individuals as a group: texts can be read and circulated in non-communal contexts and therefore do not foster the social aspect of a collective group.

Ultimately, the shift from ritual coherence to textual coherence and the change to another type of "connective structure" affected even the very conception of life. With that transition came a transformation of a sense of time that "was primarily experienced in and associated with the cycles of nature" to a temporal "dimension of history and progress."[175] *Universal*, cyclical time transitioned to *historical*, linear time,[176] and the need of collective participation receded to the involvement of an exclusive group of specialists. This change did not come without certain effects of social estrangement:

> We are used to referring, mutatis mutandis, to the experience of distance and estrangement as historical consciousness. One historical period is divided from another by qualitative changes in

[172] Ibid.

[173] See Assmann, *Das Kulturelle Gedächtnis*, 56-57, 78 and 83-86.

[174] Ibid., 57.

[175] Assmann, "Music and memory in Mozart's *Zauberflöte*," 189.

[176] See Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 127.

> its modes of perception and central value systems. Texts regulated by the structure of cultural memory that we have called tradition were written and read within a shared space of images, tropes, references, and values that prevented the experience of an aged or strange or obscure text. In the cultural frame of innovation and historical consciousness, however, a special art of reading is needed to compensate for the loss of a direct understanding. We refer to this art as hermeneutics.[177]

This echoes Jan Assmann's ideas about *new beginnings* as part of his theory about the perception of the past versus the present. As Aleida Assmann points out, however, the differences between the old and the new (between different generations) in written cultures are particularly amplified through an emergence of enhanced alienation: rituals continually adapt to generational changes and can thereby become "contemporary". Change and difference within cyclical repetition are therefore beneficial for understanding and identification. Individual written texts, on the contrary, do not go through this kind of experience-based adjustment and are often asynchronous with the change of time and are likely to be passed by the next generation. In this case, repetition – the reading of the text – occurs on foreign grounds, stuck on a historical foundation which has been passed over and where meaning is left behind and misunderstood. Aleida Assmann speaks of the importance for historical or cultural consciousness, which allows for a contextualization of meaning of a historical text: "While the art of an interpreter mediates between two foreign languages, the hermeneutic art of interpretation mediates between two different historical periods."[178]

In the chapter *Orthographic Age* in his second volume of *Time and Technics*, Stiegler discusses the technique of written text as an *instrument of reproduction* and discloses yet another kind of estrangement. While Aleida Assmann used the same allegory to describe text's "miraculous capacity not only to preserve but also to generate," Stiegler puts emphasis on the presence of temporal delay between a thought (the invention) and the "orthothetic archivization:" writing implies *différance* rather than precise reproduction.

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[177] Ibid., 129.

[178] Ibid.

In reference to Derrida's *Husserl's Origin of Geometry: An Introduction*, Stiegler states:

> Technics is a surface of *différance*, an instrumental mirror reflecting time as differentiation, differing, as deferred. Orthography is already a sort of clock to be seen, *après-coup*, in a theoretical and not a photographic light; it calls into question another kind of gaze than that of photography. […] Writing is necessary from the outset to authorize geometry, but this necessity of an orthothetic archivization can only occur *après-coup*, for the inventor's successors. Yet the time required for this test is the horizon of invention itself, and not merely of its repetition; rather, the repetition (of the already-there as what passes/is past) is the invention.[179]

Stiegler argues that the production of the thought through writing is already marked by *différance* and is thus already reproduction. Writing can hence never be production. This characteristic of text Stiegler calls *literal synthesis*. In his first volume of *Technics and Time* he writes:

> [W]riting constitutes the first case of what we will define later as what stems from the *principle of a deferring and differing identity*. This first case is achieved by what we will call, to designate the completed form of alphabetic writing (phonological writing), *literal synthesis*. A temporality that is deferred belongs in principle to literal synthesis.[180]

According to Stiegler, literal synthesis distinctly describes *différance* whereby a distinct individuation of meaning and identity is the result. The process of writing – as the inscription of knowledge – needs to be considered not as an invention, i.e. an event etc., but rather as its reproduced *memory* of it: "tertiary memory always already inhabits my secondary memories as well as my primary memories and my present 'itself.'"[181] This implies another kind of invalidation of the assumed capacity to record the truth: what needs to be considered here is that the writer interjects him-/herself into the text during the process of writing. This kind of intersubjectivity continually alters meaning, for it

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[179] Stiegler, *Disorientation*, 41-42.

[180] Stiegler, *The Fault of Epimetheus*, 230.

[181] Stiegler, *Disorientation*, 41-42.

necessarily affects both deferral and difference as they occur between moment and transcription.

> If it is true that 'tradition sedimentation in the communal world will have the function of going beyond the retentional finitude of individual consciousness' (Derrida 1989a (1962), 57), transcendence of this retentional finitude is necessarily within the moment of invention; it is this moment par excellence. 'Before being the ideality of an identical object for other subjects, its meaning alters at different moments for the same subject'; intersubjectivity is 'first of all, in a certain fashion, the empirical non-connection of the self with itself, of my eternal present with other presents as such; that is, as other and as present (as past presents).'[182]

Therefore, not only are aspects of historical dissociation and *différance* creating estrangement but also the very principle of authorship.

It is interesting to reconsider the different implications of *repetition* and *différance*: the kind of repetition inherent in ritual bears *différance* between the event and the participating collective, whereas, according to Stiegler, text itself being a type of repeated thought reveals *différance* between the thought and the record of it – not in the act of interpretation.

What is important to understand then is that in written cultures, the *who* (the thought) is affected by the *what* (the text) in an inherently different way than in ritual-based oral cultures. The inscription of text is a technics of memorization (the *what*) within the thought of the text itself: this way, the inscription fundamentally shapes the meaning of the thought in that the individuation of this meaning occurs inside the continually widening gap between two temporal extremes: at the moment of its writing, a thought has an immediate past in the text. However, this past distances itself inexorably from the reader's present as the wheel of time keeps spinning. In this way, written text causes a particular de-contextualization of meaning.

Above observations shall suffice to understand how temporal concepts, the structures of collective participation as well as specific appearances of *différance* and

[182] Ibid.

repetition are considerably different in oral traditions as opposed to written traditions. As discussed, such differences reveal distinct "connective structures" and have substantial implications in relation to cultural continuation, and the creation identity, of meaning itself.

The next section will discuss music as a technics of cultural memory and how it has been transformed throughout history, along with the introduction of various other technics.

Music as Memory – Musical Function in Musical Material

The following discussion will investigate music as cultural memory. For this purpose, I will first delve into the question of the function of music within a culture, as this aspect is crucial in how music has been conceptualized, performed and perceived through the ages, particularly in the West. Based on the understanding of cultural musical functions, the subsequent investigation will involve a comparison between unnotated, musical improvisation and notated music in order to establish a methodology of musical analysis which takes into account the presence of technicity within music as this will inform the analysis of digital technics in music in the sixth and seventh chapter.

Historically, as to be demonstrated, music has had a specific yet ever-changing function as an agent to preserve cultures of memory: music as a technical supplement of memory. As a form of tertiary memory, music is a process of individuation wherein individual and collective meanings evolve: on a social, outer-musical level but also on an inner-musical level. As cultural memory, music has the capacity to sustain meaning and the heritage of a culture transgenerationally. Herein lie two important notions.

First, music's *cultural function* has continuously gone through transformations corresponding to the developments of society and different forms of (other) grammatization as they have occurred over the course of history – in the sense of Stiegler's idea of the *history of the supplement* as the history of life.[183] Since music itself is a form of grammatization or technicity this means that, to some extent, the development of different forms of technics need to be considered inseparable and as mutually affecting, if not conditioning each other. The transition from oral to written

[183] Ibid., 3.

cultures, for example, led to a dramatic change in cultural memory (see above). In the case of music, as will be explained further below, there was a similar transition from unnotated, ritualistic music to notated music. The possibility of musical notation substantially affected the function of music. In fact, the effect of being able to spell out detailed musical ideas on paper was so profound that it altered the way music has been conceptualized and performed ever since; with that practical change music's cultural function was influenced as well.

Second, throughout the evolution of different sociogenetic stages, music has fulfilled distinct symbolic roles within its social function[184] and, with that, revealed a related aesthetic, which is primarily a question of musical material. This implies a stringent connection between social function and musical material: it is the *social function of inner-musical* representations wherein the symbolic content of a material is intrinsically determined by a given aesthetic. This symbolic content is regarded as *musical semiotics* and will be investigated in its constant reciprocal relationship with contemporary culture in the present study.

The two concepts of music's cultural function and semiotics tie in with Gunnar Hindrichs' distinction between "the musical piece of art" [*musikalisches Kunstwerk*] and "the social function of functional music:"

> Functional music is placed in heteronomic [*heteronom*] contexts. It holds its existence in an outer-musical function, which it fulfils. The musical piece of art, however, does not hold its [primary] existence in an outer-musical function, which it has fulfilled already. The very opposite is the case: all those outer-musical functions which are relevant to it [the musical piece of art] fulfil [other] functions within its autonomous regulatory system. Therefore, they [these outer musical functions] can be understood as sub-systemic instants of musical autonomy; the regulatory sub-system of its material introduces it into the autonomous regulatory system of the musical piece of art. In this way, the musical piece of art is self-regulating, without being deprived of its social function.

[184] Importantly, within the historical context of culture, the discussion about music's social function becomes a discussion about its cultural function. This is in line with the differentiation between social memory and cultural memory.

> This means that the social function of music is not the counterpart of material inventory [*Materialstand*]. On the contrary, it is one of its determinants.[185]

This means that the outer-musical social function of music as a cultural practice is intrinsically informing inner-musical semiotics, by way of which the distinct musical material of an individual composition becomes socially functional. The following scheme illustrates these interconnections wherein music reveals its double social functionality:

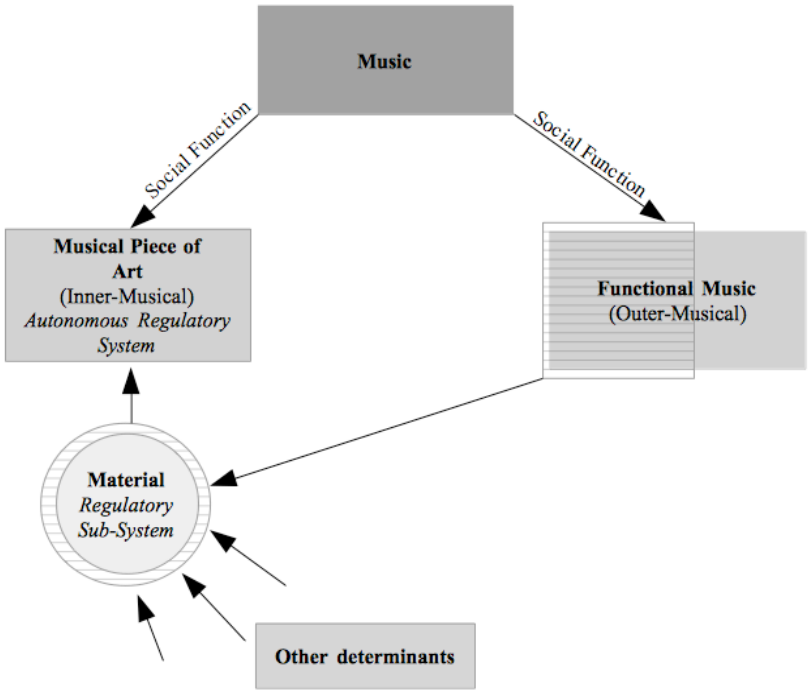

Figure 8 - The Double Social Function of Music

Both concepts imply a transformation of transindividuation, for music enacts a process of individual and collective individuation and thereby generates, or individuates, outer-musical and inner-musical meaning within the limits of its cultural function; the transformation of both processes is steadily coupled with the development of technics and therefore with cultural changes.

In the context of cultures of memory, Jan Assmann ascribes to music – besides dance, images, text – sacrality in its ritualistic operation. As ritual or ceremony, music is

[185] Hindrichs, *Die Autonomie des Klangs*, 66.

part of orality and exists within a "mode of cyclical repetition,"[186] i.e. musical pieces are performed again and again. The aspect of performance becomes the main pillar to support the musical canon. At the same time, such performances are set as communal events – as meetings for which members of a cultural group come together and participate:[187] This entails a participation of composer, performer(s) and audience. In this way, music becomes a carrier of cultural memory.

> The figures of memory have a religious meaning, and their remembered representation [*Vergegenwärtigung*] often portrays ceremony. Among many other functions, ceremony serves to represent substantiating memory [*fundierende Vergangenheit*]. It is the identity of a remembering group, which is substantiated by relating to the past. In the memory of their history and in the representation of substantiating figures of memory, a group assures their identity. This is no day-to-day identity [*Alltagsidentität*]. A ceremonial, exceptional character adheres to collective identities. In a way, they are 'larger than life,' and transcend the scope of day-to-day and constitute ceremonial, non-day-to-day communication. This ceremoniality of communication itself is such a form. It proceeds in shaping memory, which coagulates to text, dance, images, and rituals.[188]

In general, ritual is a way to represent the past – a procedure, which substantiates a culture and creates group identity via repetitive, ceremonial events. This is based on the same ontological principle from which Husserl's primary and secondary memory originates. However, ritual works as externalized tertiary memory towards what was earlier explained as Simondon's *individuation*, the theory of *becoming* and Derrida's *différance* – as a form of long-term memory which involves a much larger scope for this *individuation*, *becoming* and *différance*: historically and socially. This in turn implies that repetition in tertiary memory occurs on a more extensive temporal scale than in primary or secondary memory.

Therefore, ritual extends both communicative memory and entities of ontological matter in a temporal manner as repetitions throughout long time periods create a type of meaningfulness for an entire culture. This occurs as follows:

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[186] Assmann, *Das Kulturelle Gedächtnis*, 78.

[187] Ibid., 57.

[188] Ibid., 52-53.

> The transmission of meaning: *cultural memory*. Cultural memory creates a space, in which all three of the domains above [habitual memory as mimetic memory, memory of things as ontological beings, communicative memory as social interaction to create identity] pretty much seamlessly melt into one another. When mimetic routines assume the status of 'ritual', i.e. when they serve a purpose in addition to possessing signification, they transcend the domain of mimetic memory of habitual actions. Rituals belong to the domain of cultural memory because they present a form of transmission and representation of cultural meaning. The same is true for objects which don't only reveal a purpose but also meaning: symbols, icons, representations such as memorials, tombstones, temples, idols etc. exceed the horizon of a memory of things, by rendering explicit the implicit indices of time and identity.[189]

Assmann's theory gives emphasis to the concept that cultural memory involves a consideration of purpose – function – as it develops a cultural meaning – semiotics – by way of cyclical repetition. Furthermore, it is substantiated once more that performance is crucial in being the vehicle for music to work on a social and cultural level – within the context of repetition and ritual. To summarize, the ritualisation of music performance serves a cultural function and simultaneously informs the semiotic content of a musical piece of art.

As Jan and Aleida Assmann have described the transition of culture from orality to textuality as a striking shift of the "connective structure," it is interesting to investigate the shift of musical culture which occurred with the introduction of musical notation from the sixth to the ninth century. Here, the reality of performance-based, improvised music was profoundly changed:

> Before the world of text, orality was the primary forming parameter of musical ritual: musical song existed as a spontaneous part of mythical nature. With the expansion of monotheistic religion, written text became canonized, eventually allowing for notation to emanate from canonized text, functioning primarily to explicate syntax. Such a notational evolution gave music the

[189] Ibid., 21.

> possibility of deviating from text, allowing for increasingly abstract and complex musical forms to emerge.[190]

Musical notation generated more autonomy from text, which music had been merely servant to. Musical material such as melodies changed dramatically, as the use of notation allowed for more complexity and subtleties. Dániel Biró refers to Richard L. Crocker in *An Introduction to Gregorian Chant*:

> Some scholars feel that this development of musical notation is a watershed in the history of music, especially in its performance, and that the use of musical notation gave performers quite a different way to know music. Consequently (it is argued) we should imagine that after the introduction of notation the chant sounded different – perhaps – very different – from the way it had sounded before.[191]

Therefore, notation affected those inner-musical aspects, which represent musical meaning along the measures of contemporary social contexts for such musical meaning. In the Middle Ages, the independence and complexity of melodic, harmonic and rhythmic characteristics of music became increasingly greater and went hand in hand with the secularization of literature, the material from which became a central part of the new style of secular music. Because of this, the motet, for example, moved out of an exclusively religious context and became the musical vehicle for numerous poems of secular topoi:

> French motets rapidly became more prominent than those with Latin poetry, and few of the French texts maintained an obvious trope-like relationship with the cantus firmus. But even a good many poems in the Latin motets either retain only a topical connection with the text of the cantus firmus, while giving up the assonances characteristic of troped organa and troped clausulas, or else depart altogether from the tenor's words and their connotations. Other motets, Latin as well as French, continued to cultivate assonance with the tenor label, but rather than reflecting liturgical necessity the device now betokened poetic ingenuity and delight in punning (e.g. Maniere esgarder/Manere). […] Most French motet poems deal with love – courtly, urban or pastoral. A

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[190] Dániel Péter Biró, "Composing 'Mishpatim' - 'Laws': A Response To Ben's Mishna Music as Music," *Perspectives of New Music* 43/44, no. 2/1 (2006): 255.

[191] Richard L. Crocker, *An Introduction to Gregorian Chant.* (New Haven: Yale University Press, 2000), 155, as quoted in Biró, "Composing 'Mishpatim' – 'Laws'," 263, note 24.

> few other texts reflect the convivial life in the city (i.e. Paris); the rest are either Marian or hortatory.[192]

While secular poetry had an impact on the social setting for the French motet in the 13th century, it "also affected the music" on a structural level:

> A decisive result of the adaptation of text to clausulas concerns the weight and articulation of the notes. Comparison of any motet with the ligature notation of the melismatic original shows how the propulsive flow of the melismatic phrases is profoundly affected by the declamatory individualization of each note. The words often convert the iambic (upbeat–downbeat) implications of the binary ligatures into truly trochaic rhythms (strong beat–weak beat).[193]

By now, it has become evident to what extent music was decisively transformed by the act of notation, yet it is also important to evaluate the significance of notation within the larger context of printing, as this truly exhibits musical notation as an *instrument of reproduction*.

Music Scores as Literal Synthesis

The reproductive aspect of printing inherently changed music's situation into an object of analytical and theoretical-discursive interest. Before the introduction of printing, Marion Saxer explains in her essay about media transmission of music and sound art,[194] notation was merely perceived as a tool to remember for the performers. As printing techniques finally developed in the fifteenth century, literary works began to be published, multiplied and distributed amongst a growing community of readers while written documents started to circulate increasingly outside the local community. Of course, the same became the reality for musical scores,[195] and in the course of their

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[192] Ernest H Sanders, Peter M. Lefferts "Motet." *Grove Music Online. Oxford Music Online*, http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/40086pg1#S40086.1.1 (accessed September 25th, 2014).

[193] Ibid.

[194] See Marion Saxer, "Lücken, Brüche, Transformationen - Zur medialen Vermittlung neuer Musik- und Klangkunstformen," *Positionen. Beiträge zur Neuen Musik*, no. 72 (2007): 28

[195] For a detailed description of the developments in music publishing, please refer to Hans Lenneberg's *On the Publishing and Dissemination of Music, 1500-1850*, According to Lenneberg, the practice of large scale music publishing dates back to the middle of the 15th century. Before the Gutenberg printing press was developed, music scores copied by autograph. "The history of printing in western society is said to begin in 1454, when Gutenberg produced a papal indulgence and, soon thereafter, the first bible. […] What might be considered the first published musical work is the Gradual known as the Constance Gradual, assumed to

circulation, Saxer points out, scores were considered more and more as a theoretical substitute for "real music". In the sense of Stiegler: the literal synthesis of musical memory (the *what*) started to prevail over the musical thought (the *who*).

In his work *Musikästhetik,* Carl Dahlhaus cites Roman Ingarden to the effect that "sounding music is a 'real' matter, while notated music is a 'purely intentional' one."[196] Within this opposition, Dahlhaus situates Bergson's contrary conceptions of music as *temps durée* (experienced time, the time that music takes) and *temps espace* (spatially imagined time, the time that music carries within). Importantly, he notes how this distinction is often disregarded and that musical discourse has regularly been held without having defined the music-philosophical grounds first: whether one was about to discuss "a repeatable musical work" or "a non-repeatable individual performance" of that piece.[197]

As a consequence, in musical analysis the aspect of performance often fades into the background. One of the side effects has been that, in ignoring aspects of performance and thus an essential part of music's reality, the score – as a text to be understood as such – is often taken as the sole basis of analysis while it is merely a fragmentary device of mediation of musical content, according to Saxer. [198]

When discussing contemporary interpretations of music of the classical and romantic periods, Dahlhaus mentions the artistic, interpretive space between the *intentional matter* and the *real matter* and therefore follows Saxer's notion that the score is only one part of a musical whole.

> In order to deserve the name, an interpretation has to fulfil three conditions. First, to put it pedantically, not to ignore the text,

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date back from 1473." Hans Lenneberg, *On the Publishing and Dissemination of Music, 1500-1850* (Hillsdale, NY : Pendragon Press, 2003), 26.

[196] "Nach Roman Ingarden ist erklingende Music ein 'realer', notierte ein 'rein intentionaler' Gegenstand." Roman Ingarden, *Untersuchungen zur Ontologie der Kunst*, (Germany: De Gruyter, 1962), 101, as quoted in *Dahlhaus*, *Musikästhetik*, 112.

[197] Ibid. This also ties in with the earlier discussion about the experiential aspect of performance wherein Carolyn Abbate situates music's "carnal" reality. See Abbate, "Music – Drastic or Gnostic?," 529-530.

[198] See Saxer, "Lücken, Brüche, Transformationen," 28.

> second, to be consistent and uncontradicted within itself, and third, not to be limited to simply execute the mere letters of the work.[199]

Dahlhaus' demand that music be *interpreted* from the musical text implies the necessity of a contemporary reading of the work – which is closely related to Aleida Assmann's postulation that "[i]n the cultural frame of innovation and historical consciousness, however, a special art of reading is needed to compensate for the loss of a direct understanding."[200] In this sense, Dahlhaus referred to musical hermeneutics as it relates to the art of interpreting a historical piece of music. The hermeneutical practice itself is inseparably rooted in both, the social function of functional music and the social function of the musical piece of art: both aspects inform the renewed musical interpretation of a given piece, time and time again – interpretation itself bears *différance* in every reiteration.

In this one can perceive how music needs to be embraced as an art form, which is fundamentally rooted in event-based, ritualistic repetition and simultaneously presents a musical thought reproduced on paper. Here, it seems possible to notice the correlation between oral and written traditions in music, as has been summarized earlier: performative repetition in music as a ritual bears *différance* and creates meaning between each individual performance, between the concert, the performers and the audience. Musical scores, on the other hand, exhibit Stiegler's *principle of a deferring and differing identity*[201] as they are a literal synthesis of music. Furthermore, in analogy to Stiegler's observations about orthography in general, notation as the musical *grammē* carries the inscription of its author – the composer – within the musical text and thus attests to musical intersubjectivity.

It is important to keep in mind that while the introduction of notation had caused distinct and dramatic changes, which altered music as a form of cultural memory, music

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[199] Dahlhaus, *Musikästhetik*, 147. In relation to this, Frank Cox observes: "[...] musical works of great and enduring value have more levels of potential significance than can be realized in any performance; thus, no one performance can 'get it all,' and competing, equally sensitive interpretations will bring out different aspects of the piece that are really there, not merely projected onto it." Frank Cox, "Aura and Electronic Music," in *New Music and Aesthetics in the 21st century,* vol. 4 *Electronics in New Music*, eds. Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim: Wolke Verlag, 2006), 59, note 11.

[200] Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 129.

[201] Stiegler, *The Fault of Epimetheus*, 230.

still functioned as a performance-based (ritualistic) carrier of memory. The development of notation had ultimately transformed musical function and, with that, musical content, material, and meaning. However, the "connective structure" within which a given culture experiences music in concert settings is unaffected by musical notation: social and temporal dimensions within the cultural context remain unchanged alongside literal synthesis of music.[202] Rather, changes to the "connective structure" were brought about by the advent of the technology of printing which allowed for an extended circulation of mechanically reproduced scores.

Music Scores as Historic Memory

As discussed, notation presents a form of literal synthesis of music as tertiary memory. This may be considered as a peculiar duplex of externalized memory: music as the externalization of memory becomes externalized once more on paper. Based on the philosophical observations by Stiegler on literal synthesis, it is possible to derive a renewed method of music analysis, which – as pointed out – reflects the implications of this secondary externalization. In a more pragmatic way, however, musical orthography must also be considered as a major factor in the creation of a sense of musical history – especially in the context of printing.

From this perspective, it is critical to review the evolution of musical performance practice, particularly when historical music began to be included in concerts deliberately. Felix Mendelssohn-Bartholdy's revival of Bach's *St. Matthew Passion* in 1829 – almost a century after its premier – gave birth to an understanding of musical philology[203] as well as an established practice of performing music of the past. At the same time, this particular event is a great example of how cultural developments are always embedded within political dispositions and social circumstances.[204]

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[202] As will be discussed in the fifth chapter, it is industrial synthesis – the reproduction of music and individual sounds through electronic seriation – which has changed the "connective structure" in a radical way. Here, the social and the temporal dimensions of a culture are inherently transformed by digital technics – during the last era of Leroi-Gourhan's history of grammatization.

[203] See Berio, *Remembering the Future*, 65.

[204] In her book *Bach in Berlin*, historian Celia Applegate offers a thorough description of such interconnections. She focuses on the coinciding of the revival of Bach's passion "in Berlin in 1829" as it "depended on richly intertwined developments in human endeavors as distinct as journalism, publishing, association formation, aesthetic philosophy, history writing, pedagogy, religious practice, and, of course,

Most important to the present study, the revival of Bach's Passion music marks another major transformation caused by musical orthography which has actually affected music's prosthetic mode as cultural memory – next to the early impact of notation on a compositional level and the effects of printing presses in the fifteenth century as has been described above. Hitherto music performance had revolved around the presentation of contemporary music, thereby constituting the present cultural identity of a given society. Here, music notation served as direct instructions for the performers from the composer. Naturally, this entailed a limitation of music's reach to the local and temporal perimeters of the then and there.

> [...] [M]usic, like all products of medieval learning, was recorded by specialists (scribes) into manuscripts which were prized more highly than the modern mind can imagine. Manuscripts did indeed change hands and geographic location, but not as often as we sometimes like to think.
>
> During the 1400s one particular technological innovation was introduced which was crucial to the development of Western music: the printing and, consequently, the mass distribution of musical scores. […] During the 1460s other [than for literary books] printers became established in Germany and Italy and about a decade later they began tentatively to apply their new trade and technology to music. By 1501 the initial impediments had been removed and printed books of polyphonic music became available to a public hitherto unaccustomed to possessing compositions by Europe's leading music masters.[205]

With the revival of the *St. Matthew Passion*, however, historical music not only became part of regular concert programs but also the epitome of Art Music in Germany – if not even Europe. "Mendelssohn's performance gave rise to the notion that recovering and performing Bach's music was somehow 'national work.' In 1865 Wagner would claim that Bach embodied "the history of the German spirit's inmost life."[206]

This historic event deeply affected the then-contemporary situation of music in German history. It is evidence for how an *alive* musical culture involves social

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nation building." Celia Applegate, *Bach in Berlin: Nation and Culture in Mendelssohn's Revival of the St. Matthew Passion* (Cornell University Press, 2005), 235.

[205] John Evan Kreider, *The Printing of Music 1480-1680* (Vancouver: Alcuin Society, 1980), 1-2.

[206] Applegate, *Bach in Berlin*, 4.

commitment of its members and how it may resonate throughout the musical domain of an entire continent. Celia Applegate's analysis of this particular performance positions the role of music as cultural memory within the development of Germany's collective identity:

> [T]he performances of 1829 [of the *St. Matthew Passion*] become a paradigm of the German nation. If the nation had to be performed to exist, then for those passing moments in the spring of 1829 and in the minds of those in attendance, the community defined by German nationhood did exist. After the concerts were over, we lose sight of such consciousness, because written declarations of national intentions did not accompany every new musical initiative. Still, the next half-century brought more evidence of institutional consolidation around the idea of a distinctly German music within the broader stream of European musical development. That German music had developed over a long time and continued to form a vibrant part of educated high culture helped, in turn, to define German nationhood altogether. That process of musical consolidation was an aspect of German nation building, and it did not end in the political events of 1871 [the creation of the German Empire, which lasted until 1918]. Its significance lies in the accumulation of nationally inflected musical experiences, in small towns and major cities, among amateurs and professionals, in study practice, and performance. The people and institutions involved in Mendelssohn's and Bach's *St. Matthew Passion* of 1829 were, to be sure, a tiny minority of musically active Germans, but to follow them is still to see the variety of ways that people made a nation.[207]

This observation presents a convincing example for the development of a particular nationhood, especially expressed through music. It was perhaps due to the new national consciousness that composers could perceive themselves as heirs of a national legacy within an increasingly substantiated musical history. Luciano Berio contends:

> The history of vocal music and music-theater of the eighteenth and nineteenth centuries, after all, can be written without taking account of Monteverdi, but that of the past two centuries cannot. The deep meaning of Mahler's music became evident only fifty years after his death.[208]

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[207] Ibid., 237.

[208] Berio, *Remembering the Future*, 64-65.

Such awakening to one's musical history has not only directly influenced composers in their writing, but also how music was perceived within a larger cultural context. The perception of musical history itself has therefore been shaping the social function of functional music as well as that of musical works of art. In this movement, the importance of a musical canon becomes increasingly more evident since the archive, or the memory of musical history, has grown larger and larger piece by piece, as individual compositions have proven to remain important within this accumulation.

> We are experiencing a twilight of the distinction between long-term and short-term memory, between before and after. Everything, in that fading light, appears to become useful and intrinsically complementary. In the light of that dusk, the most radically different options coexist: Mendelssohn 'discovers' Bach; music philology is born; history becomes a science, while composers and listeners alike begin to elaborate a selective memory that isolates single works from the circumstances of their origins.[209]

In a way, as Berio writes, the historiality of a singular composition conflates with the ever-recurring presence of a canon within performance. With regards to this, Carl Dahlhaus articulates the aspect of music's social function:

> The institutional foundation of perseverance [*Überdauern*] is similar to the functional foundation, even though practical reasons may prevail over the affects. Tschaikowsky's *Violin Concerto* and Dvorák's *Cello Concerto* will be considered immortal – be it for decades or even centuries – until other musical works have replaced and shoved them aside in the function they are fulfilling. A merely aesthetic compositional-technical critique, no matter how well-founded, remains inefficient against the demands of the [music] business in which inertia and factual constraint [*Sachzwang*] dimly mingle. Only when Bartók and Berg advance to be classics – and one may be in doubt about whether or not one should wish this from them – will Tschaikowsky cease to be one.[210]

Furthermore, a piece's inclusion in a canon is ultimately determined by factors of the commercial aspects of the music business:

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[209] Ibid., 65.

[210] Dahlhaus, *Musikästhetik*, 146.

> The fading of a work's glory does not always mean that it is performed less frequently. Some pieces by Liszt and Grieg have almost entirely disappeared from the programs of symphonic concerts, instead, they have migrated to another repertoire: that of light entertainment music, which wants to become more noble by glueing on the epithet 'elevated' and by adapting and wearing out works which are impeded to return into the symphonic concert as a result. Almost no composer is safe from the dangers of trivialization of the 19th century.[211]

With regards to the cultural significance of canons, Berio contributes:

> A musical work is never alone - it always has a big family to cope with, and it must be capable of living many lives; it can be left to its own past, and it must be capable of living in the present in a variety of ways, at times forgetful of its origins. In the light of these and other conditions, the history of western music appears only occasionally to pay attention to its chronological sequence. Indifferent to the fires in its libraries, it seems, at times, to invent its own calendars, so that the distinction between the often vague directions of historical becoming and the constellation of works shaping our aesthetic experience is a metaphysical dichotomy detached from reality.[212]

Berio complements Dahlhaus' view on how music enters a musical canon, as he explains this progress within the context of time. This description is important as it reflects Simondon's concept of individuation and reintroduces the idea of *différance*: while a great work of music can certainly stand on its own, it asserts cultural authority only in a larger temporal realm, in relation to other established pieces of music. This way, music's cultural function and inner-musical semantics are directly connected to a work's capacity to bear a relevant type of *différance.* A *difference*, which is immortal and ever-changing itself. To comment on the last argument of Berio's statement, a composition, which has successfully entered a musical canon, tends to lose its historical identity, whereby the lines between the past and the present are blurred. Once the musical piece functions as cultural memory, it is perceived within a cyclical continuum of time – it then inhabits universal time, just as it did when music was solely functioning within liturgy.

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[211] Ibid., 146-147.

[212] Berio, *Remembering the Future*, 71.

At this point it is critical to understand that the condition above implies a state of music in perpetual progress, when every new performance entails a different reading, a different interpretation, a different listening experience: music that persists throughout time exhibits *différance* when the art of musical hermeneutics "compensate[s] for the loss of direct understanding,"[213] as Aleida Assmann explained. Musical *différance* is therefore always present, as long as the piece of music is performed, over and over again. Performance – no matter if facilitated via improvisation or notation – is imperative to the creation of musical meaning.

Within a wider historical context, a composed piece of music can thus never be evaluated based on a score alone, before a premiering performance has occurred. Even after a premier, it is questionable to what degree the piece is able to imprint itself, to leave an *impression* on the culture it has arisen from. Perseverance through time imbues a piece of music with true *lieux de mémoire*. For that, this musical work must have been performed and heard not once, but numerous times, over a timespan long enough to bear witness to political or societal cultural shifts, before it is even possible to assess a work's vital qualities for the *sustenance* (not the taste) of this culture.

This very dynamic has changed drastically through electronic, digital technology and processes designated by Stiegler as *telematics* – in relation to the industrial synthesis of memory. The scope and specificities of this change will be discussed in great detail in chapters five and six.

Other External Carriers

As argued above, music performance constitutes a large part of music's characteristic as a memory prosthesis, since it is predominantly situated within oral traditions through a "ceremoniality of communication" […] [which itself] coagulates to text, dance, images, and rituals."[214] This ceremoniality therefore produces a variety of external carriers. Much like music, dance functions as a form of ceremonial event as it is the performance of ritualized gestures. Other than performing arts as *event-based* technics, there exist *material-based* objects, which include monuments, statues or crafts.

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[213] Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 129.

[214] Assmann, *Das Kulturelle Gedächtnis*, 52-53.

In the realms of fine arts, this involves visual art forms such as architecture, sculpture, ceramics, painting, film, and photography. As external carriers of memory, they have adopted an intrinsically cultural meaning as visual and/or physical symbols: like music, such carriers are equally socially functional and gain meaning through this functionality. Other carriers of cultural memory are defined by aspects of spatial symbolism: specific places or spaces which act as cultural memory through their assumed social function. Through their cultural functionality, places become *venues*.[215]

As a traditionally performance-based, ritualistic art form musical ceremoniality has historically embraced such aspects of space and physical reality: music venues have become culturally functional as symbolic spaces, wherein human (musicians) and instrument bodies perform "carnal"[216] music through their inherent physicality. By extension, performance techniques can be regarded as bodily manifestations of such musical ceremoniality. These components – body and place – themselves constitute externalized memory.[217] Therefore, an analysis of music as cultural memory arguably remains inadequate when disregarding those non-musical *lieux de mémoir* that are immanent in the processes of musical production. Importantly, as is true for musical memory, these forms of cultural memory, too, are greatly determined by social and cultural situations – and with that, by aspects of externalization, or grammatization.

Notation developed partly in an attempt to more accurately form melodies for sacred texts, which in turn allowed for the emancipation from sacred text. Since then, music has become not only more independent from but also more complex and intricate

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[215] For example, Walter Benjamin's influential and important *The Arcades Project* (1927-1940; unfinished) presents a critical analysis of Parisian arcades from the early 19th century, as they reflected and animated urban life and societal characteristics of the city. The *Arcades Project* documents the ritualistic qualities inherent in these structures, displaying infrastructural as well as social functionality within artistic constructions, inhabiting specific Parisian locations. In this, we see an interaction between material-based and space-specific objects of cultural memory. The book also functions as a creative, literary collage. For more, please see Walter Benjamin, *The Arcades Project*, ed. Rolf Tiedemann, trans. Howard Eiland, and Kevin McLaughlin (New York: Belknap Press, 2002).

[216] See Abbate, "Music – Drastic or Gnostic?," 529-530.

[217] According to Stiegler, the human body is genetic memory (*Disorientation*, 61), not biological but in fact technological, "as in any technics of the body—walking, dancing, or swimming" (Ibid., 27,28). The body is therefore constituted by its technicity, its capacities for movement: the *who* constituted by the *what*. Additionally, in reference to Hölderlin, Stiegler points out that it is the pathology of body and place which constitutes time and space: "time and space are constructed as articulation of the body and of programs that is an 'obsession' with place." (Ibid., 87). He states how the and how the "disappearance of place" leads to decontextualization (Ibid., 8), the concept of which can be projected onto the body. Therefore, one may say that body and place contextualize music.

in its relationship to aspects of body and place. The specifications of instrument/ performer and venue have become increasingly more deliberate and cannot be dismissed as peripheral matters in the discussion of music as memory. Rather, aspects of body and place have needed to be increasingly considered as physical realities with intrinsic symbolic meaning and social function, which inform the symbolic meaning and social function of the given piece of music.

For example, Western liturgical music has its roots in an originary connection between venue, text and music. While this traditional interrelationship harks back to the functionality of religious practices and services, there are several early examples of how, for example, the performance venue became more than merely a performance space with symbolical or religious relevance: the Renaissance period is often associated with mathematical art, as implied by the term *musica scientia.*[218] Guillaume Dufay's *Nuper Rosarum Flores* (1436) is an impressive example of the use of mathematical ideas in music. The piece reveals the implementation of a unique isorhythmic number ratio of 6:4:2:3, which Charles Warren assigned to the architectural proportions of the inner construction of Florence Cathedral in his analysis from 1973.[219] More than twenty years later, Craig Wright determined that this association was incorrect. In his 1994 essay "Dufay's 'Nuper rosarum flores', King Solomon's Temple, and the Veneration of the Virgin,"[220] Wright explains that, rather than deriving musical material from the dimensions of the Cathedral, Dufay integrated a symbolical reference to the Christian faith as a whole by employing proportions of the biblical Temple of Solomon. As Wright points out,

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[218] In sixteenth century Italy, questions about the nature of music and how it relates to mathematical, natural sciences, poetry and rhetoric were debated. This debate had led to a distinction between the musical art and the science of sounding bodies. Of great importance to this notion was Pythagoras' mathematical-rational approach to music as is displayed in his tuning system, based on mathematical proportions between intervals. Another influence came from Boëthius who later expanded Pythagoras' purely mathematical ideas in his writings *De institutione musica* and *De institutione arithmetica.* For the first time, music was defined as a mathematical phenomena that could be perceived both rationally and sensually. For detailed information, see Ann E. Moyer, *Renaissance* (New York; London: Cornell University Press, 1992).

[219] Charles Warren, "Brunelleschi's Dome and Dufay's Motet," *The Musical Quarterly* 59, no 1 (1973): 92-105.

[220] Craig Wright, "Dufay's 'nuper rosarum flores', King Solomon's Temple, and the Veneration of the Virgin," *Journal of the American Musicological Society* 47, no. 3 (1994): 395-441.

> [t]he key to understanding *Nuper rosarum flores* is to be found neither in Renaissance architecture nor in an aesthetic theory deriving from classical or later Christian philosophy, but rather in two venerable traditions holding great sway over medieval clerics: biblical exegesis and religious number symbolism. Dufay's motet is a spiritual vehicle with a symbolic message. Its theme is the divine unity of the Temple and the Virgin Mary. In order to understand how the concept of this union entered the mind of the composer, it is necessary to return to one of the most significant images in biblical history, the Temple of Solomon. For, as was well known to the churchmen of the Middle Ages and Renaissance, the dimensions of the biblical Temple of King Solomon produced the proportion 6:4:2:3. [...]
>
> Dufay's intent in *Nuper rosarum flores* was to honor not merely the cathedral of Florence but all Christian sanctuaries, and to express this devotion while venerating the sanctity of the Virgin herself. His aim was fully consonant with his intellectual heritage and his spiritual activities. […] Instead of depicting overtly, by text painting, particular events, this motet seeks to signify implicitly, through symbolism, universal truths: the Virgin and the Universal Church are worthy of honor, not merely Santa Maria del Fiore and the cathedral of Florence. Number allegory conveys this message to an intellectual and spiritual elite.[221]

In *Nuper Rosarum Flores*, Dufay musically elevates the cathedral's liturgical significance by contextualizing it within the broader heritage of Christianity. Wright's analysis reveals specific applications of medieval number symbolism in Dufay's motet:

> The isorhythmic ratio 6:4:2:3, corresponding to the exterior dimensions of the Temple [of King Solomon] (with the length subdivided), merely adds increased weight to the Solomonic imagery. Had Dufay wished, he certainly might have written (or selected) a three-strophe poem and created a tripartite motet pursuant to the primary dimensions of length, width, and height (6:2:3). Instead, he chose a four-section plan to give expression to the traditional number symbolism of four, emphasizing the number four in the construction of the text (four seven-line strophes) and in the duration of each musical section (4 x 7 breves). In this he achieved a perfect union of the Temple and the Virgin, for the product of these numbers, twenty-eight, had since ancient times

[221]Ibid., 405-406, 434, 439.

> been recognized as a perfect number (4 x 7 = 2 x 14 = 1 x 28; 1 + 2 + 4 + 7 + 14 = 28).[222]

In that way, the innate symbolical significance of the cathedral engenders the structural and semiotic basis for Dufay's musical choices, thereby allowing the composer to create a coherent network of distinct mnemotechnical elements. These elements develop expressive relationships between sound, number, notation, space and religious history within which capacities for *différance* emerge: in Dufay's music, one may say, various forms of tertiary memory are at work and interact. It is this complex nexus of prostheses, which forms a distinct type of transindividuation, which generate a specific appearance of the *what.*

In his Charles Eliot Norton lectures, Luciano Berio points out how each prosthetic condition may have been formed autonomously, i.e. each of the musical or non-musical aspects within music performance have developed a cultural meaningfulness and functionality separately. When these elements are merged within a musical context, however, they start co-operating and affecting one another's symbolic and functional qualities:

> Performance techniques, musical instruments, and performing spaces are also shrines to memory, as much and often more so than musical works in themselves. The modes and places of performance have evolutionary timings that are different and frequently independent of those of the musical text.[223]

Numerous composers have taken aspects of body and place into their artistic considerations and musical concepts. A consideration of stage music – such as opera or music theatre – is useful to this discussion, since

> [i]t seems that opera is always, by necessity, constituted as a heterogeneous assemblage and that this is no less true of contemporary operatic/music theatre works. […] assemblages are composed of all kinds of heterogeneous elements, drawn from a variety of milieus, which are the distinctive parameters or dimensions of a phenomenon.[224]

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[222]Ibid., 438.

[223] Berio, *Remembering the Future*, 62.

[224] Campbell, *Music after Deleuze*, 52.

The implication of such a *multimediality* entails therefore an accumulation of various modes of the *what*, ultimately amalgamating into another *what*: music for the stage conventionally serves to convey a story line through or with music. Often, the story for such music is adapted from different works of the literary canon into the *libretto*, which itself fulfils a very distinct function in contrast to other texts.

> The *libretto* is not a play. It lacks the good breeding or literary heritage that allows plays to be classifiable into tragedy and comedy. Sung text slows down the conversational exchange of words by an order of magnitude. This problem is crucial for any setting of words to music, and every historical reform of opera has had, at least partly, to deal with this problem.[225]

This suggests that stage music which follows a libretto is already an intertextual construction. On this basis, there are visual and performative components involving specific staging conceptions wherein the dramaturgical setting aims to contain the narrative. Staging employs aspects of venue (stage) and performance, which "depend heavily on the physicality of the performers, amplified mainly by costumes, makeup, and, often as not, masks."[226] In opera and music theatre, this is combined with the physicality of the orchestra: instruments are perceived reciprocally with the physical movements required for the performance techniques employed.

Importantly, the practices of theatrical and musical staging themselves have symbolic meaning in a larger cultural sense: in stage works, aspects of space and performers form distinct cultural associations of meaning and enhance the musical text accordingly.

In their book *The New Music Theater*, Eric Salzman and Thomas Dési usefully divide their analysis of twentieth century music theater into the sections "Music in Music Theater," "Theater in Music Theater," and "Putting It All Together: *La Mise en Scène.*" This type of division suggests the interlocking of several aspects, of various technics, the result of which becomes perceived by the audience.

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[225] Eric Salzman, and Thomas Dési, *The New Music Theater. Seeing the Voice, Hearing the Body* (New York: Oxford University Press, 2008), 82.

[226] Ibid., 103.

The first part of this book discusses historical developments of vocal and instrumental techniques and musical forms as they affected Western art music in general – stage music or concert music. Additionally, Salzman and Dési explain the significance of intentional space in theatrical music: the functional designation of stage and the placement of musicians in relation to it.

> As the pit orchestra grew larger and deeper and traveled farther and farther underneath the stage, part of it sometimes broke off to form a smaller stage ensemble. This idea, which had already been discovered by Mozart, Verdi, Alban Berg, and others, most often has a social context and meaning. The band or small orchestra becomes a featured part of the performance and is integrated on the stage with singers and dancers.[227]

In the second part, the authors illustrate the non-musical aspects of stage music – the theatrical components. A historical overview of the cultural function of performance art reveals an emphasis on the tradition of cultural narratives to "help bind up society at a certain stage of growth and complexity."[228]

> But society is not static and the retelling even of familiar stories changes as the culture changes. Old stories come to have different meanings in different contexts. Growth, increasing (or decreasing) wealth, and the development of new technologies change the physical and acoustic environments within which performance takes place. This may alter the style and even the meaning of familiar works.[229]

Functional changes of performative stage music are therefore directly related to transformations of culture and its mnemotechnics. A dramatic example of such interconnection is reflected in the shift from a somewhat realistic form of "linear, narrative storytelling" – involving "subjects from a fairly limited stock of well-known stories" functioning as "metaphors and generat[ing] prototypical – even stereotypical

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[227] Ibid., 35-36

[228] Ibid., 60.

[229] Ibid.

roles and characters"[230] – to abstract expressionism within modernist, avant-garde opera and music theater:

> In music theater this produced an explosion of small forms beginning with *Erwartung* and *Die Glückliche Hand* of Schoenberg and *L'Histoire du Soldat* of Stravinsky and continuing with the chamber pieces and Zeitoper of the 1920s and 1930s. A series of new proposals was made about narrative and performance both in theory and in practice of which the Brechtian epic theater was the best known (but by no means the only one). The revival of a theater of masks and the notion of presentational theater were strong anti-realist (and anti-psychological) currents that inevitably involved the extensive use of visual presentation, mime, dance, new technologies, and, of course, music. Actors no longer had to become the characters they were assigned to play. Quite the contrary, the audience was expected to be aware at every point that they were witnessing a spectacle in which performers presented themselves before the public to tell stories, to put on identities or even masks, to sing ballads, to propose ideas and issues.[231]

With the absence of a narrative logic within the conventional libretto, the previous relationship between music and text was changed dramatically.[232] It is interesting to note that this shift was coinciding with and, to a degree, precipitated by the emergence of another technic: film and television gradually took over the role of transmitting linear and realistic narratives, while music withdrew into a less prominent role within movies or television shows.[233]

With that change, the role of opera and music theater started to be transformed radically in post-World War II Europe:

> New technologies made their appearance at the same time as the traditional societies of Europe broke apart. […] In Western Europe, innovation in art was connected to the destruction of the past and new commitment to leftist and communist ideaology. Ironically, in Stalinist Eastern Europe, such innovation was regarded as formalist and subversive (and was, in fact, often a form of anti-Stalinist

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[230] Ibid., 62. According to the authors, classical and early romantic opera tended to employ narratives out of novels from Goethe, Dumas, Hugo etc. while the 19th century saw an inclination toward drama ranging from classic to contemporary drama "from Shakespeare to Beaumarchais to Schiller to Dumas and Sardou."

[231] Ibid., 69.

[232] Salzman and Désí dedicate their fifth chapter to the development of text in staged. Ibid., 78-95.

[233] Ibid., 68.

> protest). And, even more remarkably, innovation and avant-garde experimentation were regarded in America as a symbol of liberalism, freedom, and anti-communism and even received government support as an anti-communist weapon in the Cold War![234]

Such developments gave rise to a dissolution of the previous functional confinement of the instrumentalists whose location used to be restricted to the orchestral pit. More and more composers such as John Cage, George Crumb, Mauricio Kagel, Georges Aperghis and Dieter Schnebel[235] assigned theatrical actions and other visual, dramatic functions to their musicians: these concepts are now generally referred to as the sub-genre of *azione musicale* or *Instrumentales Theater*,[236] which presents a blurring of the lines between the conventional understanding of opera or music theater and concert music.

From the 1970s on, opera and music theater increasingly integrated aspects of multimedia by transforming and often emphasizing the relationships between (visible) musician and (audible) sound, by questioning the traditional separation between speaker and musician, or by incorporating audience interactions into the compositional concept. "Experimentation with installations and with nontheatrical venues (street theater, site specific performance)" becomes a frequent subject, and "[b]y the end of the twentieth century and particularly after the fall of communism, the political and socially radical

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[234] Ibid., 69.

[235] For instance, Kagel's *Sur Scene* (1959/1960) shows a great variety of approaches to the notion of body:

> 1) a decoupling of acting/performance of speaker/actor and text. This leads to a kind of semantic separation, in addition to text incomprehensibility through the use of text montage; a similar dissociation is achieved by the tape representing a body-less speaker. 2) alternating functions of the singer as actor and as instrumentalist: he represents all mannerisms of the performer-type involved on stage. 3) the singing technique applied never provides full words. It is not a sung language and only has a musical function. However, there still exists semantic meaning through the mere use of voice (d) a semiological interpretation of space in that instrumentalists function as actors, walking from instrument to instrument. Thereby, they don´t "inhabit" a particular space on stage; additionally, the speed of the movements are in relation to the tempo of their parts (instrumentation).
>
> Another example is Schnebel's *visible music II, nostalgie* (1960-62) which is based on the idea of a music occurring only in one's imagination through the play with expectations: gestures, bodily expressions, posture, and other visible signs of the musician on stage symbolizes a "vox interna". A (choreo-)graphic score indicates a conductor's movements, which again generates an alternation between real conducting and a kind of gestural realization of music.

[236] See Salzman, and Dési, *The New Music Theater*, 69-70.

impulses fade and the ideologically drawn lines between opera and music theater blur."[237] Composers have employed "experimental approaches to narrative and text, […] mobile elements, multiple stages, lighting, […] electronic sound, dance, new musical idioms, variable instrumental forces and so on."[238]

With all these developments towards a combination of various technics, it is important to note the presence of a "plurality of interpretation" and the inherent problem of keeping a meaningful balance. Edward Campbell points out:

> While Wagner in the nineteenth century conceptualized the music drama as the 'total work of art', it remains to early twenty-first century practitioners and theorists to consider the workings of the assemblages that comprise contemporary operatic/music theatre pieces. It is clear that a number of composers working in the field think of their works as assemblages of heterogeneous forces, held together by precisely that quality which Deleuze and Guattari refer to as consistency or consolidation and, in which, musical sound will be only one component among a number of others drawn from various milieus. Part of the problem of contemporary opera and music theatre is the struggle for supremacy that can occur when these competitive art-forms and media possibilities are brought together. […] For Luciano Berio […] 'music can filter texts in a much more radical way [than before]. It can decide […] for example, what can be reduced to acoustic material and what can instead be highlighted with its network of significances intact' [and] […] can also 'establish the same relationship with the action', there being 'various ways in which it can identify itself with what you see on stage, but it can equally remain indifferent to it'.[239]

As the lines between concert music and stage music have blurred, it is necessary to investigate how the relationships between the multitude of technics are formed, particularly in consideration of the simultaneous presence of multiple carriers of cultural memory. This will be part of the musical analysis in chapter four.

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[237] Ibid., 376.

[238] Campbell, *Music after Deleuze*, 53. Composers who have dedicated a lot of their work in the exploration of these relationships include Luigi Nono, Hans Werner Henze, Mauricio Kagel, Dieter Schnebel, Georges Aperghis, Heiner Goebbels, Olga Neuwirth, etc.

[239] Campbell, *Music after Deleuze*, 53.

The Rupture in Life – Externalization as Disorientation

When Bernard Stiegler speaks of externalized memory as *tertiary memory*, he does so in alignment with Husserl's concept of *primary* and *secondary memory.* Tertiary is the extension of the retentional mechanisms from secondary retention to tertiary retention.

According to Stiegler, tertiary memory is neither part of "the now" of a temporal phenomenon, nor is it its perception or imagination, the recollection of that phenomenon. It is the *reproduction* of the past "now," which involves the idea of consciousness of an image. The image itself is technics:[240]

> [...] exteriorization is a rupture in the history of life resulting in the appearance of a third – tertiary – memory I have called epiphylogenetic. [...] It [epiphylogenetic memory] is a break with the 'law of life' in that, considering the hermetic separation between somatic and germinal, the epigenetic experience of an animal is lost to the species when the animal dies, while in a life proceeding by means other than life, the being's experience, registered in the tool (in the object), becomes transmissible and cumulative: thus arises the possibility of a heritage.[241]

As discussed, technics as particular means of grammatization extend prosthetically those memory capacities that are intrinsic to human brains. This, as Stiegler contends above, entails "a rupture in the history of life"[242] which lead to rather drastic changes in the relationships between memory, the *who*, and the process of individuation.

For the present study, it is important to discuss the following aspects, which are affected in these relationships: retentional finitude, contextualization, participation, and transindividuation.

Retentional Finitude and Contextualization

Human individuals and societies, as has been discussed at length in the previous chapters, have an inability to sustain memory for an extended period of time solely based on communication and social interaction. Ultimately though, individual and collective memory are limited by *retentional finitude* – the memory will be forgotten. With the help

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[240]See first chapter of the present dissertation (*Time and Memory*) for Husserl's concept.

[241] Stiegler, *Disorientation*, 4.

[242] Ibid.

of mneomotechnical supplements, for example alphabetic writing, collective memory can prevail over imminent oblivion and thereby provide the *who* with a longevity which reaches farther into the future than before, while still being limited by some degree of finitude. As a result, however, the technic of the *what* decontextualizes the *who* – to use Stiegler's language, human beings become *disoriented*.

> "Orthographic writing enacts a wrenching out of context [...] (disorientation being precisely this decontextualization, this disappearance of place), which has actually been occurring since epiphylogenesis's origin – and which thus also, paradoxically, gives place."[243]

While disorientation impacts both temporal and geographical coherence, prosthetic memory also "gives place" to humans, by "endowing them with a different kind of existence. As paradoxical as it may seem, disorientation thus lands human beings in a new place. It spatializes them in accordance with disorientation's own coordinates."[244]

Consequently, the *who* is radically transformed by the *what* for the latter imprints itself onto both time and place. One could say that technics lead to a de-contextualization and a simultaneous re-contextualization of the *who* – temporally and spatially.

Marshall McLuhan's signature phrase is called to mind, "The Medium is the Message:"[245] His aphorism indicates that the medium, the prosthetic supplement, is implanted in the message, the memory. Accordingly, the *what* and the *who* are in coexistence, a kind of symbiosis, while it remains critical to examine at which point the *what* may continue to develop and ultimately prevail – at the expense of the *who*.

For the analysis of music, this means that it is important to take into consideration the *whos* and the *whats* which are part of a given composition. With the introduction of musical notation in the sixth century, the temporal parameter of Western art music began to gain independence while gradually resigning from its former, rigid subordination to the sacred text it used to serve. Notation started to allow for a more and more precise, permanent record of musical text, of its pitches and durations, thereby changing former temporal variables and causing a type of de-contextualization.

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[243] Ibid., 8.

[244] Lebedeva, "Review Article of Technics and Time, 2: Disorientation," 82.

[245] See McLuhan, *Understanding Media*, 7.

Music's previous roots in improvisation and spontaneity had involved an implied simultaneity of the aspects of creation and performance, whereas notation entails a temporal separation of the two activities turning the composition and performance of a work into two distinct events. This results in another temporal *de*-contextualization. Furthermore, with the possibilities of repeatability on the basis of notated musical text, a composition could now be performed numerous times. And, on account of printing techniques and mass distribution, this could occur in various venues, realized by various musicians.

Music notation therefore impacts retentional finitude in that the memory of a given compositional work is sustained via repeated performances, which are possible only as a direct result of notation. The piece itself is permanently *re*-contextualized temporally and spatially throughout each performance.

Participatory Quality

Jan Assmann differentiates two structures of participation:

> The polarity between communicative and cultural memory is sociologically distinctive in what we want to call the *structure of participation* [*Partizipationsstruktur]*. For both forms of collective memory, the respective structures are equally dissimilar to one another as are their respective time structures. Within communicative memory group participation is diffuse. Admittedly, some may know more than others and the memory of the elderly reaches back further than that of the young. However, there are no specialists and experts for the transmission of information, even when some individuals are able to recall more and better than others. […] Everyone is equally competent.
>
> In contrast to the diffuse participation structure of the group within communicative memory, participation within cultural memory is always differentiated. This is also true for non-literate and egalitarian societies. Originally, the poet had the function to preserve collective memory. Today it is the griot, who acts in this function in oral traditions. […] Cultural memory always has its particular conveyors. Some of them are shamans, bards, griots as well as priests, teachers, artists, typists, scholars, mandarins and whatever they are called who are authorized to knowledge.[246]

[246] Assmann, *Das Kulturelle Gedächtnis,* 53-54.

Assmann points out that cultural memory reveals a kind of hierarchy within which the possibilities for participation vary drastically depending on a few factors. These factors relate to the size of the participating group, the intention behind the circulation of cultural memory, and the demand for accuracy within that circulation (exact repetition to varied repetition).[247]

When considering the specific participatory structures of oral traditions and written traditions – as explained above – one can see a close relationship to the opposition between communicative and cultural memory: it was pointed out earlier that with the introduction of written text into oral traditions, there was a shift from a somewhat egalitarian participation of a collective to the emergence of individual specialists. With this parallelism, it seems reasonable to emphasize that oral traditions are more rooted in interactive communicative processes (rituals) than written traditions. Rituals require the involvement of all members of the collective, which implies equal participation. At the same time, the act of ritualistic gathering itself is cultural memory – in that it has a kind of "leader" and is a repetitive event – which sustains communicative memory between the group members. Text, on the other hand, does not rely on collective participation and therefore only exhibits that differentiated participation structure of cultural memory as Jan Assmann specified above.

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[247] For example, 16th century Western composers wrote vocal music as part of religious liturgy. The audience consisted of contemporaries whose number was most likely limited by those geographical boundaries within which the composer as well as the audience were living. The composer, the performers and the audience were presumably all members of the same cultural group and the music was performed and listened to within a religious, ritualistic context for worship. This means similar conditions for musical reception and interpretation for everyone.

As a counter-example, a Western composer of the late 20th century may have written music, outside of religious contexts. His/her audience during the concert may be consisting of people from the same cultural group. However, with online streaming technologies, the audience may easily be extended beyond the concert hall, consisting of individual members that are not necessarily part of the same cultural (ethnic, religious) group and who may be geographically scattered all over the globe. It is even possible that they may not even have lived at the time of the concert: if a performance was recorded or videotaped, technology makes it possible for the same performance to be *consumed* half a century later by way of video/DVD/CD, or even more easily via internet streaming.

With regards to accuracy, Aleida Assmann has explained, that "writing belongs to the operative arts and does not present a copy of outward appearances but emanates directly from the intellect," whereas other arts were "mimetic arts, [which] can only present a diminished copy of the original." In her example, she refers to "images" as mimetic arts, but I would like to propose that this idea may (generally) include other visual arts as well as music – in accordance to the ancient Greek notion of mimesis in art, particularly as presented in Aristotele's concepts.

Music performance is cultural memory taking on a musical form and as such reveals distinct hierarchical participation structures which show an interesting hybrid form of organization as has been discussed in relation to oral traditions: music sustains both, equal participation and differentiated participation at the same time. Performance presents what Edward Said exposes as an "extreme specialization of all aesthetic activity in the contemporary West [which] has overtaken and been inscribed within musical performance so effectively as to screen entirely the composer from the performer."[248] This separation of composer and performer was mentioned earlier in discussing temporal de-contextualization through music notation. In addition to this separation, Said observes a gap between performer and audience, which he observes to be continually widening.[249] As one of the reasons, Said mentions the listener's growing incapacity for attention due to a lack of knowledge and musical training. More importantly, he identifies a second reason in

> today's complete professionalization of performance. This has widened the distance between the 'artist' in evening dress or tails and, in a lesser, lower, far more secondary space, the listener who buys records, frequents concert halls, and is routinely made to feel the impossibility of attaining the packaged virtuosity of a professional performer. Whether we focus on the repeatable mechanically reproduced performance available on disc, tape, or video-record, or on the alienating social ritual of the concert itself, with the scarcity of tickets and the staggeringly brilliant technique of the performer achieving roughly the same distancing effect, the listener is in a relatively weak and not entirely admirable position.[250]

It is important to understand that, while music shows such high degrees of exclusion based on participatory gradations, it is the event of (live) music performance, which brings together all groups of this hierarchical organization:

> But it *is*, I think, accurate to say that we can regard the public nature of musical performance today – professionalized, ritualized,

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[248] Edward W. Said, *Musical Elaborations* (New York: Columbia University Press, 1991), 2.

[249] Said refers to Adorno's critique of "the regression of hearing." For more, see Theodor W. Adorno, "On the Fetish Character in Music and the Regression of Listening," in *Essays on music: Theodor W.* Adorno, ed. Richard Leppert, trans. Susan H. Gillespie (Berkeley: University of California Press, 2002), 288-317.

[250] Said, *Musical Elaborations*, 3.

> specialized though it may be – as a way of bridging the gap between the social and cultural spheres on the one hand, and music's reclusiveness on the other. Performance is thus an inflected and highly determined point of convergence where the specific and the general come together, music as the most specialized of aesthetics with a discipline entirely specific to it, performance as the general, socially available form of its cultural presentation.[251]

In support of this perspective, Carolyn Abbate reflects on "real" music's condition of actually relying on active participation:

> Between the score as a script, the musical work as a virtual construct, and us, there lies a huge phenomenal explosion, a performance that demands effort and expense and recruits human participants, takes up time, and leaves people drained or tired or elated or relieved.[252]

In light of this, it is necessary to discuss the participatory quality of the non-performative format of music – the score: as Eric Salzman and Thomas Dési point out astutely in their book *The New Music Theater*, "[t]he score is the basis of a whole structure of education, journalism, theory, criticism, and pedagogy as well as the industrial organization of music (mass production with replaceable parts). […] The score has less importance and authority where recording media and the influence of jazz, pop, and electronic music are predominant. This is actually a problem for the literacy of the academic world, which largely defined intellectual values for centuries but is now feeling the crushing power of mass culture, which has entered the universities and musicological institutes. The lack of scores in pop, world, and electronic music is noticeable in the coverage of these kinds of musics where the traditional tools and terms of musical analysis cannot be applied."[253] This sort of exclusion, which is inherent in score-based musical discourse, is based on educational barriers and represents an institutionalization of cultural knowledge, or cultural memory. It originates from the same "privileged royal road to the past" as Aleida Assmann observes in her analysis of the literary canon.[254]

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[251] Ibid., 17.

[252] Abbate, "Music – Drastic or Gnostic?," 533.

[253] Salzman, and Dési, *The New Music Theater*, 333.

[254] See Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 129.

Additionally, with such an institutionalization, cultural memory becomes a kind of knowledge whose prime value is in its *information content* instead of its role to foster identity over time. This is based on the concept that, as Jan Assmann maintains,

> [...] there are always frames that relate memory to specific horizons of time and identity on an individual, a generational, a political and a cultural level. If this relationship is absent, then we are dealing with knowledge rather than memory. Memory is knowledge with an identity-index.[255]

On this basis, one may say that the act of performance grants music this referential frame which notated music still lacks in un-performed score form. Participation of the audience during a live event is therefore fundamental in the creation of music *as* cultural memory. As discussed, music – in its various shapes and states – contains a number of very distinct participatory structures.

In chapter five, it will become evident how the same relationships (between composer, performer and audience) have been inherently changed in two distinct ways: 1) electronic means of sound synthesis and manipulation have changed music's participation structure in a way which affects internal aspects of music performance. This means that the presence of sound may no longer be reliant on the presence of a physical performer/instrument. Therefore, the relationship between composer and performer is affected. 2) the incorporation of recording technics have widened the gap between performer and audience as live performances are replaced with recordings.

Transindividuation

The aspect of participation within societies directly relates to cultural transindividuation: as demonstrated above, participation within communicative memory is a default condition, while cultural memory involves the existence of authoritative figures. Transindividuation between equals naturally occurs differently than between group members with varying degrees of involvement. At the same time, one needs to consider that a situation incorporating particular prosthetic supplements may entail the exclusion of a smaller or larger number of group members. This means that any process

[255] Assmann, "Globalization, Universalism, and the Erosion of Cultural Memory," 123.

of individuation, any tertiary memory, also reveals a corresponding structure of participation.

In an interview, Stiegler provides an example of how the cultural aspect of knowledge and skill impact the accessibility of music to the public:

> I worked for one year with a musicologist around these questions – a young musicologist who was extremely interesting and a specialist on the work of Joseph Haydn, a composer with a politics as well as a policy regarding the public. For example, Haydn had created the concept of a society of concert music [*Musikverein*], and he imposed the repetition of newly composed pieces of music—the public had to stay and listen to the piece played three times [on the same occasion]. […] And I discovered that in fact in the 1880s, the Paris Opera had an extremely interesting policy regarding the 'public.' When you were a member, you had a subscription to the opera, and you received the entire score of a new production before the performance. And you also received the transcription of the piece, an arrangement for piano and violin and voice as well as a commentary on the complexity of the score. And you had to prepare yourself before going to the concert hall. Why? In fact, at this time throughout the bourgeois families you had people with skills at playing the piano, the violin, or singing, and everyone was reading and writing music. Being capable of playing music was a condition for listening to music, because if you could not play, it was not possible to listen to this music. [...]
>
> My own grandfather who died in 1935 was a worker who drove locomotives, but he was capable of reading music. But in my generation, our generation, reading music is exceptional, it's not common knowledge, so in fact I think that in the twentieth century you had an extremely important, instrumental shift, a transformation in education in which suddenly the skills of the 'savoir faire' – of playing instruments and reading scores – were short-circuited, and suddenly the relationship between artworks and their publics was completely changed.[256]

Such "short-circuiting" to Stiegler presents a short-circuiting of transindividuation itself[257] – a condition, which, as will be shown in chapter five, is amplified even more in the context of modern technologies.

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[256] Stiegler, and Rogoff, "Bernard Stiegler and Irit Rogoff – Transindividuation," http://www.e- flux.com/journal/transindividuation/ (accessed May 25th, 2014).

[257] Stiegler explains: "This is a short-circuiting of the *process of individuation as process of interiorisation* in this *critical process of identification and idealisation* that for Plato is the city, that is, public and political

"Zweizeitigkeit"

The manifold ways in which time and memory are interconnected distinctly within cultural memory and social memory involve two very contrasting forms of time-flow: cyclical time and linear time. The ways in which we remember, or rather, the mnemotechnics that are at work in our culture at a given time directly condition the perception of time-flow as either cyclical or linear.

Thomas Butler claims the West is a "chronometrically oriented society, measuring time in abstract units called' seconds', 'minutes', etc." This chronological view of history is based on an understanding of time as linear and can be seen, for example, in the Old Testament. This is in direct opposition to Homer's poetry and Greek mythology, wherein "cycles of recurrence" are at the core of the concept of time.[258] Butler refers to Stephen Jay Gould who points out the importance of having both linear and cyclical time: "Time's arrow is the intelligibility of distinct and irreversible events, while time's cycle is the intelligibility of timeless order and lawlike structure. We must have both."[259]

The difference between cyclical and linear time is also discussed by Jan Assmann. In his work, he refers to cyclical time as *anachronism* [*Ungleichzeitigkeit*] and to linear time as *synchronism* [*Gleichzeitigkeit*].[260]

Anachronism is created by representation and repetition and is therefore most strongly present in externalized memory, i.e. within their distinct "connective structures," text and ritual generate cyclical time: orthography entails interpretation, while myth and ritual provide the foundation for liturgy – both ways, identity and meaning is created by means of tertiary memory. For example, anachronism accords with the general function of religion[261] and is directly related to cultural memory in forms of liturgical rituals,

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space ruled by the *logos*." Stiegler, "Relational Ecology and the Digital Pharmakon," *Culture Machine* 13 (2012): 11, www.culturemachine.net/index.php/cm/article/download/464/501 (accessed June 16th, 2014).

[258] Here, Butler refers to Erich Auerbach's work *Mimesis: The Representation of Reality in Wester Literature*, trans. W. R. Trask, second edition (Princeton: Princeton University Press, 1968). See Butler, "Memory: A Mixed Blessing," 22-23.

[259] Stephen Jay Gould, *Time's Arrow, Time's Cycle: Myth and Metaphor in the Discovery of Geological Time* (Harvard University Press, 1987), 16, as quoted in Butler, "Memory: A Mixed Blessing," 30, note 64.

[260] See Assmann, Jan, *Das Kulturelle Gedächtnis,* 83-86.

[261] Ibid., 84.

through which anachronism facilitates a persistent constitution of a culture's identity. Memory serves as a representation of a cyclic past and reflects the difference between the present and the past through the use of repetition. Present and past are anachronistic and are based on their dissimilarities, which relates back to Husserl and Derrida. The anachronistic past is generated and transmitted via tertiary memory, i.e. text, monuments, sacral festivities, etc., and is conceived as universal, constant and constitutional. It is necessary to understand, however, that this anachronistic past only materializes via the *lived* experience of its memory: the externalized, tertiary memory – or mnemotechnics – must involve a participatory structure which allows a culture to have access to its past. This becomes an issue mostly in relation to text, as will be described in the context of canonicity.

With regards to music, this puts emphasis again on the performative aspect of a piece of music, with ceremonial repetition allowing it to function as cultural memory and therefore to engage in the creation of a culture's cyclical time. For example, before the intellectualization of art beginning with the Age of Enlightenment, plainchant in Europe was certainly capable of such "magical collective unification"[262] and the creation of anachronism.

Synchronism is the result of everyday life and is geared towards coordination and communication. It involves a perception of an ephemeral past as part of everyday life and is in direct contrast to the constant cyclic representation of a universal past as is the case in anachronism.[263] Synchronous time is a necessity in everyday life and involves social interaction facilitated by primary and secondary memory. It provides a perception of temporality, which is "collectively inhabited, colonised, measured and controlled."[264] Importantly, this entails an inclination towards uniformity and similarity, as opposed to difference. Furthermore, synchronism involves a participatory structure which only requires interaction between two or few more people, not the entire social group. Synchronism therefore does not foster a sense of collective identity and meaning.

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[262] Lachenmann, "Musik als Abbild vom Menschen," 111.

[263] See Assmann, *Das Kulturelle Gedächtnis,* 56-59.

[264] Ibid., 84.

In these different temporal approaches, memory exhibits its distinctive functions within a society and shapes time accordingly: anachronism and synchronism reveal distinct temporal structures which are sustained by cultural memory and social, communicative forms of memory respectively, while both temporal structures have their unique functions in a culture.

Jan Assmann notes how the creation of constitutional anachronism has primarily been a matter if not function of religion, and how in Western society religious practices have been waning. With that, a large part of the West's cultural memory has gradually been fading away and are in the process of vanishing entirely. According to Assmann, this has lead to a noticeable tendency towards a one-dimensional temporal structure.[265] With regards to the impact of the development of mnemotechnics, it is important to investigate to what extent current institutions and practices of contemporary cultural memory are still able to generate anachronism and thereby two-dimensional time.

Like Jay Gould, Theodor Adorno recognized the necessity of both forms of time and deemed the loss of temporal two-dimensionality to be a scene of horror. In response to the economic developments in post-WW2 Germany, Adorno contends:

> However, this German development, flagrant only after the second world war, aligns with the estrangement between history and American consciousness, as it had become known through Henry Ford's 'history is bunk' – it aligns with the nightmare vision of a humankind without memory. It is not merely a decomposition product [*Verfallsprodukt*], and not a form of response of humankind, which, as one says, is satiated by stimuli, which it can no longer cope with. It is linked with the progressiveness of the bourgeois principle. […] But this says no less than that memory, time, and recollection of the advancing middle-class society are liquidised as a kind of irrational relic themselves. […] If humankind relinquishes memory and asthmatically exhausts from adapting to the present [*das Gegenwärtige*], an objective development law is mirrored.[266]

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[265] Ibid., 84-85.

[266] Theodor W. Adorno, "Was bedeutet Aufarbeitung der Vergangenheit?," in *Bericht über die Erzieherkonferenz am 6. u. 7. November in Wiesbaden* (Frankfurt: Suhrkamp, 1960), 14, as quoted in Assmann, *Das Kulturelle Gedächtnis,* 85, citing Herbert Marcuse, *Der eindimensionale Mensch. Studien zur Ideologie der fortgeschrittenen Industriegesellschaft* (Frankfurt: Suhrkamp, 1967), 118.

In a musical context, the aspect of two-dimensionality has direct implications for the question of musical material. As an example, Gunnar Hindrichs refers to Claudio Monteverdi's employment of compositional methods of the *prima prattica* as well as as of the *seconda prattica* at the same time.[267] Both methods, so Hindrichs, comprise various inventories of material which interact very distinctly in Monteverdi's music: the methods of the *prima prattica* follow the rules of Franco-Flemish counterpoint while the system of the *secconda praticca* is based on an increased emphasis on an affective setting of text. In combination, there exists a simultaneity of two incompatible systems of dissonance. At the same time, both practices are able to co-exist in juxtaposition in Monteverdi's work, for the *prima prattica* is inherently associated with church music while the *seconda prattica* is primarily secular.[268] As much as Monteverdi's music is an example of constructive interaction between two different material inventories, Hindrichs warns that the "synchrony of the asynchronous"[269] yields not only opportunities but also risks:

> The older methods are at risk of becoming paralyzed as a mere museum piece or of ending in an intended antiquity for no objective reason. However, if they still hold unsatisfied conditions, these may be extended as conditions for successful pieces.[270]

Chapter 5 will examine digital technology as the "industrial synthesis of retentional finitude"[271], as the "connective structure" of this technics reveals a radically changed social and temporal dimension. In discussion will be in which ways digital extensions in music creation can contribute to the generation of two-dimensional time.

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[267] For example, see Monteverdi's 5th and 6th books of madrigals: there are madrigals which, at the time, were still *a cappella* compositions, and made use of polyphonic treatment of the voices in the style of the *prima prattica*. There exist few madrigals, however, which include parts for solo voice and the use of basso continuo as accompaniment – heralding the baroque style. With regards to the use of dissonance, Monteverdi employed unprepared dissonances in some of the madrigals.

[268] See Hindrichs, *Die Autonomie des Klangs*, 59-60.

[269] The term "Gleichzeitigkeit des Ungleichzeitigen" (synchrony of the asynchronous) was coined by German philosopher Ernst Bloch. See Ernst Bloch, *Erbschaft dieser Zeit* (Frankfurt: Suhrkamp, 1962), 104ff., as quoted in Hindrichs, *Die Autonomie des Klangs*, 60.

[270] Hindrichs, *Die Autonomie des Klangs*, 60.

[271] Stiegler, *Disorientation*, 97.

Forgetting

In his *frame-analysis*, Maurice Halbwachs explained memory as a social phenomenon. He based his theories on the notion that – as discussed – the content of memory was conditioned by its relevance to a given social framework.[272] Likewise, this framework determines the limits of social memory – Halbwach's analysis describes how memory inherently entails oblivion.[273] Like remembering, forgetting is directly governed by the present and its social frame of reference: only those objects and events are remembered which are, to some degree, relevant to these frames of reference, while unrelated and peripheral objects and events are not remembered. On this basis, a given past is reconstructed – via inclusion and exclusion of particular aspects.[274] In this context, the concept of *old* and *new* – the present and the past divided by discontinuation – becomes relevant again, as it describes *forgetting* as an integral part of memory: "Forgetting is a result of discontinued communication or of disappearing or changing frames of reference of the communicated reality."[275]

In being remembered, the *new* becomes the *old* after historical discontinuation has substituted it with a more recent *new*. This process, however, involves forgetting in the course of which aspects of the *old* get lost. For these aspects, discontinuation ends in a blank spot.

Forgetting has important characteristics with regards to identity and cultural memory. As noted in the first two chapters, identity in relation to memory can be understood as the *becoming* of subjectivity within a cultural context. This context, echoing Heideggerian subjectivity itself, comes into being via time continuously. It is this temporal process – that of individuation – which reveals the cultural role of forgetting. Aleida Assmann refers to feminist literary scholar Teresa de Lauretis, who explained the

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[272] Halbwachs, *On collective memory*, 7 and 60.

[273] It should be noted that the English word "oblivion" means both unconsciousness and the state of being forgotten.

[274] Assmann, Das Kulturelle Gedächtnis, 36.

[275] Aleida Assmann, Erinnerungsräume. Formen und Wandlungen des kulturellen Gedächtnisses, third edition (Munich: C.H. Beck, 1999, 2006), 37.

political connection between identity and time: "Identity is an active construction and a discursively mediated political interpretation of one's history."[276]

Such "active construction," Aleida Assmann contends, indicates how "we define ourselves by what we collectively remember and forget."[277] As established before, we – as cultural members – collectively remember and forget in two distinct ways, within communicative memory and within cultural memory. As an integral part of both types of memory,[278] forgetting appears and operates very differently. This distinction, as will be discussed, is analogous to the differentiation between memory within a given piece of music and music as cultural memory. However, overlaps do occur.

> On all of its levels, memory is defined by an intricate interaction between remembering and forgetting. Every form of memory that deserves the name, be it individual or collective, is defined by a division between what is remembered and what is forgotten, excluded, rejected, inaccessible, buried. This division is indeed a structural feature of memory itself.[279]

Forgetting within Music

Analogous with general forgetting, musical forgetting within a musical work occurs via exclusion: the ontological notion of music as being composed of the repetition of musical moments – be it composed of silence, motives, or themes – reveals such exclusion in form of any divergence from the "original," the primordial musical moment which is repeated in variation of any degree. Practically speaking, this means that motivic variation entails a remembering of *some* aspects, while others are forgotten – i.e. "repetition in which some features are changed and the rest is preserved," to recall Schoenberg's textbook definition of variation.

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[276] Teresa De Lauretis, "The Essence of the Triangle or, Taking the rise of Essentialism Seriously: Feminist Theory in Italy the U.S. And Britain," *Differences,* 1:2 (1991), 12, as quoted in Assmann, *Erinnerungsräume*, 62.

[277] Assmann, *Erinnerungsräume*, 62.

[278] It is worth noting, that Aleida Assmann emphasizes that access and availability of memories are not a static capacity, as "in the moment of acting, only an excerpt of his [sic] knowledge and memories is available to an individual." Ibid., 64.

[279] Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*, http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014)

The fifth movement of Anton Webern's *Bagatelles* op. 9 presents a peculiar radicalization of forgetting which remains embedded in an overarching, ubiquitous sense of remembering throughout the piece:

> In the Op. 9 *Bagatelles* (1911-13), we are faced with the paradox of a thematicism which, from one point of view, is no longer apparent in any accepted sense of the term while, from a different perspective, it is equally capable of being perceived as thematically all-pervasive. Boulez considers it to be Webern's 'most radical work in terms of non-repetition' since, for example, in the fifth bagatelle, Webern imposes non-repetition strictly and allows nothing to return in exactly the same way. For Boulez, at this point of Webern's development, 'maximum coherence equals maximum perceptual insecurity'.[280]

[280] Campbell, *Music after Deleuze*, 13.

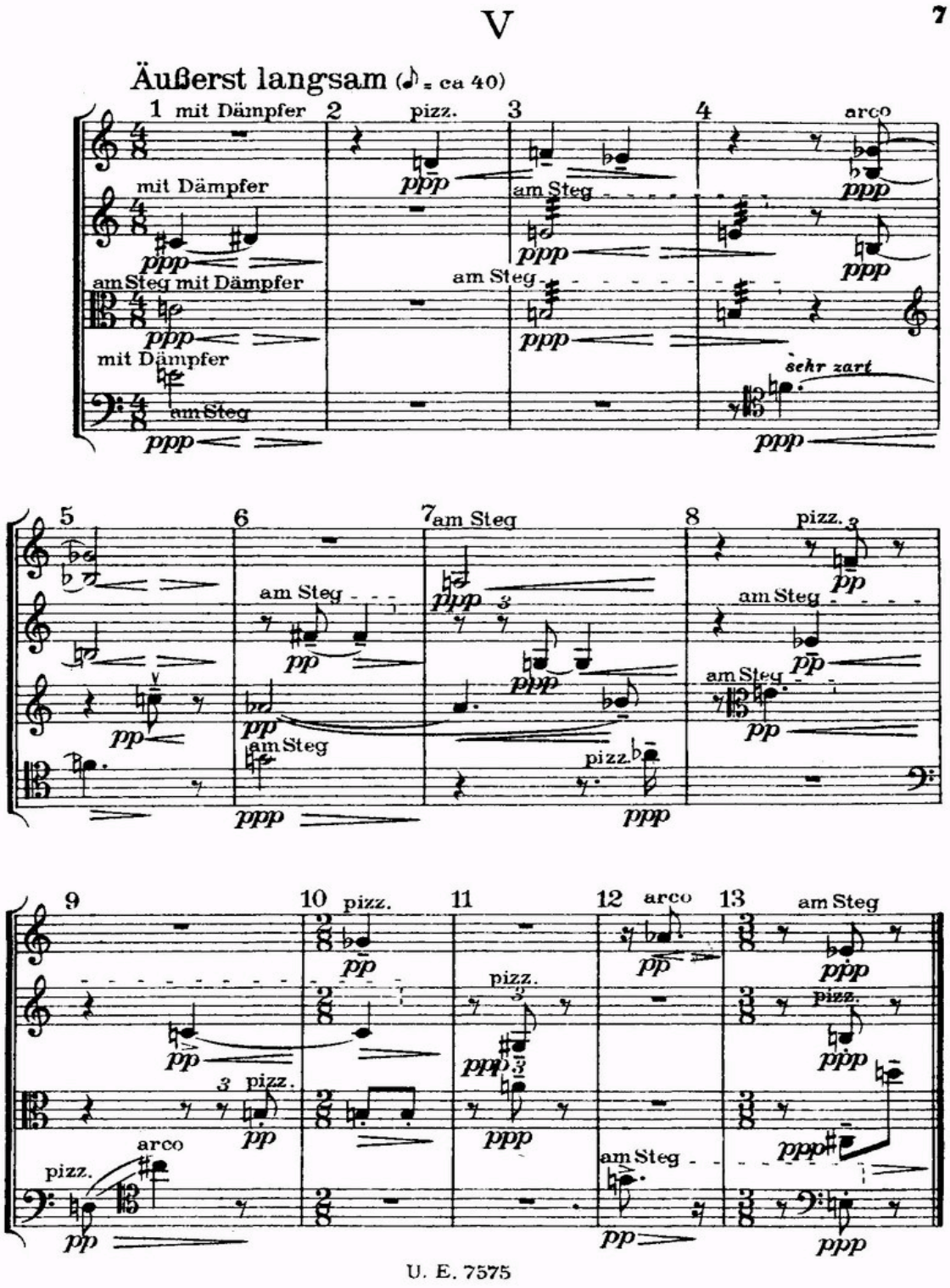

Figure 9 - Anton v. Webern: Op. 9 Bagatelles (1911-1913), No. 5

Within a piece of music, forgetting coexists with remembering and is fundamental in creating a difference to what is remembered literally. Therefore, forgetting is integral in creating *différance* and musical meaning.

While it holds true also for cultural memory that it presents a reciprocity of remembering and forgetting, a particular distinction transpires at the very moment of externalization. Temporal objects as tertiary memory are not only informed by their being remembered or forgotten – there is a further aspect joining this binary. Aleida Assmann explains:

> Cultural memory differs from other forms of memory in that its structure is not bipolar but triadic. It is organized not around the poles of remembering and forgetting, but inserts a third category which is the combination of remembering and forgetting. This third category refers to the cultural function of storing extensive information in libraries, museums, and archives which far exceeds the capacities of human memories. These caches of information, therefore, are neither actively remembered nor totally forgotten, because they remain materially accessible for possible use. One may refer to this intermediary existence between remembering and forgetting as a 'status of latency' which in this case arises from the material storage and accessibility of (for the moment) forgotten, unused, and irrelevant information.[281]

Essentially, this reveals that the amount of remembering or forgetting of cultural memory is determined by our – humans' – relationship with the medium, which carries the cultural knowledge. The mere existence of carriers of externalized memory does not guarantee constant visibility or an active manifestation of it within a culture. The members of a social group need to partake or access these media, which puts emphasis on the participatory quality of mnemotechnics once again.

> Within cultural memory, an 'active memory' is set up against the background of an archival memory. The active memory refers to what a society consciously selects and maintains as salient and vital items for common orientation and shared remembering. The content of active cultural memory is preserved by specific practices and institutions against the dominant tendency of decay and

[281] Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*, http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014).

> general oblivion. The perennial business of culture, according to Zygmunt Bauman, is to translate the transient into the permanent, i.e. to invent techniques of transmitting and storing information, which is deemed vital for the constitution and continuation of a specific group and its identity. Monuments perpetuate historical events; exhibitions and musical or theatrical performances create continuous attention for the canonized works of art.
>
> While these active forms of re-creating and maintaining a cultural memory are generally accessible and reach a wider public, the documents of the cultural archive are accessible only to specialists. This part of materially retrievable and professionally interpretable information does not circulate as shared and common knowledge. It has not passed the filters of social selection nor is it transformed by cultural institutions and the public media into a living memory or public awareness. It is important to note, however, that the borderline between the archival and active memory is permeable in both directions. Things may recede into the background and fade out of common interest and attention; others may be recovered from the periphery and move into the center of social interest and esteem. Thanks to this interaction between the active and the archival dimension, i.e. between remembering and forgetting, cultural memory has an inbuilt capacity for ongoing changes, innovations, transformations, and reconfigurations.[282]

Aleida Assmann establishes a differentiation between such technics of cultural memory based on a ceremoniality (ritual, monuments etc.) and those that are independent on an institutionalized type of archivization (books in libraries, works of art in museums etc.). Processes of memory preservation and archiving ideally occur on the basis of an existing self-awareness as a social community, allowing for consensual decision-making about which aspects are to be remembered and which may be forgotten – for the benefit and sustenance of the community. However, the success of the cultivation and strengthening of social identity results directly from a given technic's *retentional finitude*, *contextualization* and *participatory quality*, as it generates *transindividuation*. If cultural context and participation are in place, there exists "active memory." Therefore, every form of teriary memory determines degree and form of forgetting.

For example, as has been pointed out in the discussion of orthography, Bernard Stiegler has stated how literal synthesis de-contextualizes, primarily *because* it claims to

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[282] Ibid.

be exact in its remembering. As a technics of memorization, it pretends to be adequate in representing the past, notwithstanding the relinquishing of "the body proper."[283] Tragically, this involves an inadvertent forgetting of what Abbate fittingly has called the "carnal" – the "real". The approach to analyse and understand music on the mere basis of the score lends itself as a specific example for such forgetting of the "real" and it entails an exclusion of the communal experience of the piece of music.

Forgetting in a cultural dimension therefore implies an *in*active memory caused by either de-contextualization or by exclusion from a canon and inaccessibility – institutional or not.

Forgetting Culturally: Musical Canons and Authority

Earlier in this chapter, it was discussed how scores – the literal synthesis of musical memory – and their circulation *authorize* individual pieces to enter the musical canon and as such become part of a known musical history. The important question for this study is not necessarily one about how musical canons are created but rather about how they are sustained – which cultural forces are involved in deciding to remember or to forget particular pieces or even styles of a given music history.

In his essay "Culture Wars, Canonicity, and a 'Basic Music Library', music historian and librarian Edward Komara discusses the issue of canonicity in relation to academic music literature as it is distinctly reflected in the stock of music libraries. Explaining the connection between canons and music history, he writes:

> While the musicological literature on canonicity is scant, it includes writings by some of the most significant scholars of the last fifty years. A starting point is Carl Dahlhaus's chapter 'The Value-Judgment: Object or Premise of History' in his Foundations of Music History. For Dahlhaus, a canon is a selection of musical works 'belonging to history,' that is, history as 'a distillation of that part of tradition which the present considers relevant or essential to itself, whether from curiosity about its own past or from the opposing urge to gain self-detachment by assimilating the alien and remote'; he identifies two distinctions of canon: Canon Chosen, and Canon Chosen From. Canon Chosen may be thought of as Fowler's Official Canon. Canon Chosen From will differ according to whether a person is curious about one's own past, or

[283] Stiegler, *Disorientation*, 160.

> is assimilating the alien and remote. If one's own past is what is being sought, then Canon Chosen From may be Personal, Critical, or Diachronic. On the other hand, if assimilation of the alien and remote is the task, then Canon Chosen From may be Selective or Nonce, perhaps arguably also Personal. Dahlhaus regarded canon as a prerequisite for the study of music history, describing '[music] historiography and the canon it has inherited' as existing in a 'dialectical relation.' […] In short, 'History modifies the tradition it depends upon.'[284]

Komara continues to unfold the complexities of canonic continuation, a process that is based on scholarly musicological discourse in addition to an active performance practice of the canon's repertoire.

> In 1983, the same year as the publication in English of Dahlhaus's Foundations, Joseph Kerman's essay 'A Few Canonic Variations' was published in the journal Critical Inquiry as part of a special issue devoted to canons in literature and the arts. His opening paragraph ended boldly by asserting that in music 'a canon is an idea; a repertory is a program of action.' He elaborates on this statement by saying 'Repertories are determined by performers, canons by critics.' We may then equate Kerman's 'repertories' (and Kerman wishes to retain in his considerations the performance traditions inherent in repertories) to Fowler's Potential Canon, and his uses of the term 'canons' to the Official Canon and Critical Canon.
>
> Sixteen years later, in his essay 'Reception Theories, Canonic Discourses, and Musical Value,' Mark Everist took in hand the Dahlhaus and Kerman discussions of canon with the 1960s publications of Hans Robert Jauss on literary reception theory. In his conclusion, Everist argued for a theory of musical works reception being fundamental to a 'diagnosis of canonic discourse,' so to combine music history and reception history, not keeping them separated as Dahlhaus did in Foundations. Thus the values of music canonicity were maintained in anthropological culture and music history, and not in religious culture and political history that general canonicity seemed to become associated with in the 1990s.[285]

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[284] Edward Komara, "Culture Wars, Canonicity, and 'A Basic Music Library'," *Notes* 64, no. 2 (2007): 238.

[285] Ibid., 239. As an informative side-note, Komara mentions: "There are two interesting sidelights in Everist's study. One is his identification of the two principal critiques of canonic discourse as 'conservative' (which 'contemplates the canon') and 'liberal' (which seeks to broaden the existing canon or to pose alternative canons)."

Importantly, current canonicity entails both, the practical realization of the "Critical Canon" and the theoretical discourse of the "Official Canon." Both aspects are equally impacting and reflecting what musical pieces or styles are *remembered* or *forgotten.* Therefore, a culture's practices of performance and notation (and analysis) are similarly crucial in the maintenance and transformation of a given canon. This demonstrates how the technic of musical notation has permeated culture in a profound way – producing a theoretical scholarly discourse about music as well as precipitating the establishment of institutions which facilitate and foster such activities: libraries, universities, schools.

While it is certainly helpful to understand the twofold dynamic between theory and practice within canonicity, it is important for the present study to consider those areas of music creation that are directly affected by the contemporary canon – where the aspects of theory and practice converge and decisions are made about what is to be remembered, as a sustained past, or forgotten giving way to a new present. In creative processes such as music, and art in general, the quest for *new* musical directions necessitates a forgetting of the *old*, a forgetting of established musical conventions. In an interview, Pierre Boulez comments on the role of forgetting in music from his point of view.

> "Our times are a time of memory, a time of the library, so to say. In this context, I like to use the image of the phoenix mythology, and I like to ask every creative person to burn their library every day so that out of its ashes a new library can prosper. This is vital to me, this is alive to me, because a living culture forgets, it forgets truly. It is not incessantly preoccupied with its past.
>
> If, under the new conditions of media, one is only addressing memory, i.e. his/her tradition, then it will be impossible for him/her to invent something new. Certainly, there is no absolute forgetting, as one is embedded in traditions and stocked with indelible experiences, after all.
>
> But without forgetting, invention is impossible today.[286]

Essentially, Boulez demands a dynamic relationship between the composer and the prevailing canon of his or her time. This relationship should be based on a critical

[286] Boulez, "...ohne Vergessen ist Erfindung nicht möglich ...," 15.

understanding of which aspects belonging to the present are in fact inhibiting a musical *becoming*, by way of engrossing the present in exactly what it *is*: in accordance with Simondon's ontology of never-ending individuation. Within this thinking, forgetting presents a necessary step towards musical transindividuation and the adaption to a contemporary and meaningful musical language.

Traces

For Aleida Assmann, exteriorized memory – in fragmented and unconnected forms of songs, "bypassing text", ruins and relics – may also leave *traces* of the past for a culture. Traces may be understood as representations of something, which is no longer fully present or a part of the *now* – traces are not yet absolutely forgotten. Traces are no longer active parts of the common canon and as such have decreased authority as cultural memory. Instead, they emphasize the disconnection between what they represent and the present; in a way, traces bring to light the mortality of what they represent.

> In classical tradition and erudition, the texts of canonical male authors were a privileged royal road to the past. Different routes of access to the past were opened by bypassing texts and tradition and concentrating on nontextual traces such as ruins and relics, fragments and sherds, and songs and tales of a neglected oral tradition. From texts to traces – this proved to be a consequential shift in the structure of cultural memory. While the text had extended memory into the past as well as into the future, traces provided a memory of the past alone. The concern with the past became purely retrospective. It was the domain of the antiquarian to recreate a past that was not elucidated by a textual tradition but preserved more or less accidentally in isolated documents and unconnected fragments. The two souls living together in the antiquarian, the imaginative and the historical, were separated during the nineteenth century into two different discourses that were henceforth divided by institutions and genres. The poet of historical fiction aspired to restore a lost past to life by an act of the imagination; the other inheritor was the historian, who restored a past by acts of methodical reconstruction. While the former was interested in creating the illusion of a past somehow recalled to life, the latter acknowledged its distance and difference.[287]

[287]Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 129-132. Furthermore, she writes: "According to Carlyle, memory, as well as historiography, is dependent on forgetting. Carlyle's notions display a remarkable shift in the theory of memory; this theory is no longer based on inscription and storing but on a dynamic model of forgetting and contraction. As more and more data are registered through

In many ways, traces have come to be recognized as a source for artistic material. Their potential lies in their very capacity to document the disconnection between a culture's *old* and *new*, between what is culturally *remembered* in collective participation and what has begun to disappear in oblivion. Aleida Assmann observes:

> It has been a central thesis throughout this book, that forgetting cannot be removed from remembering, its participation is imperative and memory embraces it. In the end [of the book], this systematic relation between remembering and forgetting was demonstrated in its paradox shape of waste, which was thematised by artists and authors as an inverse archive. Recollective attention to waste and forgetting is not implausible in a culture, that, since the modern era has programmatically had a bet on innovation and has therefore filled the trash bins of history to the brim. Everything written, according to an ingenious phrase of Emerson, 'tumbles into the inevitable abyss, which is opened up for the Old by the creation of the New.'[288]

Her litter analogy resonates in the increasingly technological and ever-renewing reality of mass media: on the foundation of industrialized cultural memory, traces become trash, which is based on a distinct cultural awareness and understanding of time. This has far-reaching consequences for music and musical culture as will be discussed further in chapter five.

> Making a daring leap from the nineteenth to the twentieth century, we might say that some contemporary writers, searching for authentic traces of the past in a mass media culture, are discovering these in trash. With the development of new technologies and channels of communication, writing is ceding its position as the foremost medium of communication and cultural transmission.[289]

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print media and ascertained by new modes of historical erudition, cultural memory is redefined and reconfigured. It is less and less constructed in terms of stable texts and normative traditions and more and more defined by effacement, destruction, and irretrievable loss. Moreover, the shift from texts to traces signals the intrusion of forgetting into the media of cultural memory. While textual signs had contained the promise of a complete recovery of past sense, material traces could restore only "a miserable defective shred" of the magic web of the past. Traces are signs in which remembering and forgetting are inextricably encoded. It is this acknowledgment of forgetting, built into traces, that disrupts the continuity of past, present, and future and estranges the past."

[288] Assmann, *Erinnerungsräume*, 411.

[289] Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 132.

Conclusions

In order to discuss how the aspect of memory (i.e. primary, secondary, and tertiary) informs musical meaning in various ways, it was deemed necessary to first understand how externalized memory relates to internal memory – of how "the human or organic" is externalized into "*in*organic artefacts".[290] This second chapter provided a discussion of how externalized memory functions as the *what*, the prosthetic supplement of the *who*. It was described that this relationship between the *what* and the *who* facilitates necessary "processes of individuations"[291] between individual and collective individuations, by way of which the *becoming* of meaning is possible. As processes of transindividuation, carriers of cultural memory are inherently temporal objects and constitute *différance* as suggested by Derrida's "history of the grammè."[292]

It was discussed that prosthetic supplements, or carriers of externalized memory, distinctly impact the "connective structure" of a culture, revealing – as Stiegler calls it – a "rupture of life".[293] Accordingly, this chapter examined how the introduction of text presents a process of externalization that, through a distinct type of transindividuation, has impacted aspects of temporality and participatory structures wherein two-dimensional time (anachronism and synchronism) may constitute the perception of cultural meaning.

Furthermore, it was discussed how music, particularly the aspect of performance, serves as another carrier of cultural memory. Music serves a *social function* while its inner-musical logic is simultaneously informed by outer-musical aspects - such as non-musical technics. Based on this idea, music was described as serving a double social function: that of presenting a musical piece of art and of serving as functional music. From this perspective, it was possible to discuss how the introduction of musical notation, reproduction and distribution influenced musical culture but also how, within a larger historical context, the creation of musical meaning has always been affected by the complex network of relationships with other external carriers of memory.

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[290] Stiegler, "The Theater of Individuation: Phase-Shift and Resolution in Simondon and Heidegger," 55.

[291] Jacques Derrida, *Of Grammatology*. (Baltimore & London: Johns Hopkins University Press, 1998), 84, as quoted in Stiegler, *The Fault of Epimetheus*, 136.

[292] Bernard Stiegler, and Irit Rogoff, "Bernard Stiegler and Irit Rogoff – Transindividuation," (interview) *e-flux Online Journal* 3, no. 14 (2010), http://www.e-flux.com/journal/transindividuation/ (accessed May 25th, 2014).

[293] Stiegler, *Disorientation*, 4.

Chapter 3: Time and Meaning in Music – Primary, Secondary and Tertiary Memory in Music

> Paradoxically speaking, as long as it is form, music attains its actual existence just in that moment in which it has passed. Still retained by memory, it moves into a distance which was not there in its immediate presence.[294]

A discursive art form, music unfolds *in time;* in this case, time unfolds within a musical work. Simultaneously each era of musical history presents a time period of a musical epoch. Each epoch depicts a given historical time of musical practice whereby every historical change, as has been discussed in chapter two, leads to the perception of difference. This enables contemporary listeners to perceive *past eras* as well as *present eras of musical production*: historical shifts in musical practice mark the end of a given era and determine a new present.

The history of musical epochs comprises the history of a musical culture and the functionality of a musical work within a given epoch.

In these ways, music reveals its twofold relationship to time, one relating to a short-term domain, the other relating to a long-term domain. Herein, the functions of primary, secondary and tertiary memory emerge and interact: the experience of musical time and memory within the context of a given musical composition is inseparably connected with the experience of musical time and memory within the context of a given historical epoch. This connection is rooted in what Gunnar Hindrichs has described as music's "double social functionality": "the social function of the musical piece of art" and "the social function of functional music" interact in that both social functions inform musical meaning.[295]

Music's cultural functionality is constantly influenced by all three forms of memory (primary, secondary, and tertiary) as has been described in the previous chapters, and as such informs musical meaning: the creation of identity and meaning is intricately connected to the perception of time. Expressed within the existence of musical time

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[294] Dahlhaus, *Musikästhetik*, 22.

[295] See Hindrichs, *Die Autonomie des Klangs*, 66. It is important to note that, in the following chapter, the idea of "social function" may be referred to as "cultural function" in order to emphasize a larger historical context of culture.

within a given composition, a given musical expression *becomes* actual and individuated. Within a piece of music, occurrences of difference and repetition engender *différance* by way of which musical meaning unfolds within the contemporary perimeters of music's social functionality as cultural memory while reflecting a culturally established understanding of music. The understanding of the functionality of music continuously changes alongside the historical development of *supplementary technics* of memory – for example the introduction of notation, as has been explained earlier. According to a given cultural notion of music, any point in musical history has entailed particular tendencies of material thinking *within music* and stylistic variance *outside of music.* This reveals the twofold relationship between time and music.

First, music has *time within it* as it progresses through time within the limits of a given composition and/or musical performance. In this chapter, this type of temporal aspect will be referred to as *musical time*.

The second relationship between time and music is one, which describes music as a historic-cultural entity, as individual compositions incessantly reflect the constant development of the social function attributed to music by a culture at any given time. In the following, this will be called the *history of musical culture.*

Musical time may generally be associated with *short-term memory* – as the inner-musical temporal dimension, which is perceived via primary and secondary memory. The *history of musical culture*, on the other hand, can analogously be linked with *long-term memory*[296] – as the temporal dimension of music that exists in an outer-musical, social dimension conveyed via tertiary or cultural memory, displaying a historical evolution of music. This is the space of musical transindividuation.[297]

Based on these connections between time and music, the present chapter will discuss how *musical time* and the *history of musical culture* distinctly elicit *différance* through repetition and thus influence and generate musical meaning – in forms of what is generally referred to as musical *material* and *style*. This examination will provide the

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[296] Compare to Assmann, "Music and memory in Mozart's *Zauberflöte*," 187-206.

[297] Stiegler, and Rogoff, "Bernard Stiegler and Irit Rogoff – Transindividuation," http://www.e- flux.com/journal/transindividuation/ (accessed May 25th, 2014).

foundation for the musical analysis of works by Luciano Berio, Helmut Lachenmann, John Cage and Pierluigi Billone.

Musical Time and the History of Musical Culture

In his essay "The Beautiful in Music Today", Helmut Lachenmann emphasizes the necessity that a composer be able to identify oneself as being part of a given stylistic period and location. With this knowledge, composers ought to distinguish him-/herself within his/her own culture by making use of or by deliberately challenging the present "aesthetic apparatus."[298] In order to make culturally relevant musical choices as a composer, it is therefore inevitable that one would be able to recognize musical material and style for their distinct identities and functions as they have developed and are still developing over time: the past and present meaning of given materials and styles, in addition to their potential for the future – as in music's perpetual condition of *becoming*. For this, it is important to reflect on the relationship between music and time and how time unfolds in the context of musical time and in the context of the history of musical culture.

As has been described in chapter two, Gunnar Hindrichs distinguishes between "the social function of the musical piece of art" and "the social function of functional music," while both social functions inform musical meaning. In light of this, *musical time* and the *history of musical culture* may both be considered as temporal reflections of socially informed musical meaning: as will be discussed, musical time is inherent in musical material and is perceived through *intratextual* memory. The history of musical culture conveys the temporality surrounding the cultural identity of a given musical style and is perceived through *extratextual* memory but can become a matter of intratextual memory in the context of musical quotation or reference.

This particular notion of the intertwined perception of both musical time and the history of musical culture is based on Jan Assmann's concept of memory as it operates within music:

> Music draws on two different forms of memory. On the one hand, it employs almost regularly, at least until the twentieth century, certain traditional rhythmic and melodic gestures which are easily

[298] Lachenmann, "The 'Beautiful' in Music Today University," 23.

> identified as allusions to or evocations of certain moods and tempers without functioning as real 'signifiers' and may even quote well-known formulae or tunes, or refer to other musical styles or pieces by ways of intertextuality. On the other hand, under certain conditions it may create a 'past' and a memory of its own as it unfolds in time. We may call the first form 'extratextual' memory, because it refers to elements outside the musical text itself, and the second form 'intratextual' memory, since the elements referred to belong to what the listener has already heard within the same piece some minutes ago.[299]

Within a single piece of music, material and style do not remain separate forces but rather interact, on the basis of their interconnectedness via intratextual and extratextual memory. A musical example for this interconnection will be provided later in this chapter. First, it shall be discussed how *time* presents an instrumental force in the essence of music.

Music and Time

In his book *Die Autonomie des Klangs*, Gunnar Hindrichs dedicates his third chapter to "Musical Time" in which he explicates the philosophical idea of music as a temporal art – "Zeitkunst." Temporal art presents an "order of juxtaposition" where a series of structured events occur in succession over a period of time.[300] Poetry and theater are other such temporal art forms. "In this sense, music as a temporal art represents the art of arranging its [music's] moments one after another."[301]

Hindrichs' conclusion supports the idea that music is composed of a series of repeated – varied or literal – musical moments and that this repetition reveals *différance*, within which musical meaning transpires, as has been proposed in chapter two.

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[299] Assmann, "Music and memory in Mozart's *Zauberflöte*," 187-188.

[300] Hindrichs, *Die Autonomie des Klangs*, 109. On the contrary, space art ("Raumkunst") includes painting, sculpture, and architecture and is characterized by an "order of togetherness."

[301] Ibid., 109. Hindrichs derives this understanding of music from Gottfried Wilhelm Leibniz' classical theories about space and time. Leibniz' ideas reveal a relational approach to space and time as opposed to an absolute theory, as represented for example by Isaac Newton and Samuel Clarke. In the years 1715 and 1716, Clarke and Leibzig corresponded about their theories via letters, as is documented in G. W. Leibniz, and Samuel Clarke, *Correspondence* (Indianapolis/Cambridge: Hackett Publishing Co. Inc., 2000).

Time in Musical Moments

Hindrichs discusses music's ability to present successive musical moments. This notion is based on John McTaggart's theories about musical time as expressed in his 1908 work *The Unreality of Time*.[302] Hindrichs gives an outline of McTaggart's classification of musical temporality: on the one hand, there exists the order of time, which is relative always to one specific subject. Mc Taggart called this the "A series". It describes a distinct musical moment as perceived as either past, present, or ahead in the future: this kind of perspective considers a musical moment in relationship to the temporal course of the musical piece – the moment is then either remembered, in the process of being perceived, or anticipated.

On the other hand, McTaggart's "B series" outlines a relationship between musical moments, which remains consistent, unaltered by the music's process through time. Here, moment y occurs *before* moment z, but *after* moment x has happened – this relationship between musical moments remains constant and does not change over the course of the given piece.[303]

The former classification of musical time is of importance to the present study, as McTaggart's classification is directly concerned with the musical subject, in terms of its relationship to memory-enabled perception by the listener. The "B series" of musical time, however, is descriptive of the "ontological condition of being" which exclusively implicates the "order of its succession."[304]

For Hindrichs, the idea of music as a temporal art can only be based on the "B series" as it does not presuppose a listener who identifies musical moments in their relational position in time. Following the concept of the "B series", a succession of musical moments exists in its given relative order outside of empirical contexts. In spite of that argument, the idea of the "A series" is equally important for the present study which originates from the idea that music as a temporal art is dependent not only on its theoretical existence after its composition, but also on its *becoming real* music through its performance and perception by a listener: as discussed, music performance and

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[302] J. M. E. McTaggart, "The Unreality of Time," *Mind: A Quarterly Review of Psychology and Philosophy*, no. 17 (1908): 456-473.

[303] Hindrichs, *Die Autonomie des Klangs*, 110.

[304] Ibid.,110.

perception both epitomize further instances of music as temporal art. For that reason, the following discussion will integrate the ideas of both, the "A series" and the "B series." Additionally, it will embrace Hindrichs' observation that musical time refers to time which has been shaped by music: referring to Friedrich Wilhelm Schelling's *Philosophy of Art*, Hindrichs explains that in the pre-formed, composed succession of musical moments music yields "time within itself."[305] As such, music does not succumb to time but actually *shapes* it. This is relevant to the present dissertation as it impacts the creative processes of music composition, performance, and perception – music shapes time in all these instances.

In his chapter, Hindrichs goes on to examine the ever-changing concept of the "order of succession" in music. As he points out, "musical time itself is nothing measurable but formulates something measurable within itself."[306] It is therefore necessary to investigate specific musical figures, which are measurable and are arranged in a given "order of succession" in a composition.

Having "time within itself," Hindrichs explains, music reveals distinct temporal concepts which, since the advent of the technic of mensural notation, have been realized along the prescribed principles behind *mensura*, *tactus*, and *tempo*:

1. The principle of *mensura* situates individual durations of notated pitches into a proportional relation to an "original duration." Principle note values are maxima, longa, brevis, semibrevis and minima, as illustrated in Willi Appel's *The Notation of Polyphonic Music 900-1600*:[307]

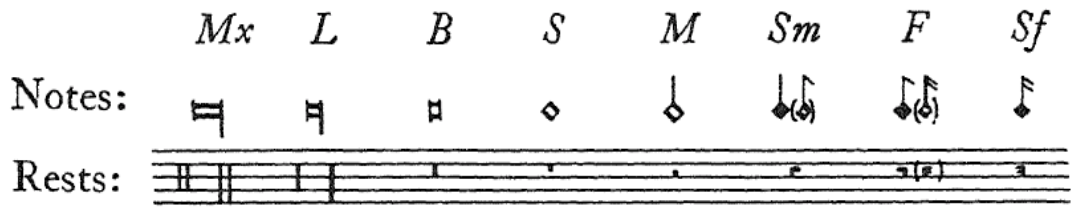

Figure 10 - Notes and Rests of Mensural Notation (Graph by Apel)

[305] Ibid.,113.

[306] Ibid., 118.

[307] Willi Apel, *The Notation of Polyphonic Music 900-1600* (Cambridge: The Mediaeval Academy of America, 1942), 87.

By means of ligatures, these note values are combined within ternary and binary relations, dividing the principle value into three or two, respectively:[308]

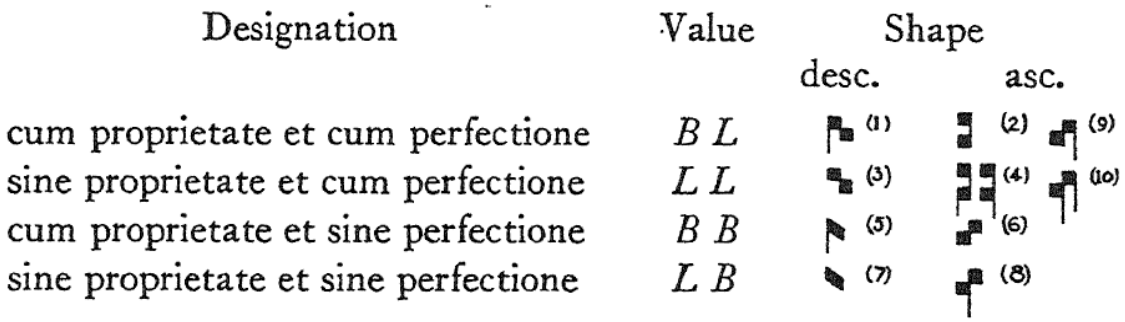

Figure 11 – Ligatures (Graph from Apel)

The duration of the original note value (*integer valor mensurae)* is of a predetermined length, which then all shorter values are proportionally related to.

2. *Tactus* determines the temporal quality or value of a measure within which each individual note value functions. In the case of 3/4, for example, the value of the measure is three quarter notes, while the exact duration of quarter notes is not yet determined: importantly, metre cannot be understood through the "concept of reference value which one adds up or divides, but through the generating continuity of an ever-proceeding value."[309] Metre is therefore a temporal unit, which comes into effect only *during* the realization of music's overall time.

3. *Tempo* is a factor which specifies the duration of each note and their proportional values. For example, an eighth note at tempo 100bpm (per eighth) is double as fast as at tempo 100bpm per quarter but has the same duration as a quarter note at 100bpm per quarter. However, tempo markings such as "allegro" or "andante" do not prescribe absolute measurable values but rather function as guides to a tempo interpretation. Hindrichs concludes that all three temporal factors obtain absolute values not from outer-musical regulations but from the inner-musical systematization.[310]

It is crucial to understand that the notation of time employing mensura, tactus, and tempo generates temporal relationships between individual notes whose inception as well

[308] Ibid., 89.

[309] Hindrichs, *Die Autonomie des Klangs*, 123.

[310] Ibid., 116-117.

as perception are absolutely dependent on the re-cognition of previous note values as well as on the anticipation of following values: a quarter note – at a fast tempo in a 4/4 bar, for example – is only perceived as a quarter note because of the musical context in which previous note values are remembered and following ones may be anticipated to some extent. In this sense, to say that McTaggart's "B series" highlights music as a temporal art in opposition to the "A series" would be incorrect, as the above example is strongly indicative of musical time existing as an experienced (remembered and anticipated) succession of individual moments, according to the "A series".

Time as Form

The following section will briefly introduce ways of ordering time within larger arrangements of musical moments: time as musical form. There are different understandings of musical form:

1. form as an arrangement of sections which reveals a kind of macro-rhythm, as proposed by Eduard Hanslick.[311]
2. functional form such as Bach's inventions or fugues. This is determined by both motivic-thematical processes and harmonic relationships within a piece of music, as proposed by Erwin Ratz.[312]

In both instances, time as musical form reveals a close connection between such compositional procedures to distinct musical functionalities in a specific time in music history. From this relationship between musical form and functionality, as will be shown, various conceptions regarding musical material have emerged – eventually constituting an entire musical style. Hindrichs explains:

> [...] the measure of musical time has to be derived from an initial time. The autonomous regulatory system of the musical piece of art, which embraces the regulations of the shaping of time, must be explored for the possibilities of such derivation. There are three

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[311] Eduard Hanslick, *Vom Musikalisch-Schönen. Ein Beitrag zur Revision der Aesthetik der Tonkunst* (Leipzig, 1858), 37, as quoted in Hindrichs, *Die Autonomie des Klangs*, 69.

[312] Erwin Ratz, *Einführung in die musikalische Formenlehre. Über Formprinzipien in den Inventionen und Fugen J.S. Bachs und ihre Bedeutung für die Kompositionstechnik Beethovens* (Vienna: Universal Edition, 1951), as quoted in Hindrichs, *Die Autonomie des Klangs*, 69.

> primary forms: the measure of time as process, the measure of time as a reflection of eternity, the measure of time as moment form.[313]

These three possibilities of shaping time can be associated with specific epochs in music history. These interconnections provide convincing indications of the "social function of functional music" and the "musical piece of art" – as suggested by Hindrichs. In the following, the three primary forms of measuring musical time will be presented chronologically in their specific historical, cultural contexts.

"[T]he measure of time as a reflection of eternity" – mentioned as the second primary form –permeated compositional works of the Middle Ages. At that time, the concept of music representing eternity entailed the musical implementation of the idea of eternal time as perfection, as well as the idea of *becoming* representing imperfection. This is well documented through Franco of Cologne's mensural notation, in which the division of the *longa perfecta* by a factor of two results in an *imperfection* of the *longa* value, while the division by a factor of three operates according to the cardinal number of the Divine Trinity creating *perfect* relations to the prime value.[314] Hindrichs explains:

> The representation of eternity in Gregorian chant is based on its association with liturgical actions. This association is characterized by the use of instructions for actions instead of notated durations. The musical time of Gregorian chant is the time of action [*Handlungszeit*]: the time of liturgical activity.[315]

While serving to transmit religious text, to Hindrichs music retains a specifically musical order of time, as its "meaningfulness develops the possibility to present the word only via music." In Gregorian chant, the purpose of music is liturgical,

> the diachronic order of time in Gregorian chant is therefore the order of time of prayer and praise, the execution of which impacts the order of musical durations. It [the diachronic order of time] generates a liturgical order of time even in its individual actions.[316]

The classical and romantic music from the sixteenth until the early twentieth century was greatly influenced by the first possibility of organizing time. Time

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[313] Hindrichs, *Die Autonomie des Klangs*, 123.

[314] For more on this, see Hindrichs, *Die Autonomie des Klangs*, 133-137.

[315] Ibid., 137-138.

organization then was centred around the idea of "time as process" – sounds existing in the process of *becoming* [*Klänge des Werdens*].

> "The core idea [of classical and romantic music] is to comprehend the metric foundation of a work through the idea of becoming. Sounds which occur in time are replaced by sounds existing in the process of becoming, which carry time within themselves. They develop, sustain and decay not according to an external order but establish the restless ground of duration. Sounds in the process of becoming are a time which fulfils itself."[317]

This category of temporal order within music was part of an entire cultural development, wherein a new concept of time came about which detached itself from natural, cyclical time allowing for a new conception of time able to reflect on ideas of history and progress. This development transformed the West into what Thomas Butler explains as a "chronometrically oriented society, measuring time in abstract units called' seconds', 'minutes', etc."[318] Jan Assmann refers to Karol Berger's work *Bach's Cycle, Mozart's Arrow. An Essay on the Origins of Musical Modernity*, in which this development is discussed regarding its significance to music composition, as it occurred in the West around the middle of the eighteenth century.

> Not only the cycles of natural life, but also the idea of divine eternity kept the idea of linear, historical, and homogeneous time at bay. Only after 1750 was time in the sense of change, history, and progression actually discovered by composers as the proper dimension of music.[319]

An example of this is the development of motivic thinking in romantic operas: Jan Assmann mentions the essential impact of the *leitmotif*, which Richard Wagner used lavishly throughout his four *Ring* operas. In bringing "to fullest fruition" a compositional approach which would "wilfully abolish the form aspect of music in favour of its flow aspect," Wagner was able to establish a sense of linear development (and linear time) within his music by means of the *leitmotif*, as opposed to a cyclical temporality achieved

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[316]Ibid., 138-139.

[317]Ibid., 124.

[318] See Butler, "Memory: A Mixed Blessing," 22-23.

[319] Assmann, "Music and memory in Mozart's *Zauberflöte*," 189-190.

by periodic motivic and thematic work of "the da capo aria and other forms of cyclical memory."[320]

With regards to rhythmic devices, Hindrichs suggests that "to comprehend the basic measure of musical time as *becoming* means to comprehend 'metre as rhythm.'"[321] In contrast to the divisible metre of Gregorian chant, the *becoming* metre of classical-romatic music represents a flow of continuity.

> This is possible, when one considers rhythm […] as the order of sustained sounds. The beginning of a sound is not a a specific instant but the potential of a duration which [the potential] is completed with the beginning of a new sound. The past of sounds therefore consists of already completed potentials, and the future of sounds is a still indeterminate space of possible durations. In order to understand metre as a form of rhythm, one must perceive the potential of a sound's duration as the potential of its own reproduction.[322]

Essentially, linear musical time, which represents musical time in the process of *becoming*, yields a relationship between individual sounds or musical moments based on what Hindrichs refers to as "projective potential." This means that a past duration of a sound disseminates a potential, which is then projected onto a present duration, effectively moving into the future. To summarize, a present musical moment in its state of *becoming* is inherently predetermined by the past, as the remembering of that which came before is inevitably connected to its state of *becoming*.

While the first two possibilities of temporal order articulate musical time based on processes of *becoming* eternal or *becoming* sound, the third possibility presents a condensation of the present moment and impedes any sense of *becoming*. More specifically, musical time is composed under the condition that the beginning and the completion of individual sounds and musical moments are actively omitted. Therefore, sounds are presentations of a kind of temporal directionlessness – time does no longer *become.* This "moment form"[323] does not imply a particular treatment of individual

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[320] Ibid., 195.

[321] Hindrichs, *Die Autonomie des Klangs*, 126.

[322] Ibid.

[323] Jonathan Kramer defined "moment form" as "a mosaic of moments". Herein, a moment is a "self-contained (quasi-)independent section, set off from other sections by discontinuities." See Jonathan Kramer,

rhythms or meters but rather affects a general conceptualization of the idea of sound itself: sound is reduced to its present sounding. Hindrichs associates this principle primarily with the serialist music of the 1950s, in particular with the music and forms created by German composer Karlheinz Stockhausen "which have always already begun and could always be continued further."[324]

These various compositional methods reveal how historical and particularly cultural contexts have not only determined the implementation of the above temporal concepts into music but also allowed for the possibility to experience such structured time through music. At the same time, the compositional methods discussed relate to questions of how musical time is structured and thereby substantiate Henri Bergson's theories about time existing as an experiential entity rather than one of chronometric measurability, as has been presented in chapters 1 and 2.[325] Music reveals *temps espace* as it transpires within its own *temps durée*.[326]

Music, both conceptualized by the composer and simultaneously existing as a carrier of cultural memory, functions to temporally structure sound in a manner that creates a meaningful temporal experience for the listener. This is relevant for a musical analysis, which focuses on a particular ordering of time that may present one of the above possibilities. However, if the musical analysis is primarily, or even exclusively, based on the musical text – the score – then it omits the *real* experience of the musical time

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The Time of Music: New Meanings, New Temporalities, New Listening Strategies (New York: Schirmer Books, 1988), 453.

[324]See Hindrichs, *Die Autonomie des Klangs*, 141-145.

Stockhausen's conceives of a "moment" as a "formal unit in a particular composition that is recognizable by a personal and unmistakable character. […] Depending on their characteristics, they can be as long or as short as you like." See Karlheinz Stockhausen, "Momentform: Neue Beziehungen zwischen Aufführungsdauer, Werkdauer und Moment," in *Texte zur Musik*, vol. 1, ed. Dieter Schnebel (Cologne: DuMont Schauberg, 1963), 200.

Stockhausen employed the concept of "moment form" for the first time in his work *Kontakte* (1958-1960), and subsequently in *Gesang der Jünglinge* (1955–1956), *Carré* (1960), *Momente* (1962–1964/1969), *Mixtur* (1964), *Mikrophonie I* (1964), *Mikrophonie II* (1965), *Telemusik* (1966), *Hymnen* (1966–1967/1969) and other composition.

[325]See Cleland, "Musical Transformation as a Manifestation of the Temporal Process Philosophies of Henri Bergson," 54.

[326] Bergson's dual concept of *temps espace* (experienced time, the time that music takes) and *temps durée* (spatially imagined time, the time that music carries within) was discussed in relationship to music in Dahlhaus, *Musikästhetik*, 111-112.

experienced as a sonorous object for listening. Thus, in line with Bergson, a meaningful analysis must involve the experiential aspect of a piece of music.

This is idea is confirmed in the writings of Karlheinz Stockhausen. In his essays "Structure and Experiential Time" (1958) and "...How Time passes..." (1959), Stockhausen reflects on time as he sees it materialize distinctively within various musical structures, such as pitches, intervals, and rhythmic values.[327] In his writings, Stockhausen considers both the logical quantity and perceptual quality of time in music; he contends that musical complexity, density and predictability – as determined by a composer – greatly impact the perception of time.[328] In a similar way, French composer Gérard Grisey sees a close connection between the perception of time and the complexity, density and predictability of musical events. In his essay "Tempus ex Machina: A composer's reflections on musical time" (1987), he makes a pertinent distinction between the "skeleton of time" and the "flesh of time,"[329] ultimately describing musical time as quantitative and qualitative matter, respectively.

In this comprehension of musical time, two ways of understanding form exist. The first one is not concerned with musical material itself but with its arrangement in time: the macro-rhythm or the "skeleton of time". The other concept of musical form is contingent on musical material itself being able to determine musical form: "the principle of functional form […] takes into consideration material insofar as not every material is capable to fulfil every function; material is therefore determining form and is not just a filler of classified schemes."[330]

Swedish composer Örjan Sandred reconciles Stockhausen's and Grisey's theories and refers to philosopher Susanne Langer who insightfully wrote:

> But the experience of time is anything but simple. It involves more properties than 'length', or interval between selected moments; for its passages have also what I can only call metaphorically, *volume*. […] it is filled with its own characteristic forms, otherwise it could

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[327] See Karlheinz Stockhausen, "...How Time Passes...," *Die Reihe*, vol. 3 (1959): 10-40.

[328] See Karlheinz Stockhausen, "Structure and experiential time," trans. Leo Black, *Die Reihe*, vol. 2 (1958): 64-74.

[329] See Gérard Grisey, "Tempus ex Machina: A composer's reflections on musical time," *Contemporary Music Review* 2, no. 1 (1987): 239-275.

[330] Hindrichs, *Die Autonomie des Klangs*, 69-70.

> not be observed and appreciated at all. The phenomena that fill time are *tensions* – physical, emotional, or intellectual. […] for perception they give *quality* rather than form to the passage of time...[331]

These "phenomena" which elicit the "physical, emotional, or intellectual" from music reveal the quality or "flesh" of musical time, and it is imperative to investigate these "characteristic forms" as they allow for time to be experienced, to be "observed and appreciated". Music carries "time within itself" through these forms, constituting various, over-arching formal structures of musical time such as the three primary ones (eternity, progress, stasis) which were introduced above. Each of these formal structures has emerged in close connection with the particular social functionality that music had fulfilled at a given time in history. This is an essential consideration as, throughout history, each of the described primary forms of musical time has produced an established set of stylistic idiosyncrasies reflecting and reinforcing a corresponding *musical culture.* This was possible as particular musical styles were established and *cultivated* allowing for the development of particular musical material within each music historical epoch. The next section will investigate the relationship between musical material, time and memory, which will then lead to an examination of the relationship between musical style, memory and culture.

Musical Material

The "Becoming" of Musical Material

Historically, ideas about musical material have shifted constantly, and the question of how differently today's composers approach the problem of musical meaning intersects with current philosophical discussions.

In *Die Autonomie des Klanges*, Gunnar Hindrichs discusses ontological aspects of musical material within the larger context of artistic material. He establishes that the condition of a piece of art – no matter if it is considered a concrete or abstract matter – is

[331]Susanne K. Langer, *Feeling and Form* (New York: Charles Scribner's. Sons, 1953), 112, as quoted in Örjan Sandred, "Temporal Structures and Time Perception in the Music of Gérard Grisey: some similarities and differences to Karlheinz Stockhausens's ideas," (academic paper, McGill University Motréal – Québec, 1994), 4.

always born out of its *Gemachtheit* (being-made);[332] as such it is dependent on human performance: work.[333] This work comes about by means of *artistic material.*[334] This is not to be equated with *physical material* – artistic material can sometimes be made out of physical material, but that process is not reversible. Rather, artistic and musical material is composed of systems and ideas: it is an intellectual product, which is presented by the artist through his/her work. The various concepts behind any intellectual product only eventuate through the composition, they can only obtain a specific material form as a result of the reification of the composed music. "The material belongs to the ontology of the piece of art. […] No longer as substance [*Stoff*] of the compositional work, but existing as as a coordinate of the piece as material formed matter."[335]

Musical material is already determined by compositional labour, which means that the material is pre-formed. However, it does not remain in the realm of passive potentiality, it actually demands a particular form out of its own pre-formation.[336] Therefore, musical material is not just object with potential in a composition; rather, it is reified subjectivity.

> Musical material has a double character. Its pre-formation imparts it with idiosyncratic meaning; its potentiality, however, makes it dependent on practical labour. To put it briefly, its idiosyncrasy is dependent on being employed by this practical labour. Musical material therefore makes demands from the artistic labour and only acquires its meaning through its [the labour's] realisation.[337]

Accordingly, the double character of musical material indicates its simultaneous dependence on the past (with regards to its pre-formation) and the future (with regards to the realisation of the compositional labour and the musical meaning acquired through it). In summary, the pre-formation of musical material relates to the past while its potential

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[332] Hindrichs inaugurates this term based on the fact that any piece of art is *made*. "A text was written, an painting was painted, a piece of music was composed." Hindrichs, *Die Autonomie des Klangs*, 37.

[333] "Art is the product of work." Ibid., 46.

[334] Ibid.

[335] Ibid., 47.

[336] Ibid., 52-53.

[337] Ibid., 53.

reaches into the future and as such is still in its state of *becoming.* In this way, the double character of musical material reveals a relationship to the past and the future.[338]

This notion of the double character of musical material calls to mind Simondon's individuation process: the preindividual – the already-there, to use Stiegler's expression – gains further meaning in its progress through time, while continuously interacting with a collective. The function of the collective is to generate *différance*, based on the fact that a collective is composed of several non-identical preindividuals.[339] *Becoming* is therefore the vehicle for meaning.

In the case of music, I would like to propose that the occurrence of non-identicals in musical material is assured based on the assumption that, over the course of the piece, there exist varying degrees of sameness between and within musical material: based on Schoenberg's classification, there is the range between "exact" to "modified" and "developed" repetition and implies countless degrees of variation.[340] However, it seems that absolute unrelated-ness between musical material(s) is unthinkable within a single piece of music.

Going back to Schoenberg's definition of variation, a possible conclusion might be that unrelated musical materials revealed that all features (timbre, rhythm, intervallic relationships, harmonic structure, harmonic rhythm, degrees of complexity, density, etc.) were contrasting and nothing of the previous material was preserved. As pointed out above, the condition of unrelated-ness would also mean that none of the features above could actually be assessed or analyzed, as *différance* would not actually be present. The

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[338]At this point, it seems interesting to refer back to Husserl's melody example, which proposes melody as a temporal object that is continuously self-constituted while being perceived via primary and secondary memory. I would like to suggest that Husserl's concept seems applicable to musical material in general. It provides a useful approach in order to understand at least one aspect of musical material: primary and secondary retention ensure the cognitive perception of musical material as such in a listening situation. Primary and secondary memory perceive the material's pre-formation, determined by compositional labour, as the material progresses in time. Hindrichs' concept is applicable in that it implies the importance of the past and the progressing present. However, Husserl's idea falls short of emphasizing the second aspect of Hindrichs' thesis of the twofold characteristic of musical material: its relationship to the *becoming* future.

[339]At a lecture at the Tate Modern art gallery in 2004, Stiegler expands on Simondon's original concept of *individuation* as a process of *becoming* identity. In this concept, the idea of the "preindividual" reflects this process in relation to a given individual as a temporal object. Bernard Stiegler, "Bernard Stiegler: Culture and Technology" (lecture, Tate Modern Art Gallery, London, UK, May 13th 2004) http://www.tate.org.uk/context-comment/video/bernard-stiegler-culture-and-technology (accessed June 15th, 2014).

[340] See Schoenberg, *Fundamentals of Musical* Composition, 9.

assumption that musical materials within a singular piece can be absolutely unrelated therefore ends in a negation of musical meaning.

Referring to musical themes and material development, Schoenberg pointed out later:

> [...] [T]here is nothing in a piece of music but what comes from the theme, springs from it and can be traced back to it; to put it still more severely, nothing but the theme itself. Or, all the shapes appearing in a piece of music are *foreseen* in the 'theme'.[341]

The principles of *différance* create meaning regardless of dissimilarity as at its centre is difference, which consequently implies a related-ness.
Musical material has meaning and, along with the piece, continues to gain meaning. Therefore, musical meaning exists as individuated musical material.

Within the pre-formed possibilities of meaning, Hindrichs argues, the material becomes normative.[342] That normativity, within a singular composition, and its potential as pre-formed material is what Adorno termed *the tendency of musical material*.[343] This tendency must not be considered to be following some kind of linearity, for musical material is not limited to obey one-directional gravitation.[344] Instead of thinking about singular lines, Hindrichs suggests the metaphor of a river delta[345] with its many furcations and directions. It is important to recognize the linear motion of music due to its temporal progress, while the tendency of the material can still exist to pull in multiple and opposite directions: the delta image implies that there exist multiple, dissimilar actualizations of music's temporal tendencies. Hindrichs points out, however, that the simultaneity of the articulation of these tendencies does not just reveal a neutral coexistence of a variety of

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[341] Arnold Schoenberg, *Style and Idea: Selected Writings of Arnold Schoenberg*, ed. Leonard Stein, trans. Leo Black (California: University of California Press, 1975), 290.

[342] "Das Werk kann als die Verwirklichung vorgeformter Möglichkeiten mit Eigensinn begriffen werden. Das musikalische Material wird so normativ." Hindrichs, *Die Autonomie des Klangs*, 53.

[343] See Theodor W. Adorno, *Gesammelte Schriften*, Band 12: *Philosophie der neuen Musik*. (Frankfurt: Suhrkamp, 1975), 54.

[344] Ibid.

[345] Hindrichs borrows this metaphor from Erich Doflein's "Musik im Delta." See Erich Doflein, "Gewinne und Veruste in Neuer Musik und Musikerziehung," *Vorträge und Programme der VIII. Arbeitstagung des Instituts für neue Musik und Musikerziehung in Lindau 1955, Hagnau 1955,* 5-33, here 28ff., as quoted in Hindrichs, *Die Autonomie des Klangs*, 56, note 16.

possibilities. Instead, the different directions taken by the tendencies are distinguished by their mutual negations – whereby

> [t]he furcations of the tendency of the material are [...] to be understood as a coherent connection of reciprocal negations. This negative condition allows for another potential where the compositional work can react to the mutually overturning stipulation of the material.[346]

These potentials and tendencies substantiate the various relationships between musical materials within a piece of music. Hence, no matter how oppositional some tendencies of the musical material may be, there is always a related-ness, which connects them within the piece.

Interestingly, this concept calls to mind both the arborescent image and the rhizome as presented by Deleuze and Guattari. It appears impossible to clearly associate Hindrichs' philosophy of musical material with either the theory of the delta or the rhizome. While the delta image with its multi-directional branches resembles the rhizome more than the tree-like image, the fact that music – as described above – is highly dependent on memory processes in its construction and perception indicates that there be a point of return and reference. Deleuze and Guattari suggest a "multilinear system, [where] everything happens at once: the line breaks free of the point as origin […]."[347] However, music does *begin* at a specific moment with a specific material, which, because of its forward motion, is perceived as a *point* of departure. No matter how multilinear the musical progress and how independent the line to the point, the tendency of musical material emanates from said material – the point of origin.

In the case of Webern's implied athematicism, as discussed with regards to musical forgetting in the second chapter, thematic coherence of the material is sustained in an ever present reference to a *virtual* theme which never comes to actualization.[348] With this new thematic method, Webern set the course for numerous composers of the following generation by having introduced a

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[346] See Adorno, *Philosophie der neuen Musik*, 38.

[347] Deleuze, and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, 297.

[348] See Campbell, *Music after Deleuze*, 12.

> renewed variation principle in which thematic elements are separated, given autonomy and recombined in variation. […] [C]ertain elements may have a 'primordial' but not 'definitive' place, as the musical language no longer begins with standard recognizable objects, but rather with basic elements which continually recombine to create objects related through their similarity and difference.[349]

In the case of such *virtual* thematicism, the idea of the rhizome with its characteristic absence of hierarchical relations between lines and points does not hold as the primordial root of a theme is still implied. Therefore, I would like to maintain that musical material reveals both the tendency of an arborescence (externally, culturally) as well as of a rhizome (internally).

Lastly, there is a more evident connection between Hindrichs' explanations of music's pre-formation, its potentials and tendencies, and Deleuze-Guattarian molecularity.

Social Function of Musical Material

When Gunnar Hindrichs draws connections between music's cultural aspect and musical material, he contends "that the social function of music is not the counterpart of material inventory [*Materialstand*]. On the contrary, it is one of its determinants."[350] Music's function within society, as has been discussed, displays music's existence within an outer-musical context. It involves the social functions of functional music as well as of the musical piece of art alike. Through both aspects, social function directly impacts musical material as an inner-musical matter. Therefore, the discussion of musical material requires a consideration of that outer-musical domain which involves the social function of music: the domain of cultural memory wherein music functions as tertiary memory:

> Musical material is history written into the musical piece of art. Its conception makes possible the music-historical analysis which aims to embrace the musical piece of art as a musical piece of art and which is therefore synthesized with the comprehensive sector of art, human and social history. Because the musical piece of art

[349] Ibid., 15. Another specific instance for such expressed thematic virtuality can be found in Boulez' Sonatine for flute and piano, which was composed in 1946 as one of his first dodecaphonic serial works. Ibid., 15-20.

[350] Hindrichs, *Die Autonomie des Klangs*, 66.

> exists in the sphere of music history through the perspective of material inventory.[351]

On account of this connection, it is now important to investigate the relationship between composer and his/her musical material as this relationship may be seen, to some extent, to be reflective of the relationship between individual and society. In *Philosophy of Modern Music*, Adorno writes:

> This material is traditionally defined – in terms of physics, or possibly in terms of the psychology of sound – as the sum of all sounds at the disposal of the composer. The actual compositional material, however, is as different from this sum as is language from its total supply of sounds. It is not simply a matter of the increase and decrease of this supply in the course of history. All its specific characteristics are indications of the historical process. […] The demands made upon the subject by the material are conditioned much more by the fact that the 'material' is itself a crystallization of the creative impulse, an element socially predetermined through the consciousness of man. As a previous subjectivity – now forgetful of itself – such an objectified impulse of the material has its own kinetic laws. That which seems to be the mere self-locomotion of the material is of the same origin as is the social process, by whose traces it is continually permeated. This energy pursues its course in the same sense as does actual society, even when energy and society have become totally unaware of each other and have come into conflict with each other. Therefore, the altercation of the composer with his [sic] material is the same as an altercation with society, precisely to the extent that it finds expression in his work, and does not simply face his product as consumer or opponent – a mere external and heteronomous factor.[352]

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[351] Ibid., 66-67.

[352] Theodor W. Adorno, *Philosophy of Modern Music*, trans. Anne G. Mitchell, and Wesley V. Blomster (London: Sheed and Ward, 1973), 32-34.

Furthermore, Hindrichs points to two relevant theories formulated by Adorno: first, the theory of musical material as "sedimented spirit" (for more, see Adorno*, Philosophie der neuen Musik*, 40, as quoted in Hindrichs, *Die Autonomie des Klangs*, 64). This theory relates material to its social function, which predetermines the tasks and demands that the material presents *to* the compositional work. This is the social function of the *musical piece of art* and is not to be confused with the social function of *functional music* whose function is outer-musical. Importantly, though, both kinds of social function inform the inner-musical systems of the musical piece of art. Adorno's observation implies the idea of a *material form* as musical material gives a given composition *form* through the compositional work, if this work engages with the particular demands (i.e. social, historical, etc.) of existing material tendencies (See Adorno*,* "Mahler. Eine musikalische Physiognomik," in *Gesammelte Werke in 20 Bänden, 13: Die musikalischen Monographien* (Frankfurt: Suhrkamp, 1971), 193f. and 239ff., as quoted in Hindrichs, *Die Autonomie des*

Historically, altercations with society have open up radically new approaches for composers beginning with the question of what kinds of musical processes and what kinds of structural forms would resonate within – i.e. serve – a current society. Ultimately, this leads to the question of what kinds of distinctive material would be required for these processes.

As part of a historical outline, three primary forms of shaping musical time (representing eternity, progress, or stasis) were briefly introduced on the basis of Hindrichs' theories, aggregating nearly five centuries of music history into three main groups. The outline made evident the connections between specific musical conventions with a more general cultural identity and suggests that such different musical conventions have naturally entailed specific material inventories. In order to create a meaningful foundation for the analysis of contemporary music it is now crucial to determine those inventories that are prevailing in contemporary practices and their cultural context: with regards to the last half century, Claus-Steffen Mahnkopf identifies four major movements that have emerged in Europe after the apogee of serialism in the 1970s. These movements have established distinct approaches to the question of musical material and have thus contributed significantly to the current material inventory:[353]

1. Musical Negativism challenges conventional notions of sound and, more generally, of beauty. Well documented in the music of German composers Helmut Lachenmann and Mathias Spahlinger, musical negativism focusses on the production of alienated [*entfremdet*] sounds which then become tangible again outside of a given traditional context.
2. Musical Complexity, which – correctly or incorrectly – is associated with English composer Brian Ferneyhough, achieves a highly differentiated "mediatedness" [*Vermitteltheit*] of music by means of an "exponentiated polyphony." This, of course, leads to an intense degree of complexity,

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Klangs 69). The musical form then is the result of a compositional labour, which confronts and conforms to the demands of the musical material.

Both theories substantiate that musical material is inherently determined by social and historical – cultural – aspects.

[353] See Claus-Steffen Mahnkopf, *Kritische Theorie der Musik* (Weilerswist: Velbrück, 2006), 143ff, as referenced in Hindrichs, *Die Autonomie des Klangs*, 58-59.

which prevents individual sounds from unfolding and existing for their own sake, so Hindrichs.

3. Iannis Xenakis is the main proponent of the Statistic-Stochastic System. Here, "sound masses, event groups, or sound clouds organized by density, and degrees of order, and chance operations" replace melody, harmony, and counterpoint. As Hindrichs astutely remarks, the result of such material and compositional procedure is the creation of "mass repercussions" leaving no possibility "to perceive musical atoms".
4. French Spectralism involves a material inventory which is derived from the nature of "pure sound". The notion of "pure sound" as musical material entails a particular compositional approach, seeking to generate and define acoustic space. According to Hindrichs, this has prevented the movement – and the work of French composer Gérard Grisey in particular – to transcend the naturalism of sound, limiting it to remain just that.[354]

The above trends of material thinking, as proposed by Mahnkopf, are committed to a thorough engagement with historical and current material inventories and music philosophies. The four movements are in no means an exhaustive representation of contemporary material thinking, particularly when considering other musical movements, which have approached the question of material outside of music historical and cultural contexts.

A critical consideration – *critical* here is understood as being *aware* and *reflective* about current developments in composition and music philosophy[355] – of various material inventories, however, may require that the tensions between the different inventories

[354]See Theodor, *Philosophie der neuen* Musik, 38.

[355] The fifth volume of *New Music and Aesthetics in the 21st Century* is entirely dedicated to the topic of *Critical Composition Today*. Several essays offer various perspectives on the topic and may be useful in finding individual approaches to the question of what Critical Composition is. In his essay about "Critical Composition", Mahnkopf insists that "the critical activity must be characterized by more than reflection and awareness; it must rather constitute a form of examination with clear yes/no options. Secondly, it must redefine the criteria for such options, the aspects under examination and the examination's degree of intensity with every new historical location. Critical examination thus engages with the issues and the time, as well as the social situation with which artistic activity is intertwined in manifold ways." Claus-Steffen Mahnkopf, "What Does 'Critical Composition' Mean?" in *New Music and Aesthetics in the 21st Century*, vol 5 *Critical Composition Today*, ed. Claus-Steffen Mahnkopf (Hofheim: Wolke Verlag, 2006), 82.

provide a basis for material tendencies of these movements: "In this sense, the music of our time is situated in a paradox network which does not neutralize the demands of material but, to the contrary, merges to a network of responsibilities."[356]
Musical material can hence be said to be carrying a discursive historiality[357] within its material tendency. That is to say that its *becoming present* is informed by its historical nature by means of an immanent reference to different, *différant* material; therefore, one may say that musical material is immanently shaped by a *différance* originating from the history of musical culture.

In his essay "Critical Modernism: Beyond Critical Composition and Uncritical Art" American composer Frank Cox explains his "Critical Modernist model", which reflects on interconnections between musical material and historical as well as cultural conditions as suggested above. Cox's reflexions are

> based on a triad of interdependent concerns, the achievement of which must in the long run be measured against the standard of the finest works in the musical tradition:
>
> 1. Extending the tradition of material and formal innovation;
>
> 2. Extending the tradition of exploration and validation of the subjective realm, this involving the development of expressive potentials, both internally (i.e., the exploration of the inner realm, including its corporal embeddedness) and externally (i.e., in response to changes and challenges in its environment and social context); and
>
> 3. Organically and dynamically unifying all elements of the artwork.[358]

One can perceive in these concerns a two-dimensional compositional methodology in analogy to Jan Assmann's theory about the simultaneity of anachronism and

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[356] Hindrichs, *Die Autonomie des Klangs*, 59.

[357] Stiegler defines "historiality" to be the "connection to the already-there as the past: as anticipation after the already-there, as facticity within being-toward-the-end in which 'being-there *is* its past' – which is nonetheless not its own, a 'previous' already-there that is absolutely factitious. Such anticipation then becomes the 'history of being' when ontological difference is posited as a question—and as question *as such*." Stiegler, *Disorientation*, 41.

[358] Frank Cox, "Critical Modernism: Beyond Critical Composition and Uncritical Art," in *New Music and Aesthetics in the 21st Century*, vol 5 *Critical Composition Today*, ed. Claus-Steffen Mahnkopf (Hofheim: Wolke Verlag, 2006), 153.

synchronism. A critical treatment of what Ernst Bloch termed "synchrony of the asynchronous"[359] reveals asynchronous musical material within an arrangement of different, synchronous tendencies. Such a compositional approach may *materialize* once the composer becomes aware of these tendencies. As Hindrichs writes, a "composing which is conscious of the material tendencies seeks to overcome the aporias of the four main movements,"[360] which ultimately seems to be the function of such pieces of musical art as suggested by Cox (in terms of the "Critical Modernist model) and Hindrichs (with regards to music's double social function as functional music and as a musical piece of art).

It has become evident that "the philosophy of the musical piece of art is based on the idea of musical material:"[361] the development of critical thought regarding musical form, function, and music in general has been embedded in a doctrine centred around material thinking. Even during the second half of the nineteenth century, "[f]or a long period of time, this idea [of musical material] has served as a distinctive mark for the avant-garde."[362] Its quest to explore the New in unknown territories has necessarily entailed an occupation with and a focus on musical material whose inherent aporias would provide relevant stipulations and challenges for the compositional labour of the avant-garde.

In the context of *différance*, one may see once more that the ontology of music is grounded in its material and therefore say: music *becomes* subjectivity on the foundation of its material, which is inherently historical. Such historiality – as has been discussed – is not only inner-musical but also inherently extra-musical due to music's functionality in culture. Consequently, one may say that if musical material both informs and is informed by historiality, it is necessarily dependent on *différance*. Thereby, the function of musical material is to exhibit such *différance*: *différance* is created within the material's tendencies as well as by the interactions between musical material inside and outside of

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[359] See Bloch, *Erbschaft dieser Zeit*, 104 f.

[360] Hindrichs, *Die Autonomie des Klangs*, 59.

[361] Ibid., 71.

[362] Ibid.

the work. This, again, is not the case for music that does not take into consideration material tendencies but instead simply relies on the conceiving of a concept alone. Hindrichs draws the following conclusion:

> The idea of musical material is nothing one would have to decide for or against. It rather establishes the first ontological determination of the musical piece of art. Hereby, the philosophy of music ties to the movement of the avant-garde, which results from the tendency of the material.[363]

Musical Material Perceived through Intratextual Memory

The description above, that musical material exists in and develops meaning within the framework of a composition's temporal structure, implies the significance of musical form, as it is the temporal space of a piece of music within which the pre-formed material unfolds its potential. This condition was discussed earlier in relation to *time as form* and the musical order of time: three primary possibilities of shaping musical time were illustrated – musically shaped time representing eternity, process and stasis. Continuing the thought behind this observation, Jan Assmann points out:

> Music may be received as a finite form, a temporal gestalt with a beginning, middle, and end; it may also be received as a stream or flow without recognizable formal contours. These are obviously two ways not only of listening to music, but also of composing music. […] Music as form relies strongly on memory.[364]

Jan Assmann classifies such memory as intratextual memory: this kind of memory allows for a cognitive perception of the musical material – in the manner of Husserl's melodic retention and protention. As a result, one is enabled to recognize a recurrence of the same material in the cases of "music as form", or the lack of recurrence of recognizable material – in the case of "music as flow."[365]

With regards to "music as form", this implies that memory enables recognition which then facilitates the perception of *différance*, as repeated material is temporally deferred and as such is already different. While the recurrence of recognizable material

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[363] Ibid.

[364] Assmann, "Music and memory in Mozart's *Zauberflöte*," 188.

[365] See Assmann, "Music and memory in Mozart's *Zauberflöte*," 188.

allows for thematicism to be at work within a composition,[366] it becomes evident that primary and secondary memory are fundamental not only to the recognition of material but also to the agency of thematicism through perceivable form. Therefore, memory projects material onto a formal level, which exists on the basis of time but is organized only through memory. Furthermore, one may conclude that, because of primary and secondary retention, musical material becomes recognizable as being related to a virtual or actual theme and bears *différance* as a consequence.

> 'Music as flow' – as predominantly represented by classic-romantic music – employs the idea of 'time as process' and "swamps our capacities of musical comprehension which consist of retention and protention. This kind of music is neither easy to retain nor to expect. […] However, Richard Wagner, who certainly was the most prominent exponent of the flow concept of music exploited more systematically than any other composer its memory aspect. His new technique, for which Hans von Wolzogen coined the term *Leitmotiv*, made use of recurrences and variation and, while defying expectability, relied heavily on memory and recognition.[367]

At this point, Jan Assmann bespeaks the implications of predictability, as this is where the difference between (primary and secondary) retention and protention becomes transparent: retention enables memory while protention entails expectation,[368] both of which are essential in perceiving music. In the context of Wagner's *leitmotiv*, however, expectation and predictability are counteracted by the very manner in which the leitmotiv works within a temporal flow. The leitmotiv is

> clearly defined so as to retain its identity if modified on subsequent appearances, whose purpose is to represent or symbolize a person, object, place, idea, state of mind, supernatural force or any other ingredient in a dramatic work. [...] A leitmotif is to be distinguished from a reminiscence motif (*Erinnerungsmotiv*), which, in earlier operas and in Wagner's works up to and including Lohengrin, tends to punctuate the musical design rather than

[366] See Schoenberg, *Fundamentals of Musical* Composition, 9 and 290.

[367] Assmann, "Music and memory in Mozart's *Zauberflöte*," 188.

[368] Ibid.,187.

> provide the principal, 'leading' thematic premisses for that design.[369]

In retaining a rather constant identity the leitmotiv can therefore be considered to reveal different material tendencies than other musical material – recognizable or not. This is because the leitmotiv is conceptualized and predetermined to fulfil a purpose of representing a given object or idea. The (almost) unchanged identity of the leitmotiv may therefore be understood as constructed of component material that has very little or no tendency itself. The tendencies and potential of the leitmotiv are not within the motif but in its placement within the surrounding musical context, wherein which it can be recognized.

Importantly, this demonstrates that the tendency of the leitmotiv as musical material implies a conceivable occurrence of *difference*, which is inevitable through renewed contextualizations of the leitmotiv. I would like to suggest that this observation applies also to musical material, which is not leitmotiv, in accordance to Derrida's concept of *différance* being constituted by repeated perception in general.

It is furthermore essential to recognize that the contextualization of musical materials imply their occurrences within a network of musical moments as determined by the compositional labour which was carried out in accordance to the tendencies of the material. These occurrences therefore delineate musical form as both macro-rhythmical arrangement and material-specific functional form, but also – as Hindrichs points out – a form, which is derived from the tendency of the material and ultimately confers coherence on a musical piece of art.[370]

With regards to the meaning of material through time, Jan Assmann suggests the term "memory motif" in order to describe a given material's capacity for meaning within a piece. This term is useful as it embraces the implications of memory through musical recurrence (repetition). In order to understand that musical material is perceived in the present and that "memory motifs" are remembered from the *past*, it is important to consider the following:

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[369] Arnold Whittall, "Leitmotif." *Grove Music Online. Oxford Music Online*, http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/16360?q=leitmotiv&search=quick&pos=2&_start=1#firsthit (accessed November 19th, 2014).

[370] Hindrichs, *Die Autonomie des Klangs*, 70.

> [Music] cannot 'refer' to the past in the way a text and a film can, but it can refer to the past in two ways: it can create its own past to which it can refer in the course of its temporal progression, and it also can refer to music of the past. The first case corresponds to intratextual, the second to extratextual and intertextual memory, respectively. The interesting fact about this in the context of cultural memory is the existence of several ways of creating such a memory and referring to an internal past; even more important is the observation of rather fundamental shifts in these concepts. The use of the memory metaphor seems the more revealing the longer and more variegated the piece is whose unfolding in time we observe.[371]

Music referring to the past via extratextual memory suggests a foreign musical past whose existence goes beyond the limits of a single work. This entails the reference of either previous "memory motifs" – which is generally referred to as a quotation of and from other compositions[372] – or what Assmann calls "formulae". In the latter case, music references "a code, be it the personal code of a composer or the conventional code of a time period or a genre."[373] The employment of such formulae as a reference will be investigated below in the discussion about "style".

In both cases, however, extratextual memory is directly related to music as tertiary memory: "memory motifs" quoted from other singular pieces are remembered constellations of material extrapolated from the musical canon, while "formulae" are

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[371] Assmann, "Music and memory in Mozart's *Zauberflöte*," 189.

[372] "The incorporation of a segment of existing music into another piece, akin to quotation in speech or literature; also, a segment of existing music so incorporated in a later piece. The term usually refers to melodic quotation, although the whole texture may be incorporated and solely rhythmic quotation is possible. Quotation is distinct from other forms of BORROWING in that the borrowed material is presented exactly or nearly so, unlike an ALLUSION, but is not part of the main substance of the work, as it would be if used as a theme in variations or other forms, or if presented complete in a transcription or medley. Quotation plays a role in other forms of borrowing, such as COLLAGE or the use of a previous work as a model. Music scholarship has not always observed these distinctions, and the term "quotation" has been used to refer to a variety of borrowing practices." See J. Peter Burkholder, "Quotation." *Grove Music Online. Oxford Music Online*,

http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/A2257170?q=quotation&search=quick&pos=1&_start=1#firsthit (accessed November 20th, 2014).

A specific example for this is Charles Ives' second piano sonata (*Concord* Sonata) in which the composer makes use of the opening measures of Beethoven's fifth Symphony in every movement. Examples of self-quotation are especially plentiful in the symphonic works of Mahler. See Robert Samuels, "Mahler within Mahler: allusion as quotation, self-reference, and metareference," in *Self-Reference in Literature and Other Media*, eds. Walter Bernhart, and Werner Wolf (Amsterdam: Rodopi, 2010), 33–50.

[373] Assmann, "Music and memory in Mozart's *Zauberflöte*," 193.

references which bear testimony to an entire conventional inventory of material of either one individual composer or a whole musical culture. Musical material which is based on extratextual memory is rendered into intratextual memory by being employed as a material within another composition: when music references extratextual memory, a foreign past is remembered and, in a way, appropriated.

Style: Musical Material Perceived through Extratextual Memory

Intratextual memory allows for the cognition of music and the generation of meaning with means that are not "presupposing a knowledge of this language which is only accessible to a scholarly reconstruction a posteriori."[374] What is more, intratextual memory works in the perception of music by an individual, wherein musical meaning is formed, to whatever degree possible, without any cultural implications. Cultural contexts, however, clearly determine in what way extratextual memory informs musical perception:

Jan Assmann refers to "extratextual memory" relation to "elements outside the musical text itself." Such elements include particular rhythms and harmonic or melodic progressions, but also formal structures. Specific combinations of these elements can describe a characteristic musical style – provided that these are *active* elements of a musical past.[375]

While it is difficult to give a generalized definition of musical style, it is helpful to understand it as a term that

> may be used to denote music characteristic of an individual composer, of a period, of a geographical area or centre, or of a society or social function. […] For the historian a style is a distinguishing and ordering concept, both consistent of and

[374] In this quote, Jan Assmann is referring to Mozart's musical language. Assmann, "Music and memory in Mozart's *Zauberflöte*," 193.

[375] According to Aleida Assmann's distinction between *archival memory* and *active memory* this entails that given musical elements need to be part of a lived musical practice in order to become active memory and as such represent a particular musical style. See Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*,

http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014).

> denoting generalities; he or she groups examples of music according to similarities between them.[376]

A style that reveals particular generalities and similarities must be understood to pertain to a specific material inventory along with the various forms, which have evolved out of that inventory and were established by a composer or at a time in history. In fact, the perception of such generalities is only possible when the particular set of musical materials and forms was successfully established in a culture, as created by societal shifts or individual influence. Subsequently, stylistic references within a composition may be recognized as "not contemporary" or as "from another composer". They might even be recognized as representations of styles of the past.

The beginning of the Adagio "Der welcher wandelt diese Strasse voll Beschwerden" in Mozart's *Zauberflöte* (1791), with its instrumentation and compositional treatment of the chorale, exists as an example of such referencing. As Jan Assmann explains, in using a chorale by Martin Luther from 1524, Mozart sets the string accompaniment in a fugato style as would have been used by Johann Sebastian Bach.[377] In addition, for the cantus firmus Mozart chose to compose a variation on the melody of Bach's Kantate No. 2 *Ach Gott, vom Himmel sieh darein*, BWV 2 (1724) – set in D phrygian, one of the most common church modes used in Gregorian chant (see fig. 13). Set in an overall C minor environment, Mozart kept the finalis of Bach's melody on D. The end of the unison duet of the two men in armour, however, cadences in C phrygian with the characteristic Db programmatically set to the word "Isis" (see fig. 14). Additionally, the Adagio ends in Ab major – the Db, previously the phrygian tone, therefore becomes an integral part of the new diatonic scale (fig. 15). In this way, Mozart came full circle, masterfully reconciling the "alien" material of Luther and Bach's styles with his own, not only making stylistic references but actually integrating them fully into

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[376] Robert Pascall, "Style." *Grove Music Online. Oxford Music Online*, http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/27041?q=style&search=quick&pos=1&_start=1#firsthit (accessed June 30th, 2014).

[377] Assmann, "Music and memory in Mozart's *Zauberflöte*," 200-201.

his own compositional practice.[378] This way, Mozart's music allows extratextual memory to interconnect with intratextual memory.

The following excerpt (fig. 12) shows the Finale, Scene 10 of Mozart's *Zauberflöte* (1791). The excerpt illustrates the fugato style string accompaniment (blue) as well as the use of a cantus firmus (red): a variation of the cantus firmus in Bach's second cantata.

[378]It is important understand that musical quotations and references demonstrate an interplay of musical memory: intratextual and extratextual at the same time. In this, quotations and references occupy a peculiar space between musical style and musical material. The above example of Mozart's opera depicts how the use of Basso Continuo as a Baroque style figure may be "quoted" in a composition at a later point in history, when the conventional material inventory no longer includes this style figure. The characteristic code will evidently bestow further meaning upon the carried material – i.e. pitches, melodic movement or cohesion, rhythmicality, harmonic clarity or distortion etc. – throughout the composition in the manner of musical material. This, however, presupposes that the audience recognizes this historical code. In this case, the quoted code is a historically pre-formed material, which is now *becoming* something new, or gaining additional meaning within the new musical context. Short-term memory directly becomes interpolated in long-term memory, which in turn is drawing on familiarity with the particular style in quotation: intratextual memory informed by extratextual memory. Conversely, musical material of a particular piece may be quoted "verbatim" as a memory motif. As with stylistic references, borrowed material works as a quotation only if recognized as such. Therefore, musical material becomes extratextual matter and its pre-formed meaning is not only determined by the compositional labour but additionally by its historic meaning and the compositional labour exerted on the source piece.

It is hence difficult to say if borrowing particular musical material, or memory motifs, is not already implying a stylistic reference, or code. All quotations employ long-term memory and borrowed material accordingly projects a specific code which blurs the lines between intratextual and extratextual memory. A good example for the use of quotations, or more specifically in this case self-references, are some of the symphonic works of Gustav Mahler – i.e. Symphonies 1, 5, 9. For more on this, see Samuels "Mahler within Mahler," 33-50.

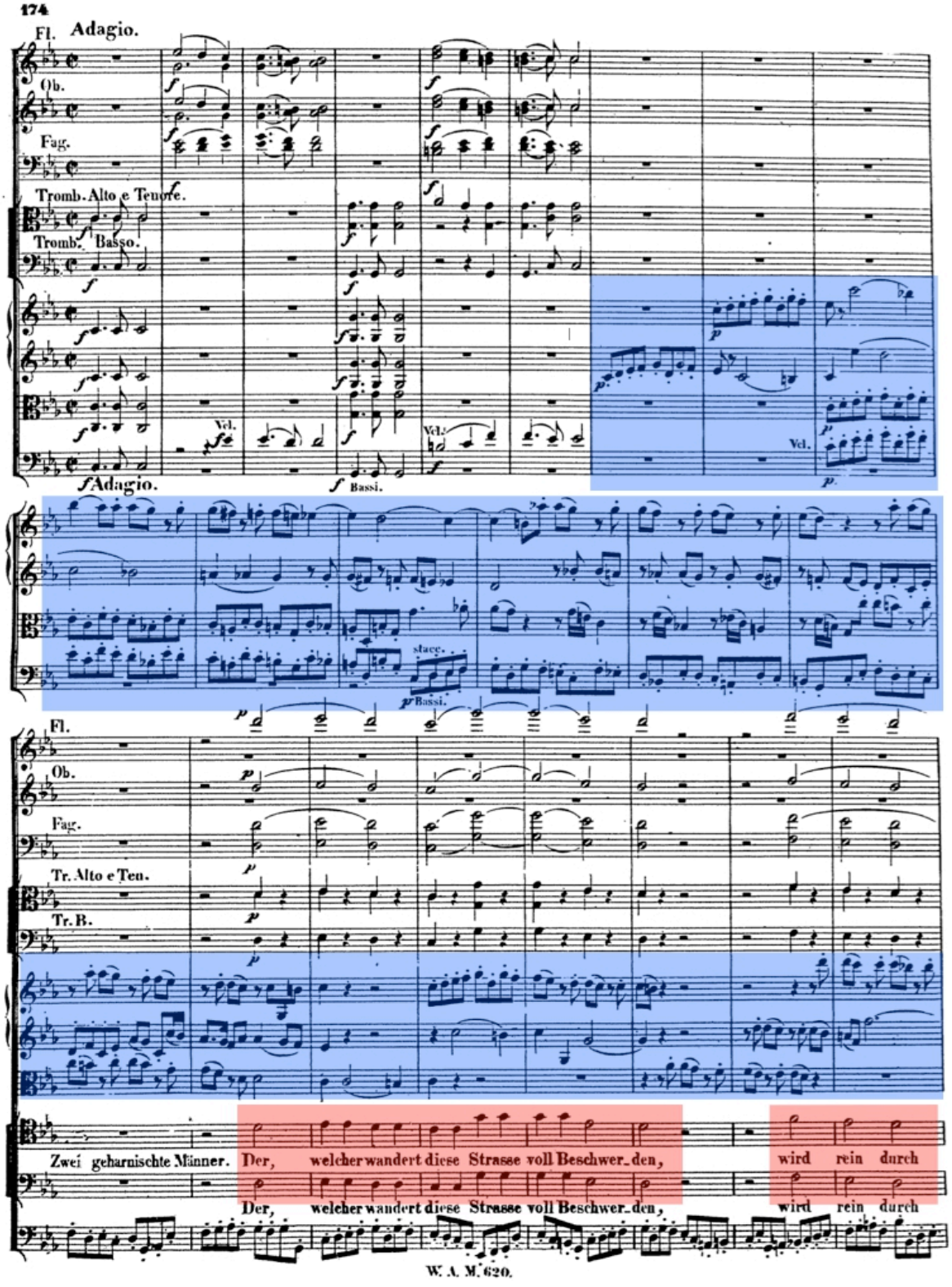

Figure 12 – Extratextual Memory in Mozart: Zauberflöte, Finale, Scene 10.

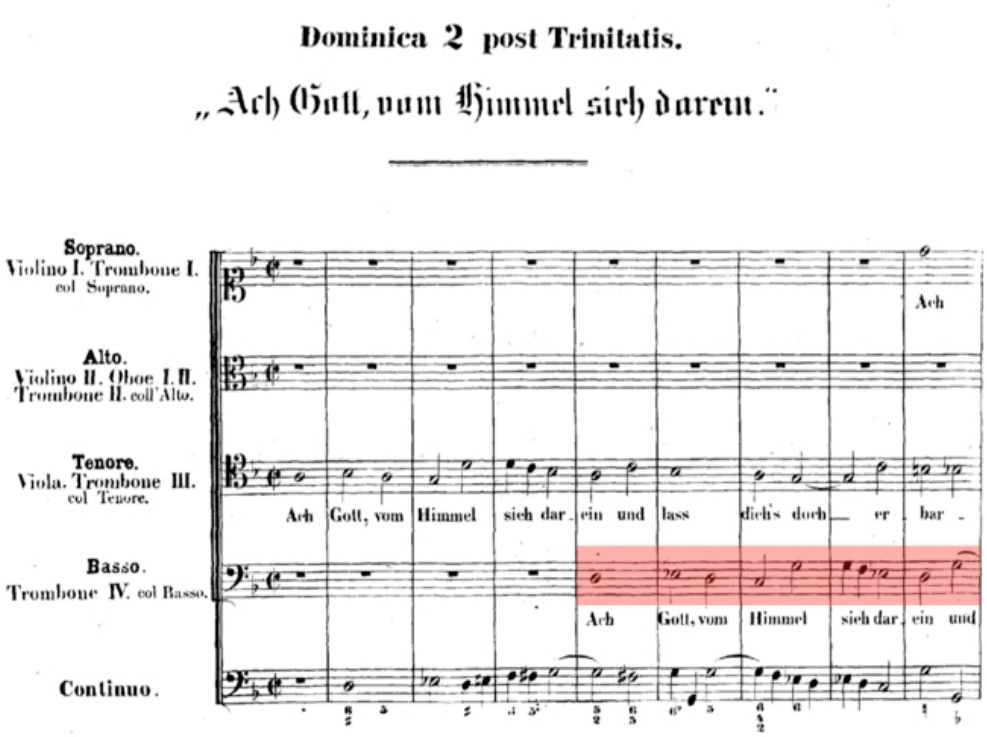

Figure 13 - Excerpt from Bach's Kantate No. 2, Ach Gott, Vom Himmel sich darein BWV 2 (1724)

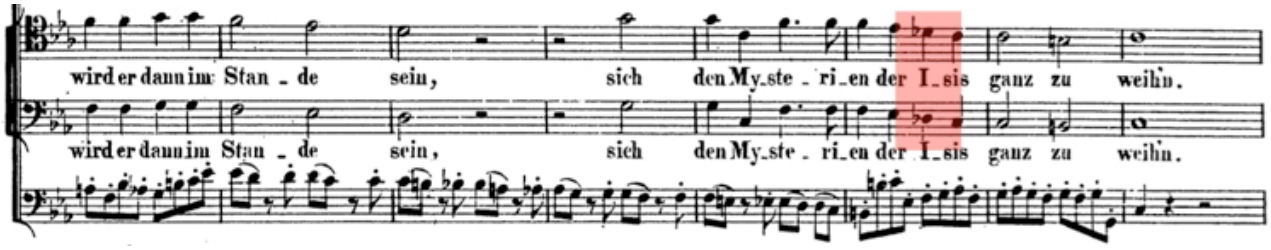

Figure 14 - Mozart: Zauberflöte, Finale, Scene 10: Lowered Second Scale Degree (C minor).

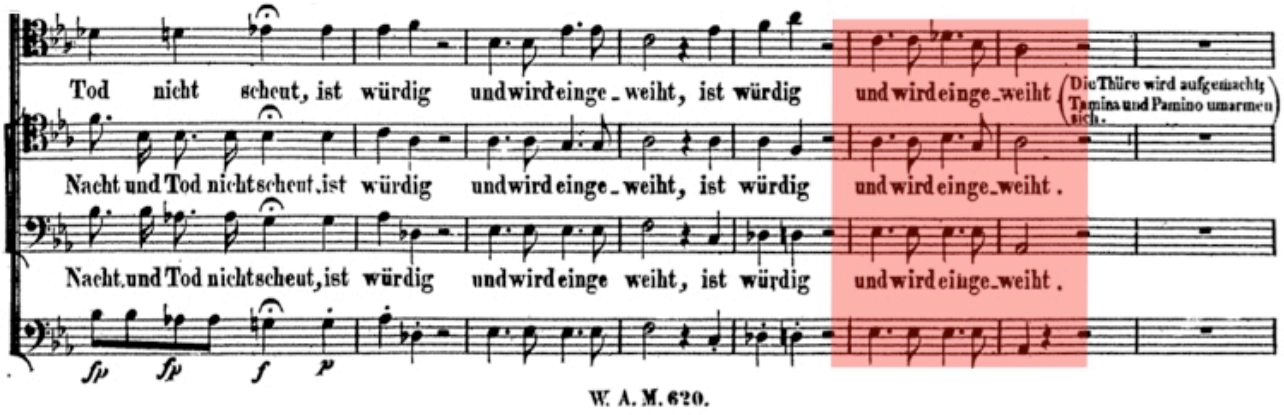

Figure 15 - Mozart: Zauberflöte, Finale, Scene 10: Cadenza in Ab major and final integration of Eb.

At this point, one might consider that musical style – be it a personal, ethnic or epochal style – is constituted by the very perception of *différance*. In this way, musical formulae provide a pool of generalities and similarities in the form of given stylistic determinants, bringing forth a particular musical conventional code.[379] Referring to the relevance of the type of code, or style, Stiegler states:

> Style is the mark and the highest level […] of singularization, an idiomaticity that cannot be thought simply as language, but more broadly as the medium manifesting personal singularity, in the sense in which one can speak of ethnic personality or of a person's physical or moral personality. Here person means *person*, im-personality as such: personal style is always contained within a less personal style, within a certain impersonality. Mozart's music is German, El Greco's painting Spanish, Proust's language French, Celan's poetry Franco-Judeo-German. [...] Style is *occurrencial*: Mozart's style is not simply an occurrence of the German *musical* style. It has always been localized, and the more it is localized, individuated, the more it is contested. At the same time, style always delocalizes, tearing itself out of its spatiotemporal determinants; it circulates, penetrates, invades; it is transferred, translated, expanded—and lost. Style is idiomaticity. The stylistic component of all things, both material and immaterial, of all methods and modes for manufacturing automobiles and forks, is idiomatic dissemination in all of its forms. Style is always the product of a place; it speaks the unity of a group or of a person, a work or a particular technical know-how. [...] Style is absolutely

[379] See Assmann, "Music and memory in Mozart's *Zauberflöte*," 193.

> deictic. As the radical experience of space and time, of originary locality, style is the anchor for all contextuality as for every possibility for escaping from context.[380]

According to Stiegler, style is individuated while dependent on historical and local coordinates. This reveals the significance of music *as* cultural memory: musical styles are individuated as the products of active musical traditions, which are part of cultural memory. This describes a long-term memory allowing the *re*cognition of a musical style as it is presented or quoted or alluded to. This means, music in circulation – i.e. music, that is part of a current canon through repeated performance, reviews, etc. – can be identified as or associated with other music that shows similarities and similar conventional characteristics. Such a condition then allows for the manifestation of *différance*.

In conclusion, it is possible to say that, within a culture or a single piece of music, musical codes bear *différance*. Within a piece of music, the use of a given musical code is similar to the use of musical material in general, which – as has been established – allows for *différance* when the conditions for its own *becoming* are fulfilled.
According to the insights gained in the second chapter, *différance* enables the individuation of meaning via memory. With regards to musical material, this raises the question of how to interpret such individuated meaning.

Interpretations

> the *a* of *différance* also recalls that spacing is temporization, the detour and postponement by means of which intuition, perception, consummation - in a word, the relationship to the present, the reference to a present reality, to a being - are always deferred. Deferred by virtue of the very principle of difference which holds that an element functions and signifies, takes on or conveys meaning, only by referring to another past or future element in an economy of traces. This economic aspect of *différance*, which brings into play a certain not conscious calculation in a field of forces, is inseparable from the more narrowly semiotic aspect of *différance*.[381]

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[380] Stiegler, *Disorientation*, 84-85.

[381] Derrida, "Interview with Julia Kristeva," 28–30.

The previous discussion of musical material – where both its essence and cultural function were outlined, according to Gunnar Hindrichs' theories – has revealed the complex condition of music being in the state of continuously *becoming* as it is intrinsic to musical material. A logical conclusion might suggest that musical meaning may be a question of a musical piece *having* meaning and thus being meaningful rather than having the specific *content* of that meaning. Corresponding to this deduction, the following section will set out to investigate whether a composition is meaningful in that its musical material engages in a process of *becoming*, which corresponds directly to the function of music in contemporary culture – whether a musical piece is able to function as a carrier of cultural memory. If so, the process of musical *becoming* must arise on an inner-musical as well as outer-musical level.

The question of musical meaning is central to musical semiotics, an area of research specifically dedicated to the study of signs as they function in music on diverse levels. Musical semiotics attempt to provide methods to describe the symbolic content which is comprised by musical codes and musical material in general. However, as will be discussed, the complexity of music's embeddedness in culture and the various notions of temporality and *différance* need to be taken into consideration in the investigation of musical meaning, which is inherently informed by social and cultural memory.

Musical Semiotics and Cultural Semiotics[382]

The discussion of the social function of musical material appears to be directly related to musical semiotics, as music's symbolic forces exist within semiotic contexts that connect to identity, culture and carriers of cultural memory.

One of the most prominent figures in the field of musical semiotics is the French-Canadian scholar Jean-Jacques Nattiez.[383] His theories are greatly influenced by the

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[382] Both terms "semiology" and "semiotics" are often used interchangeably by the authors cited. The present discussion is based on the following distinction:

"Semiotics is preferred by Deleuze to semiology on the grounds that where the latter is primarily linguistic in conception, devaluing the non-linguistic or attempting to think it in linguistic terms, the former seems better suited to thinking pre- nad non-verbal signs, images and sounds." See Campbell, *Music after Deleuze*, 9.

[383] Other prominent figures in the field of musical semiotics are Eero Tarasti (editor of *Musical Signification*, DeGruyter 1994), Kofi Agawu (*Playing with Signs: A Semiotic Interpretation of Classic Music,* Princeton:

structuralist semiology of Ferdinand de Saussure and Charles Sanders Peirce. Nattiez's theory entails the idea of a tripartition, which is based on Jean Molino's structuralist model and Peirce's extension of the sign.[384] Therefore, Nattiez' semiotic theories entail the following three objects:

1) poietic process (the creation or composition of music), 2) esthesic processes (the perception of music), and 3) the *trace* which is "the material reality of the work (its live production, its score, its printed text, etc.) – i.e. the physical *traces* that result from the poietic process."[385]

Within a communicative model, these objects are connected as follows:

Poietic Process		Esthesic Processing
"Producer"	→ Trace ←	Receiver

Referring to Molino, Nattiez maintains that

> a symbolic form (a poem, a film, a symphony) is not some 'intermediary' in a process of 'communication' that transmits the meaning intended by the author to the audience; [...] it is instead the result of a complex *process* of creation (the poietic process) that has to do with the form as well as the content of the work; […] it is also the point of departure for a complex process of reception (the esthesic process that *reconstructs* a 'message.')[386]

In accordance with his observation, Stiegler's and Hindrichs' theories may be applied as follows: the symbolic content – meaning – of music is fundamentally dependent on processes of creation and perception *and* on "the form as well as the content of the work". The latter aspects, form and content, it seems, refer to the technical mediation of music (form) but also to the musical material itself (content) along with its

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Princeton University Press, 1991), Robert Hatten (*Interpreting Musical Gestures, Topics, and Tropes: Mozart, Beethoven, Schubert*, Indiana: Indiana University Press, 2004). As diverse as each of these researchers' approach to musical semiotics may be, their underlying foundation is the structuralist semiotics of Ferdinand Saussure and Charles Sanders Peirce. Shortcomings of structuralist semiology, as will be discussed, affect the understanding of the latter aspect, the trace, in that it is conceptualized within a semiology that has been described synchronically, primarily by Saussure.

[384] See Jean-Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music* (Musicologie générale et sémiologue, 1987), trans. Carolyn Abbate (New Jersey, 1990), 10-16, and 28-32. In establishing his theories, Nattiez primarily refers to personal conversations with Molino and his "Fait musical et sémiologie de la musique," in *La linguistique*, no. 17, 37-62 as well as to Peirce's *Collected Papers*, vol. 1-6. Cambridge: Harvard University Press, 1931-1935.

[385] Nattiez, *Music and Discourse*, 15.

[386] Ibid.17.

characteristic forms. Therefore, while the "symbolic form" contains the "skeleton" and the "flesh of musical time", technicity formulates that "symbolic form" as a performance, a score etc. At the same time, the content of the "symbolic form" is determined by the compositional labour within a complex framework of the twofold social functions of music. Within this framework, the physical *trace* exists as the third level of Nattiez's tripartition.

Interestingly, the complex matter of the semiotic *trace* presents only one aspect of Nattiez's semiotics and has been critiqued multiple times, primarily based on the claim that his work is based on a misreading of the *trace*, the "neutral level" of musical material. For example, Rosario Mirigliano insists:

> Nattiez's reading of Peirce is marred by a basic misunderstanding, and a common one in interpretations of Peirce: the reduction of the sign to its expressive occurrence. In Nattiez's opinion the Peircean sign 'is evidently analogous to Saussure's signifier, [and] in current usage, the word 'sign' designates only the 'sound-image'' (1989:29). But, precisely, in current usage; because Saussure points out that 'in its essence' the linguistic signifier 'is not phonic but incorporeal – constituted not by its material substance but by the differences that separate its sound-image from all others' (1916:164).[387]

Essentially, this criticism is referring to the technicity-aspect of the *trace* itself. It is important to investigate this matter further as it stands to reason that such criticism is truly rooted in a broader question of technics and culture. This supposition is vindicated since Nattiez's semiotic framework has additionally been criticised for its lack of practical applicability in the analysis of music, especially of music after 1950:

> One diagnosis of what is going on with 'difficult-to-analyse' works of the post-war avant-garde is that this situation of semiotic ambiguity is pushed to an unprecedented extreme. On the one hand rationalised or arcane processes at the poietic level (e.g. the multiple-serialist techniques of Boulez, or Maxwell Davies's use of magic squares) find no counterpart at the esthesic level: as Lerdahl has (contentiously) claimed, such music pushes beyond a listener's cognitive constraints; hence the parameters for analysis may become correspondingly attenuated. On the other hand, in works

[387] Rosario Mirigliano, "The sign and music: A reflection on the theoretical bases of musical semiotics," in *Musical Signification*, ed. Eero Tarasti (Berlin, New York: Mouton de Gruyter, 1995), 47.

> that embrace indeterminacy the question of what – in Nattiez's terms – constitutes the material trace (and hence neutral level) that gives the work a stable identity – is itself under question. Under such conditions, what are we meant to be analysing?[388]

The critique addresses the issue of music being situated in a culture that seems to have developed in such a way that can no longer be grasped by a fairly simplified semiotic concept such as that of Nattiez.[389]

As I have demonstrated, music's semiotic contexts are based on the interrelation between identity, culture and its prosthetic supplements. This connection – as has been explained – is dynamic and its constant transformation has necessarily provided semiotic consequences for music: musical meaning – the meaning of music as tertiary retention, which Stiegler termed the *what* of cultural memory – must always be understood in the context of the *who*, i.e. music's creators, performers, and listeners.

The semiotic infrastructure proposed by Nattiez only ascribes "material reality" to the *trace* but fails to recognize the same to be true for the poietic and esthesic processes in music. Since the discussion of tertiary memory is one of "material reality" within culture, the reduction of the material aspect to the *trace* discounts the importance of tertiary memory within culture and as such leaves out an essential cultural aspect in the investigation of the poietic and esthesic dimension of music.

As the present thesis is based on an understanding that culture is constantly changing alongside technicity's continuous development, it is important to project the aspects of cultural and technological change into the semiotic investigation as well.

The research of German memory studies professor Astrid Erll is influenced by the theories of Aleida and Jan Assmann and centres around cultural studies and Anglophone literature. In her book *Memory in Culture*, Erll comments on the interdisciplinary

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[388] See David Clarke, "Ambiguity and Beyond: Theories of Musical Meaning and Their (Non-)Application to Music post-1950," *Analysing 'Un-Analyzable' Art Music since 1950*, Eighth European Music Analysis Conference (EUROMAC) - Leuven, Belgium 2014, program note. Available online: http://www.euromac2014.eu/programme/5b/clarke (accessed November 27th, 2014).

[389] See also Claus-Steffen Mahnkopf, "Neue Musik am Beginn der Zweiten Moderne," *Merkur: Deutsche Zeitschrift für Europäisches Denken,* 594:595 (1998): 864-875.

methodologies of cultural semiotics.[390] She observes a renewed semiotic approach, which integrates anthropological definitions of culture as well as the structuralist concept of semiotics. The interdisciplinary research of cultural semiotics is useful in order to "conceive this fundamentally temporal aspect of culture."[391] In her work, Erll refers to Roland Posner, one of the foremost scholars in the field. He explains the tasks of cultural semiotics in reference to philosopher Ernst Cassirer:

"a) the study of sign systems in a culture (in the sense of Herder or Tylor) with respect to their contribution to the culture,

b) the study of cultures as sign systems with respect to the advantages and disadvantages, which an individual experiences in belonging to a specific culture."[392]

The study of cultural semiotics is thus based on the understanding that culture and sign systems mutually are mutually dependent. The first area of cultural semiotics focuses on sign systems as they appear in a culture: this study investigates interconnections between forms of processes, codes, and media, as they determine a culture – always in distinct relations.

Since music performs its social function within a culture as a medium of cultural memory, the aspect of media is of most interest. In his paper *Basic Tasks of Cultural Semiotics*, Roland Posner explains how

> [t]he term 'medium' is used to designate a constellation of factors which [the constellation] remains the same over a wide range of sign processes. One can therefore say that two sign processes belong to the same medium when, in their reception, they either rely on the same sensory apparatus (for example, the ear), or utilize the same contact matter (physical channel; e.g., air), or operate with similarly functioning instruments (technical channel; e.g., the telephone), or occur in the same type of social institution (for

[390] In "Basic Tasks of Cultural Semiotics", German semiotician Roland Posner explains: "The term 'cultural semiotics' has been used since Ernst Cassirer (1923-29) suggested describing certain kinds of sign systems as 'symbolic forms' and claimed that the symbolic forms of a society constitute its culture. Cultural semiotics is that subdiscipline of semiotics which has culture as its subject." Roland Posner, "Basic Tasks of Cultural Semiotics," in *Signs of Power – Power of Signs. Essays in Honor of Jeff Bernard* (Vienna: INST, 2004), 56-89. Available online:

http://faculty.georgetown.edu/irvinem/theory/Posner-basictasksofculturalsemiotics.pdf (accessed November 28th, 2014).

[391] Astrid Erll, *Memory in Culture*. (UK: Palgrave Macmillan, 2011), 102.

[392] Posner, "Basic Tasks of Cultural Semiotics," http://faculty.georgetown.edu/irvinem/theory/Posner-basictasksofculturalsemiotics.pdf (accessed November 28th, 2014).

example, in a fire department precinct), or serve the same purpose (such as calling for help), or use the same code (for instance the English language). In order to distinguish between these types of conditions, one speaks of a biological, physical, technological, sociological, functional, or code-related media concept (see Posner 1985: 255ff).[393]

[393] Ibid. Further:

"The *biological media concept* characterizes sign processes according to the bodily organs (sensory apparatus) which are involved in the production and reception of signs. With respect to humans, [...] the auditory medium, whose signs are received with the ears […] The *physical media concept* characterizes sign processes according to the chemical elements and their physical make-up (contact matter) which are used in establishing a connection between the signs and the receptor organ of the recipient, and, where available, the production organ of the sender. […] auditory sign processes are dependent on solid, liquid, or gaseous bodies capable of acoustic transfer to serve as a physical connection between the sign and the recipient (acoustic medium). […] The *technological media concept* characterizes sign processes according to the technical means used to modify the contact matter involved. […] In auditory sign processes, the technical means include musical instruments, microphones and loudspeakers, radios and receivers, as well as vinyl records, reel-to-reel tapes, cassette tapes, and CDs, which is why one speaks of records, reel-to-reels, cassettes, CDs, and so forth as different media. […]

The *sociological media concept* characterizes sign processes according to the social institutions that organize the biological, physical, and technical means involved in producing signs. […] Social media for auditory sign processes include concert halls, jazz clubs, and piano bars, as well as record companies, radio stations, and telephone centers. [...] The *functional media concept* characterizes sign processes according to the purpose of the messages which are transmitted by them. We are here dealing in a generalized form with what is known as "styles", 'genres', or 'discourse types' in literature, art, and musicology (see Morris 1946=1971: 203-232). The purpose of the communication gives the messages similar structures regardless of the biological, physical, technical, or social medium in which they occur. Not only in newspapers, but also on the radio and on television, one distinguishes between news, commentary, criticism, reportage, feature stories, and advertising. The distinction between serious art and entertainment products appears in cinema as arthouse films versus Hollywood movies, in music as classical versus pop, and in fiction as literary fiction versus airport novels. In the field of entertainment there are once again multiple parallel divisions, for example when a book is presented as a comic novel, a detective novel, or a historical novel; when a film is presented as a comedy, a detective film, or a historical feature; and when a television program is presented as a sit-com, a detective show, or a 'historical portrait'. This raises the more general question of how the limitations to which a message is subjected differ when one publishes it in the context of a news item, a commentary, criticism, a reportage, a feature story, or an advertisement. The fact that such limitations are fairly stable justifies speaking of news, commentary, criticism, reportage, feature reporting, advertising, and so forth as functional media (see Hempfer 1973 and Rolf 1996). The *code-based media concept* characterizes sign systems according to the types of rules by means of which the sign users manage to assign messages to the signs. We are dealing with a code-related division when an institution such as a radio network differentiates between departments for broadcasting spoken texts versus music, or when an international publishing house organizes itself into sections for English, French, German, and Spanish. A code-related differentiation in Western music is the distinction between monophony and polyphony, as well as that between tonal and atonal music; […] A publisher's decision to publish a book in English, French, German, or Spanish, a composer's decision to compose tonally or atonally, a painter's decision to paint representationally or nonrepresentationally, or an architect's decision to build a house in a neo-Romantic, neoGothic, or neo-Functional style can be understood as a choice between various media of publishing, composition, painting, or building, respectively. Each medium determines the types of messages which can be transmitted in it." Ibid.

In recognizing the complexity of this compound media concept, the aspect of performance comes to the fore as it is here that biological, physical, technological, sociological, functional, or code-related matters come into effect. At the same time, it becomes clear that several cultural aspects impact all three aspects of the conventional music-semiological diagram: the poietic and esthesic process as well as the material *trace*.

Through the lens of cultural semiotics, music's ogical manifestation within a culture is therefore considerably more complicated as is given credit to in Nattiez's semiotics. When considering the second task of cultural semiotics – culture *as* sign systems – the prospects of cultural musical semiotics appear to become even more intricate. Astrid Erll explains:

> A theory of culture which integrates anthropological and semiotic perspectives has been developed by Roland Posner. He conceives of culture as a system of signs which has three dimensions:
>
> 'Anthropology distinguishes between social, material, and mental culture, and semiotics systematically connects these three areas in the way it defines a social culture as a structured set of users of signs (individuals, institutions, society); the material culture as a set of texts (civilization); and the mental culture as a set of codes.'
>
> The three dimensions of culture postulated by cultural semiotics are dynamically interrelated, since users of 'signs' (social dimension) are dependent on 'codes' (mental dimension) if they want to understand 'texts' (material dimension). In a specific cultural formation, codes manifest themselves in social interaction as well as in media and other artefacts; at the same time, it is here that culture is continually created anew.[394]

[394] Erll, *Memory in Culture*, 102.

These three dimensions are: material dimension, social dimension, mental dimension.

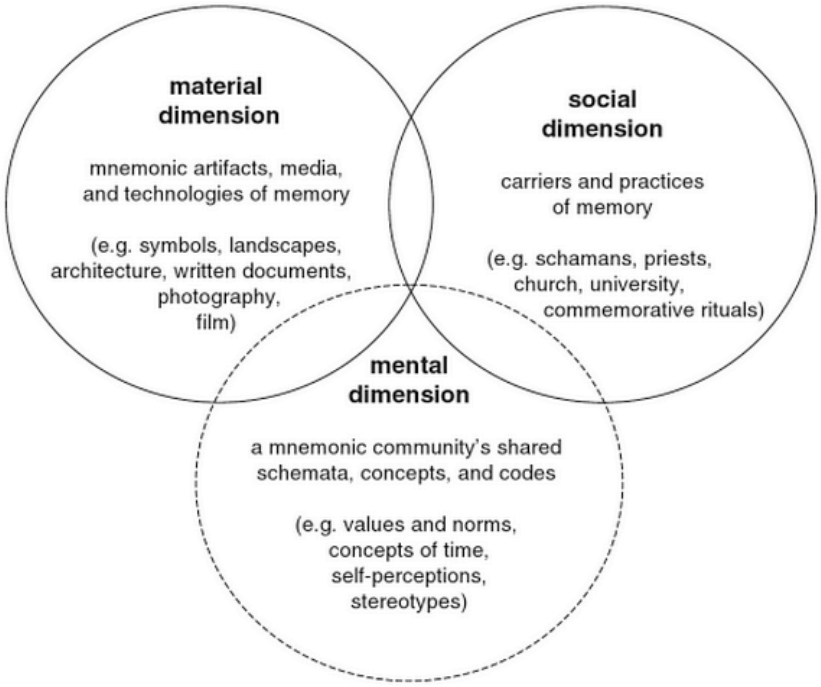

Figure 16 - Three Dimensions of Memory Culture (Graph by Erll, 103)

As has been pointed out, the advances of cultural semiotics are that it distinguishes a) sign systems as they constitute the idea of culture in the forms of processes, codes, and media from b) cultures as sign systems themselves, developing social, material, and mental cultures. Additionally, cultural semiotics investigates how culture and cultural change mutually influence and substantiate each other at the same time.

Applied to a musical context, the thorough insight offered by cultural semiotics appears to be useful as they accommodate Aleida and Jan Assmann's concepts of cultural memory and Stiegler's theories of technicity, and it may help the reader understand how cultural developments have impacted social functions of music and musical material in general. More importantly, cultural semiotics reveal the ubiquitous complexity of medial aspects as they are at work in the musical realm: a semiotic investigation would therefore require a consideration and evaluation of the poietic and esthesic processes as well as the

material *trace* in terms of the biological, physical, technological, sociological, functional, or code-related media concept, as proposed by Posner.

Conclusions

The aim of the present dissertation is to develop an approach to musical analysis whose focus is on memory and thus time-related aspects in and around music and how various forms of media *interact* within this realm as tertiary memory. As discovered before, these relationships can be located inside musical material which itself is marked by its inherent historiality and by a tendency of *becoming.* As such, musical material is both dependent on *différance* and exhibiting *différance*, thereby fulfilling its double social function. On this basis, meaning is engendered – a cultural meaningfulness is then actualized. It is therefore necessary to turn towards a semiotics wherein the notion of *différance* is the theoretical foundation as well as the determining factor.

A fusion of interdisciplinary theories seems useful: in order to apply concepts of cultural memory and technicity to a culturally meaningful musical analysis, the next section will serve to project Derrida's ideas of *différance* onto the medial concepts suggested by Posner as well as onto Nattiez's semiotic tripartition: the levels of creation (poietic), perception (esthesic), and the material *trace.*[395] With regards to these three aspects then, temporal deferral and sameness are not merely presupposed but become the foundation for a musical semiotics wherein musical creation, perception and material reality are all performed within a cultural context. A semiotics of *différance* will be applied to the investigation of all medial aspects (the biological, physical, technological, sociological, functional, or code-related media concept as per Posner) within the creation and perception of music, which will furthermore validate the association between music's twofold social function and the regulatory sub-system of musical material as suggested by Hindrichs.

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[395] Relevantly, Abigail Heathcote cites Adorno: "What is, is more than it is. This 'more' is not imposed upon it but remains immanent to it, as that which has been pushed out of it. In that sense, the non-identical would be the thing's own identity against its identifications. The innermost core of the object proves to be simultaneously extraneous to it ... This is where insistent thinking leads us in regard to the individual: to his essence rather than to the universal he is said to represent." Theodor W. Adorno, *Negative Dialectics*, trans. E. B. Ashton (London: Routledge, 190), 161-162, as quoted in Heathcote, "Liberating Sounds," 13.

Chapter 4: Analytical Approaches – *Différance* and Rhizomatic Molecularity

In the previous chapters, it was determined that meaningfulness transpires when temporal perception (the distinctive notion of past, present, or future) occurs in relation with identity. With regards to social identity and meaning, philosophical concepts were discussed in order to outline the interconnections between 1) the perception of time and 2) the perception of difference within these temporal realms.

These concepts revealed a simultaneous involvement of short-term memory and long-term memory in processes of music conception and perception – affecting composer, performer and audience. As has been described, the interconnection of primary, secondary and tertiary memory is fundamental to the emergence of musical meaning which results from the perception of differences, all of which is facilitated via temporally, and spatially, deferred repetitions or recurrences.

Throughout the previous chapters, Derrida's concept of *différance* has served as a cardinal point for various theories, amalgamating them into a theoretical framework, which encompasses a synthesis of philosophy and semiotics:

> […] the relationship to the present, the reference to a present reality, to a being – are always deferred. Deferred by virtue of the very principle of difference which holds that an element functions and signifies, takes on or conveys meaning, only by referring to another past or future element in an economy of traces.[396]

With regards to externalized memory, it was explained that *différance* occurs between the *who* and the *what* – between the memory itself and its externalization, constituting an indefinite connection between the organic and the inorganic which consequently impacts the "connective structure" of a culture in a distinct way. Accordingly, meaning is created.

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[396] Derrida, "Interview with Julia Kristeva," 28–30. It should be noted that Derrida's use of the term *trace* is related to the notion of writing as inscription and articulation of the *grammē* and is therefore part of the concept of externalization exhibiting *différance*. It is part of his post-structuralist semiological approach, which rejects the traditional opposition between signifier and signified upon which Saussurean semiology is based. Instead, Derrida proposes an assessment of meaning on the basis of *différance*, while the trace, or material form, is recognised for its supplementary formation, its technicity.

"The trace is the *différance* which opens appearance [*l'apparaître*] and signification [...]If the trace […] belongs to the very movement of signification, then signification is a priori written, whether inscribed or not, in one form or another, in a 'sensible' and 'spatial' element that is called 'exterior'." Jacques Derrida, *Of Grammatology*, trans. Gayatri Chakravorty Spivak. (Baltimore: Johns Hopkins University Press, 1976), 65, 70.

One may therefore recapitulate that musical *différance* appears in a cultural realm when: 1) contextualization is given, 2) participation of the members of the cultural group is guaranteed, 3) music actively serves as a process of individuation – as transindividuation, and 4) musical culture performs a two-dimensional temporality [*Zweizeitigkeit*].

For example, the repeated, canonical performance of a piece of music reveals *différance*, when the piece itself reveals a material inventory reflecting the past equally as the present of the musical culture that it is part of. In this situation, the conditions of the "connective structure" are fulfilled; i.e. a given compositional work acts as part of a cultural tradition – as cultural memory. It follows that social identity and memory allow for a perception of time through the perception of *différance.*

Furthermore, in the second chapter of this dissertation Derrida's concept was furthered by Deleuze's and Guattari's ideas of the molar and the molecular in order to describe vectorial potentials which determine developmental possibilities. This is important for the purpose of assessing the material tendencies inherent to musical material. At the same time, Deleuze's concept presents an alternative to musical semiotics, as it embraces the idea of individuation, or *becoming* – a recurring topic in the theories of Assmann, Simondon and Stiegler: accordingly, Edward Campbell points out, Deleuze's

> work on regimes of signs […] presents the possibility of a semiotics that is fit to consider the workings of signs that no longer look for validation to verbal language operating, as they do, below the level of the conventional sign and in the realm of the molecular. Deleuze's semiotics is one of forces that produce signs that are not intended to become part of a common currency or a lingua franca, and which are destined to remain as parts of an always novel musical dialect.[397]

In the following, recent music-analytical work of other authors will serve as examples for the application of the concept of *différance* in combination with theories of the rhizome and molecularity, with a focus on aspects of tertiary, cultural memory as well as primary and secondary memory in relation to music. The purpose of this – integrating extended philosophical theories of *différance* into multilayered memory concepts – is to

[397] Campbell, *Music after Deleuze*, 161.

establish an approach to musical analysis which aims at examining a piece of music for its capacities as cultural memory, and if it is capable of fulfilling its double social function. Such an investigation will therefore seek to determine if particular examples of musical material respond to a contemporary social function of music – and what that social function is. According to Hindrichs, the demands of music are directly addressing the question of material inventory, which must be employed in a committed dialogue with its historiality and thus show degrees of *différance.* It is then in this context, that the multifaceted media concepts – presented by Roland Posner – will inform the analysis of the material inventories. In the following, it will be investigated if a given composer of a given piece of music deals with biological, physical, technological, sociological, functional, or code-related medial aspects in his/her compositional practice, which would reveal *différance* and, as such, inform the meaning of the composition within a current cultural context.

Différance on the basis of Intertextuality in Luciano Berio's *Sinfonia*

The third movement of the *Sinfonia* (1968-1969) is a great example for the investigation of *différance* in relation to musical material and musical semiotics, as the composer layers a plethora of literary and musical quotations in an orchestral context. Often discussed in academia for its collage technique and use of numerous musical quotations, the discussion of Berio's piece has often turned into a kind of music trivia, where it is imperative to be able to identify as many references as possible.[398]

The following score excerpts show the integration of Mahler's Symphony No. 4 (1899-1900) and No 2 (1888-1894), Debussy's *La Mer* (1903-1905), Schoenberg's Op. 16 *Fünf Orchesterstücke* (1909), Berg's *Violin Concerto* (1935), and Brahm's Op. 77 *Violin Concerto* (1878).[399]

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[398]Of course, this is inherently based on the issue of knowledge, generally academic knowledge, or as Carolyn Abbate refers to the "disclosed secrets reserved for the elite and hidden from others" – the *gnostic*. With this, we are also presented with the question of the *carnal*, which, as discussed, implies a *real* performance of music, and in the context of *past* music this would presume a musical canon of which this past music is an *active* part. See Abbate, "Music – Drastic or Gnostic?," 510.

[399] Analysis by Michael Hicks. For a thorough analysis, please see Michael Hicks, "Text, Music, and Meaning in the Third Movement of Luciano Berio's Sinfonia," *Perspectives of New Music* 20, no. 1/2 (1981/1982), 199-224.

Figure 1. Berio, Sinfonia:mvt. 3, mm. 1-10

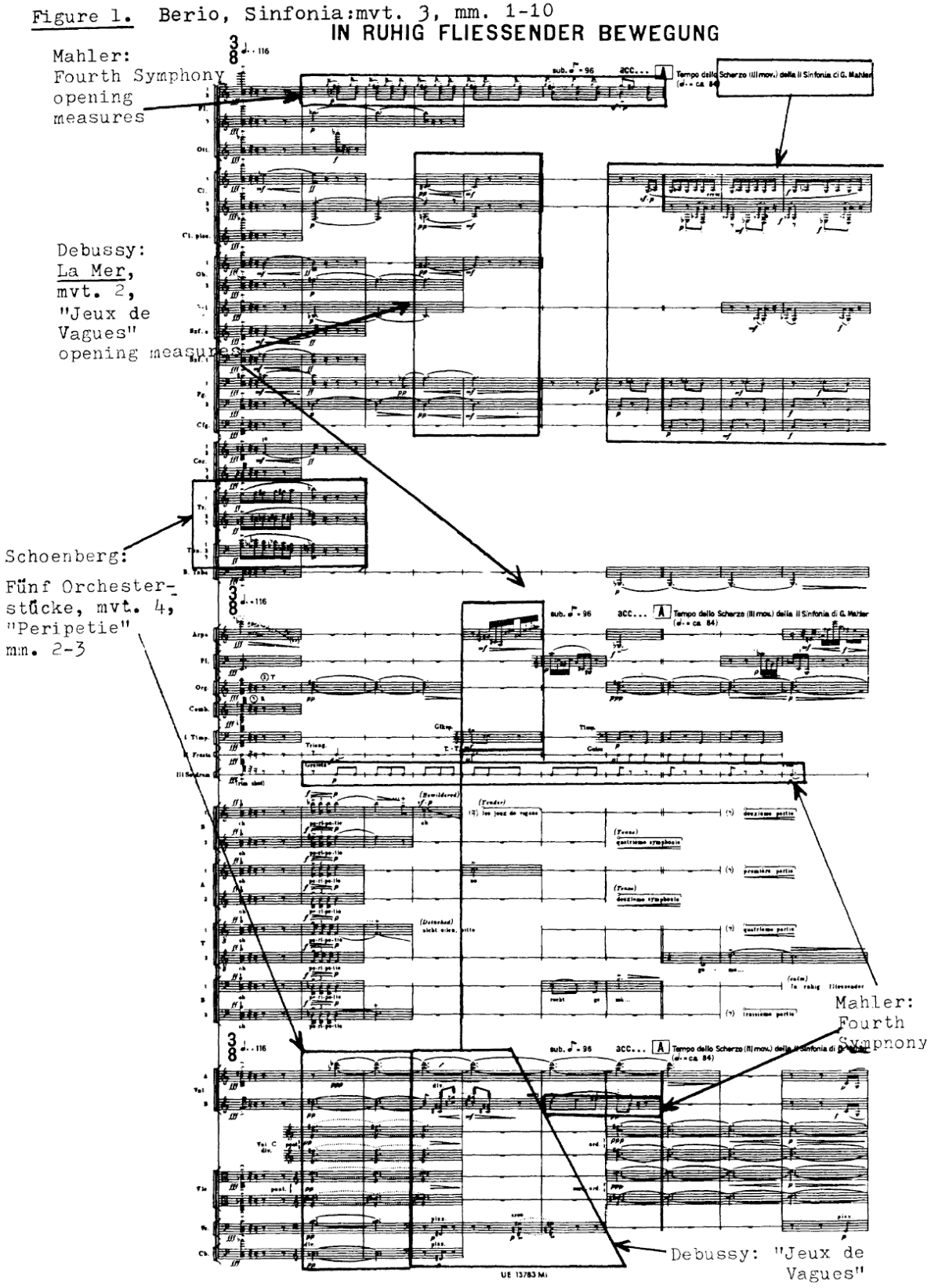

Figure 17 - Berio: Sinfonia, 3rd mvt., mm. 1-10 (Analysis by Hicks)

Figure 2. Berio, Sinfonia: mvt. 3, mm. 59-69

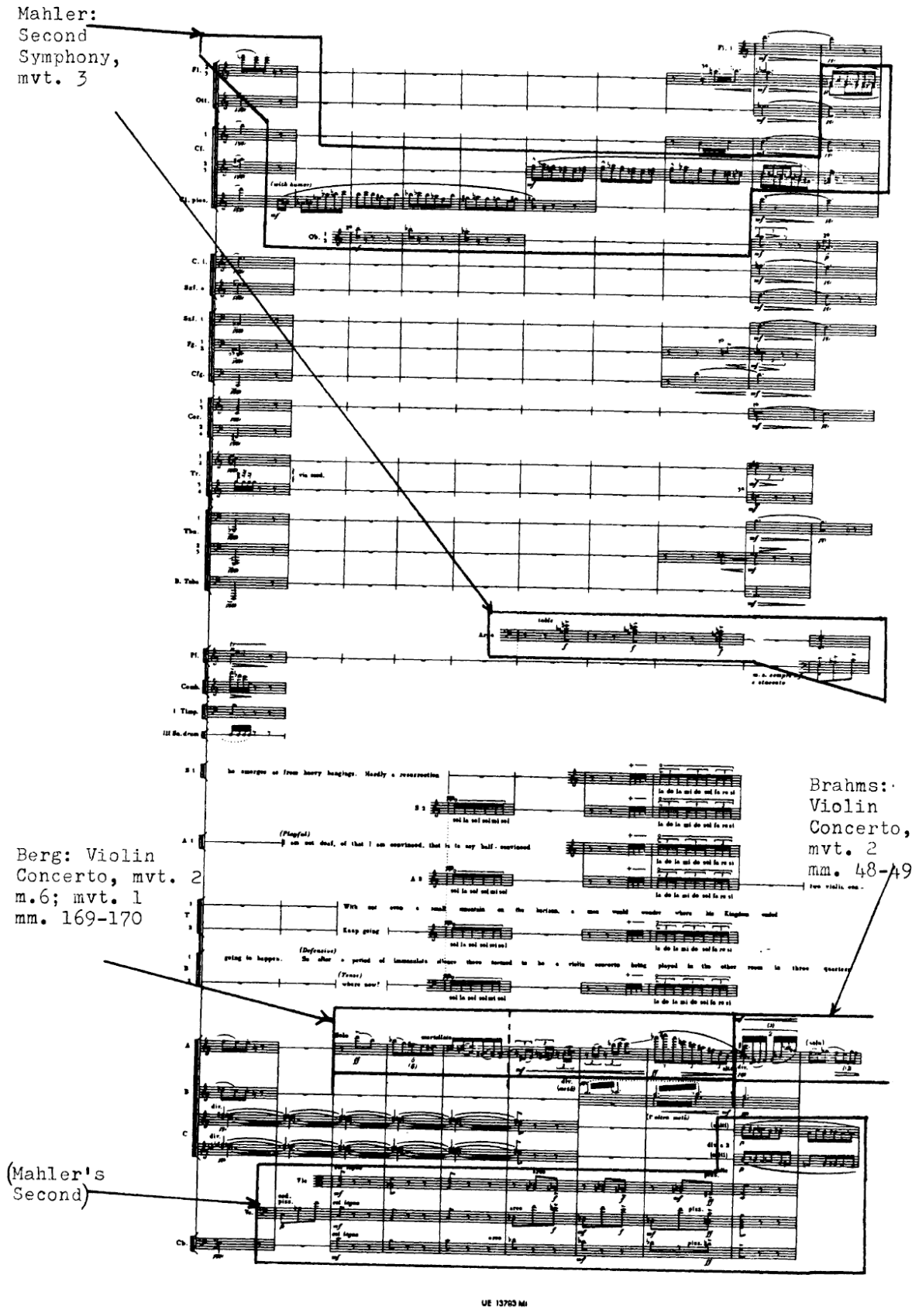

Figure 18 - Berio: Sinfonia, 3rd mvt., mm. 59-69 (Analysis by Hicks)

In his essay "Intertextuality and 'différance' in the third movement of Luciano Berio's *Sinfonia*",[400] pianist and musicologist Eduardo Plaza aims to go "[b]eyond an analysis of the composer's language and a meticulous description of the many literary and musical references" and instead discuss "the work's complex discursivity from a broader and more flexible perspective using, for example post-structuralist theories and more specifically the concept of *différance* proposed by Jacques Derrida."[401]

Plaza interrogates "the complex system of multiple meanings which the third movement of the *Sinfonia* (1968-1969) acquires when two elements with strong semantic charges are inserted into its structural base."[402] This way, he puts a particular emphasis on the layering of *inter*textual materials and meanings[403] exhibiting the connections between intratextual and extratextual memory at work in this piece.

These two elements are the text of Samuel Beckett's *The Unnamable* (1953) and Gustav Mahler's *Scherzo, In ruhig fließender Bewegung*, from his Symphony No. 2, the *Resurrection Symphony* (1888-1894). Notably, these are the only quotations that consistently meander through the entire movement.

In his analysis, Plaza differentiates between two sources of *différance*.

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[400] The original Spanish version of the essay ways previously published: "La différance y la intertextualidad en el tercer movimiento de la Sinfonia de Luciano Berio." *Musicaenclave: Revista Venezolana De Música* 5:3 (Sept-Dec 2011): 9. RILM Abstracts of Music Literature, EBSCOhost (accessed December 4th, 2014). Available online:

http://www.academia.edu/1468061/Intertextuality_and_diff%C3%A9rance_in_the_third_movement_of_Luciano_Berio_s_Sinfonia (accessed November 27th, 2014).

[401] Ibid. Within the scope of the present dissertation, the analysis will serve to emphasize the philosophical framework with regard to extratextual musical memory via musical quotations. The third movement of Berio's *Sinfonia* has been analyzed multiple times; for specific analytical examples, please refer to:

Francis Bayer, "Thèmes et citations dans le 3e mouvement de la Sinfonia de Berio," *Analyse musicale* 13 (October 1988): 69–73; Elmar Budde, "Zum dritten Satz der Sinfonia von Luciano Berio," in *Die Musik der sechziger Jahre. Zwölf Versuche*, ed. Rudolf Stephan (Mainz: Schott Musik International, 1972) 128–144;

Alfred Schnittke, "The Third Movement of Berio's Sinfonia: Stylistic Counterpoint, Thematic and Formal Unity in Context of Polystylistics, Broadening the Concept of Thematicism (1970s)," in *A Schnittke Reader*, ed. Aleksandr Vasil'evič Ivaškin, transl. John Goodliffe (Bloomington, IN: Indiana University Press, 2002), 216–224.

[402] Plaza, Eduardo. "Intertextuality and 'différance' in the third movement of Luciano Berio's Sinfonia," http://www.academia.edu/1468061/Intertextuality_and_diff%C3%A9rance_in_the_third_movement_of_Luciano_Berio_s_Sinfonia (accessed November 27th, 2014).

[403] For a thorough description of the plethora of musical and outer-musical references which can be found in the entire *Sinfonia*, see David Osmond-Smith: *Playing on words: a guide to Luciano Berio's Sinfonia* (London: Royal Musical Association, 1985).

First, *différance* arises based on the juxtaposition of intertextual meaning, most evidently between the different literal and musical materials in the *Sinfonia*, such as the two principal quotations of Beckett's text and Mahler's scherzo as well as various other references.

Plaza makes an important observation, stating that quotations are "semantically charged" – as is the nature of any borrowed, pre-existing material. The pre-formation of the material, therefore, is greatly influenced by an already-performed meaningfulness since the materials have previously been perceived by an audience and have thus left their trace in a given musical culture. With regards to the distinct semiotic qualities, Plaza refers to linguist José Ángel García Landa:

> Metalanguage [is] the motor of the prose in *The Unnamable*. It is clear that the subject matter of unnamability, of necessary alienation from the self, finds in this textual generator, in meta-language, not only an instrument of expression, but also a structural parallel and a thematic reinforcement. The reflexivity of language and the reflexivity of the conscience have, above all, the same root: the differential constitution of reality, the presence of difference within the very notion of identity.[404]

At this level of meta-language, Plaza locates the second source of *différance* constituted in Beckett's text through the friction between

> the syntactic construction of the text where the simultaneous action between what is narrated and the action of the language can be observed. […] What the text 'does' and what the text 'says' is, at the same time, opposed in essence and a product of the differing action of *différance*.[405]

Similarly, the scherzo quote reveals another inner-textual *différance* wherein particular elements are employed which had already been pre-formed, prior to the

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[404] José Ángel García Landa, "Lenguaje y différance en El Innombrable de Beckett,"

http://www.unizar.es/departamentos/filologia_inglesa/garciala/publicaciones/differance.html, as quoted in and translated by Plaza, "Intertextuality and 'différance' in the third movement of Luciano Berio's Sinfonia". http://www.academia.edu/1468061/Intertextuality_and_diff%C3%A9rance_in_the_third_movement_of_Luciano_Berio_s_Sinfonia (accessed November 27th 2014).

[405] Plaza, "Intertextuality and 'différance' in the third movement of Luciano Berio's Sinfonia." http://www.academia.edu/1468061/Intertextuality_and_diff%C3%A9rance_in_the_third_movement_of_Luciano_Berio_s_Sinfonia (accessed November 27th 2014).

composition of Mahler's second symphony. In addition to the *différance* on the level of meta-language, the scherzo becomes re-contextualized as it serves as the structural and tonal framework for other musical quotations in Berio's *Sinfonia – différance* here occurs on the structural level. Plaza explains:

> [T]he inclusion of the scherzo and its original subtitle ["In ruhig fließender Bewegung" – In a calm, flowing movement] generates a superimposition of closely related meanings. In effect, the third movement of Mahler's Symphony is inspired by the song of the *Knaben Wunderhorn* which refers to St. Anthony of Padua's sermon to the fishes. It is no coincidence that this subtitle, closely related to water, appears textually quoted in the third movement of the *Sinfonia*, since a large part of the texts chosen by Berio for the first movement belong to Brazilian myths about water, compiled in Claude Levy-Strauss' *Le cru et le cuit* (The Raw and the Cooked). Finally, the composer describes the presence of Mahler's scherzo in his *Sinfonia* as 'a river which crosses a landscape which is constantly changing, and which sometimes disappears beneath the earth to later reappear with a totally different face.'
>
> [...] The de-contextualisation of the quotes, which are unfolded throughout the third movement of the *Sinfonia*, from the inclusion of four simple chords from the [sic] Bach's first Brandenburg Concerto, to various bars from Stravinsky's *Rite of Spring*, re-conceptualise the original meaning of these 'objects' as they are inserted into a different context.
>
> […] On being inserted into a context 'other' to itself, […] at least two semantic charges co-exist simultaneously: that which belongs to the cited object and that which is produced as a result of the new context.[406]

In Berio's *Sinfonia*, intertextuality is generated through the juxtaposition of numerous materials – involving intratextual memory – whose pre-formation is informed by extratextual memory and already implies specific semantic and semiotic identities. On the basis that these identites have already existed in the form of tertiary memory, intertextuality then allows for the occurrence of *différance* between such semantic entities as they are temporally and spatially deferred within the new musical context.

With reference to the interplay between the manifold references, the composer is quoted as saying:

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[406] Ibid.

> Precisely, as the degree of perception of the text, which varies throughout the work, is integrated in its musical structure, the fact of 'not understanding clearly' must be seen as essential to the nature of the work itself... The different musical quotes are always integrated with the harmonic structure of Mahler's scherzo. They both signal and comment on the events and transformations. They therefore illustrate a harmonic process and they do not constitute a 'collage'. Furthermore, these quotes from famous musicians, as they play out over each other, are transformed and suddenly acquire a new meaning, as so happens to familiar objects or faces placed under a light or within an unusual context.[407]

Interestingly enough, Berio's treatment of "familiar objects" extends beyond the musical and literary materials borrowed from other authors.[408] His compositional concept includes the very notion of the performers on stage as well as the audience – in that sense, the aspect of participation of this movement is widened and may be regarded as another kind of musical material: it embraces members of a social group, sharing the experience of the present Now.

> [...] a large part of the text of the *Sinfonia* makes reference to the audience, the conductor and the soloists, that is, to the present time of the performance. It is this very 'étant-présent', as Derrida would call it that ends up elusive in the substitution of the sign for the thing that is represented: it is the polysemous nature of the deferral, in time and space, of the plurality of differences of meaning which are made tangible each time the work is performed.[409]

It seems reasonable now to make theoretical connections between the above observation and Simondon's and Stiegler's ideas of the pre-individual and the concept of individuation, while, in musical terms, it directly relates to Hindrichs' definition of

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[407]"Luciano Berio(1995/2003)". http://brahms.ircam.fr/index.php?id=6881, as quoted in and translated by Plaza, "Intertextuality and 'différance' in the third movement of Luciano Berio's Sinfonia." http://www.academia.edu/1468061/Intertextuality_and_diff%C3%A9rance_in_the_third_movement_of_Luciano_Berio_s_Sinfonia (accessed November 27th, 2014).

[408]As Plaza points out, musical quotations were used in various examples and were in no way a new concept at the time of the *Sinfonia*.

"Examples of musical quotes have been found in the medieval period and famous composers have used this resource to compose their works, some in a structural manner (variations on a theme), others taking advantage of semantic context (the Bach's chorale *Es ist genug* which is quoted Berg's "Concerto for violin and orchestra") and the majority use both resources (the *Dies Irae* in Berlioz's *Symphonie fantastique* which is both a melodic-structuring element and an element with extramusical semantic charge)." Ibid.

[409] Ibid.

musical material: the pre-formed musical material is in a state of *becoming*, continually determined through time by its innate molecular tendencies. This is substantiated by the fact that, according to Plaza, due to "the differential concept of 'temporization', from a Derridean point of view, the object's meaning is once again naturalised in the present and what was strange at first is replaced with a new meaning."[410]

The analysis of Berio's *Sinfonia* served to illustrate how musical quotations express a musical material, which is pre-formed semiotically because of the *literal* recall of its historiality. It is evident how musical material can thus carry with it a semiotic content that is rooted in its role as cultural memory. As such, it inevitably performs within a larger cultural context and springs from a given semiotic and aesthetic convention.

> The *Sinfonia* is inscribed within a historic context which breaks with the established modernist proposal in atonal serialism developed at the beginning of the twentieth century from the Second Viennese School.[411]

In a subversive way, the third movement of the *Sinfonia* presents the articulation of such historical consciousness: essentially, its musical form originates from the idea of performance culture; in a philosophical abstraction, one may say that the composition provides the occasion to facilitate the performance of multiple historical pieces of music and literature simultaneously. In this way, Berio's compositional method emphasizes the "drastic" aspect of the sources quoted. Again, Carolyn Abbate's remarks become relevant:

> But – and this cannot be overstressed – the decipherer's habit is ineradicable from musical hermeneutics. Neither dialectical foreplay, nor the soft caveat that, as Kramer puts it, 'meaning is not the cause of the interpretation, but its effect' or that 'what is objectively "present" in the work . . . is not a specific meaning but the availability or potentiality of meanings,' can compensate for statements wherein a specific import is indeed ascribed to some aspect of or configuration within the work, in acts of academic authority (MM, p. 118). In other words, you cannot hide the nature of the hermeneutic act, no matter how eloquent and well-meant

[410] Ibid.

[411] Ibid.

> your framing disclaimers. It is built into the very bone, into the moment when the notes are said to be something other (a 'nocturnal sun,' perhaps?). One could say it is built into the business, untranscendable, and one must decide whether to make peace with that or not.[412]

Finally, this interplay between the "drastic" and the "gnostic", which is at the core of the third movement of the *Sinfonia*, exhibits the moment of two-dimensional temporality – an intricate conceptualization of musical "synchrony of the asynchronous".[413] Correspondingly, Plaza concludes his analysis:

> [...] Berio uses the superimposition of anachronistic musical styles which co-exist in the same work and create a hybrid language opposed to preceding aesthetic proposals.[414]

Therefore, within a larger cultural and aesthetic context the intentional synchronization of asynchronous materials individuate a "hybrid language" which bears meaning, and prevents the piece to being merely a "collage piece" which gives a musical outline of history. This conclusion is also greatly substantiated by Deleuze and Guattari who comment on semiotic forces from the relevant perspective of the rhizome:

> A rhizome ceaselessly establishes connections between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles. A semiotic chain is like a tuber agglomerating very diverse acts, not only linguistic, but also perceptive, mimetic, gestural, and cognitive: there is no language in itself, nor are there any linguistic universals, only a throng of dialects, patois, slangs, and specialized languages. There is no ideal speaker-listener, any more than there is a homogeneous linguistic community. Language is, in Weinreich's words, 'an essentially heterogeneous reality.'[415]

Lastly, the above observations may be summarized in relation to cultural memory: in terms of the "connective structure", the third movement of Berio's *Sinfonia* reveals itself to be meaningful in that it fulfils the conditions of providing historical and cultural

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[412] Abbate, "Music – Drastic or Gnostic?," 527.

[413] See Bloch, *Erbschaft dieser Zeit*, 104 f.

[414] Plaza, "Intertextuality and 'différance' in the third movement of Luciano Berio's Sinfonia," http://www.academia.edu/1468061/Intertextuality_and_diff%C3%A9rance_in_the_third_movement_of_Luciano_Berio_s_Sinfonia (accessed November 27th, 2014).

contexts in addition to a participatory quality which draws on the cultural experience of the music by the performers and the audience. Because of the historical and cultural pre-formation of the materials, Berio's piece may be considered as an example of transindividuation itself, while it is conceptualized on the foundation of temporal two-dimensionality. These conditions naturally present *différance* and provide grounds for a musical *becoming*.

The *Becoming* of Molecules in the work of Helmut Lachenmann

> Lachenmann's explicit aim is the 'liberation' of perception through the rendering newly expressive of obsolete structures ('the leap to freedom by entering into the lion's den of one's own socialized, unliberated ego [*Ich*]', 'extending into the simultaneously known at the same time unknown'). This is potentially a very exciting moment in the piece.[416]

Derrida's theory of *différance* was shown to be readily applicable to musical quotations, which are employed as musical material. Primarily, such theoretical approach is relevant due to the inherent processes of re-contextualization within the musical piece. The objective of the following analysis is to exhibit similar notions in relation to musical materials that are not based on quotations but still possess historical and semiotic pre-formation. The analysis will discuss the presence of *différant* dynamics in the work of Helmut Lachenmann, and how they differ from those at work in the case of quotations. For this, the analytical approach will be extended by the theories of Deleuze and Guattari.

In his book *Music after Deleuze*, Edward Campbell applies the post-structuralist philosophies of Deleuze to musical analysis. Deleuze's "semiotic scheme" involves a theory, in which the previous concept of Saussurean "signifier-signified"-opposition is substituted by semiotic relations that are based on connections rather than oppositions ("referrals from sign to sign"). Simultaneously, in Deleuze's scheme the notion of "presentation" replaces the former concept of "representation".[417]

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[415]Deleuze, and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, 7.

[416] Heathcote, "Liberating Sounds," 183.

[417] See Campbell, *Music after Deleuze*, 133-135. Campbell situates Deleuze's semiotic thinking as a "mix of that of Charles Sanders Peirce and the linguistic theory of Louis Hjemlslev."

To Campbell, the renewal of the semiotic program appears to be particularly useful for the analysis of contemporary music as it

> maps out a continuum from 'a solid state, where molecules are not free to move about (molar or human perception)' through 'a liquid state, where the molecules move about and merge into one another', to 'a gaseous state, defined by the free movement of each molecule' […]. It should become apparent […] that this distinction of solid liquid and gaseous signs […] resonates very well with the work of a number of contemporary composers, in whose work musical material is similarly dissolved and molecularized.[418]

Based on this philosophical perspective, Campbell's musical analysis sets out to investigate "the semiotic potential of contemporary musical material […], with Deleuzian molecularity in mind and not in terms of preformed, conventional associations, operating at the level of the molar."[419]

At the end of chapter 1, Deleuze's ideas were presented in relation to musical thematicism and the employment of repetition within a piece of music. In this context, it was determined that musical form and musical material can both be conceived and conceptualized as molecular constructs. In chapter 3, it was discovered that, at this point, the notion of *virtuality* disintegrates traditional ideas of hierarchy within which musical repetition is always associated with an awareness of precedence and priority – historically and chronologically. Such hierarchical structures are denied by the essence of the rhizome.

Campbell derives his philosophical standpoint on music from Deleuzian thinking:

> The preeminent musical values from a Deleuzian perspective are not those of the same, the similar or the identical, and there is no primacy of original statement or form of a musical unit over subsequent enunciations. Multiplicity is a key principle whether this be in relation to the possibilities thrown up by compositional or improvised material, the wealth of interpretative choices open to performers or the possibilities for innovative approaches to listening. Repetition, no longer subject to identity, is given new force and musical works are understood productively in terms of the concepts of the virtual and the actual, the virtual operating at

[418] Ibid., 135.

[419] Ibid.

> multiple levels including that of the musical motive, theme, line, form, work or repertoire.[420]

While Campbell's strategy certainly offers an alternative method to examine musical meaning especially for music in which deconstructive compositional procedures are employed it is important to keep in mind that the notion of music as being rhizomatic is helpful for an analysis of material dynamics and tendencies *within* a piece of music: I would argue, however, that an analysis which aims to be historically and culturally contextual requires the recognition of historical and chronological strands connecting developmental points in musical history. Here, the rhizome cannot remain the only philosophical perspective. If so, one would fail to understand that musical material can never discard its innate historiality and indwelling semantic qualities, for music is part of and is formed by cultural memory. This is not to say that *within* a compositional work the composer cannot generate musical processes that "attempt to empty it [the existing material] of existing connotations".[421] Musical material – as per Hindrichs – is always "pre-formed", yet out of this pre-formation it gains a specific musical form, and the potential for *différance* is immediately dependent on the formal process. In presenting Deleuzian analogies in the work of Lachenmann, Campbell confirms this dualism, pointing out that

> [d]ialectical structuralism is Lachenmann's way of referring to the process whereby composition results from 'a conscious-unconscious confrontation' with musical structures which are acknowledged but also broken and remade […]. His works emerge from the confrontation between the composer's creativity and a pre-organized 'network of possibilities', and while 'each event' is 'integrated into a new structural context', it nevertheless, 'seems always to remember the older context from which it was taken' [...]. What Lachenmann describes as a dialectical process, namely, the breaking up of previous musical structures and the production of 'different, newly-created categories' […], seems very similar to Deleuze-Guattarian deterritorialization and reterritorialization.[422]

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[420] Ibid.,163.

[421] Ibid., 148.

[422] Ibid.,152. For more, see Helmut Lachenmann, "On structuralism," *Contemporary Music Review* 12, no. 1 (1995): 93-102.

Abigail Heathcote writes about the connections between Lachenmann's concept of "structure hallucination" [*Stuktur-Halluzinationen*][423] and Derrida's *différance*. She explains that "[t]his entails the radical paring down of musical structure as a means of liberating content,"[424] which reveals Lachenmann's characteristic approach to music's inherent historiality and "semantic charge".[425]

Lachenmann specifically employs this idea in his piece *Tanzsuite mit Deutschlandlied* (1979-80), composed for orchestra and string quartet. In his writings about the piece, the composer describes how he employs familiar musical objects, "dance-like forms and music-performance formulae, but also songs and, in two cases, fragments of Bach's music […]."[426] He makes connections between these memories of musical objects with particular functions such as the representation of "home, religiousness, holidays, tradition, longing for childhood."[427] This presents the individual and social function of the functional music which Lachenmann's familiar musical objects are based on. As such, these objects express a ritually cultured memory – a previous participatory quality is therefore implied – and are then taken out of their cultural context and "reterritorialized" by the composer.

> My music is fed by forms in which such memories are encapsulated. Thereby, they [the forms] are not not treated much differently than in other pieces with elements of traditional perceptions of musical material which it [the music] has always compositionally reflected as a social product and as the pre-determination of musical expression, i.e. [the music] has moved [them] into a structurally extended context and determined their expression anew.[428]

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[423] See Helmut Lachenmann, "Struktur und Musikantik," in *Musik als existentielle Erfahrung*, 155-161.

[424] Heathcote, "Liberating Sounds," 179.

[425] This notion as presented in relation to Berio's Sinfonia seems applicable to the aspect of "structure hallucination" in Lachenmann's musical thinking. See Plaza, "Intertextuality and 'diffe☩Lrance' in the third movement of Luciano Berio's Sinfonia," http://www.academia.edu/1468061/Intertextuality_and_diff%C3%A9rance_in_the_third_movement_of_Luciano_Berio_s_Sinfonia (accessed November 27th, 2014).

[426] Helmut Lachenmann, "Tanzsuite mit Deutschlandlied. Music für Orchester mit Streichquartett (1979/80)," in *Musik als existentielle Erfahrung*, 393.

[427] Ibid.

[428] Ibid.

For example, in the fifth section of the *Tanzsuite*, bars 70-83, Lachenmann employs a Siciliano rhythm as rhythmical framework. Figure 19 shows the basic structure of that distinct rhythmic pattern, figure 20 illustrates the composer's own analysis of the section.

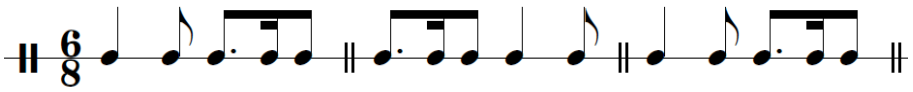

Figure 19 – Basic Structure of Siciliano Rhythm

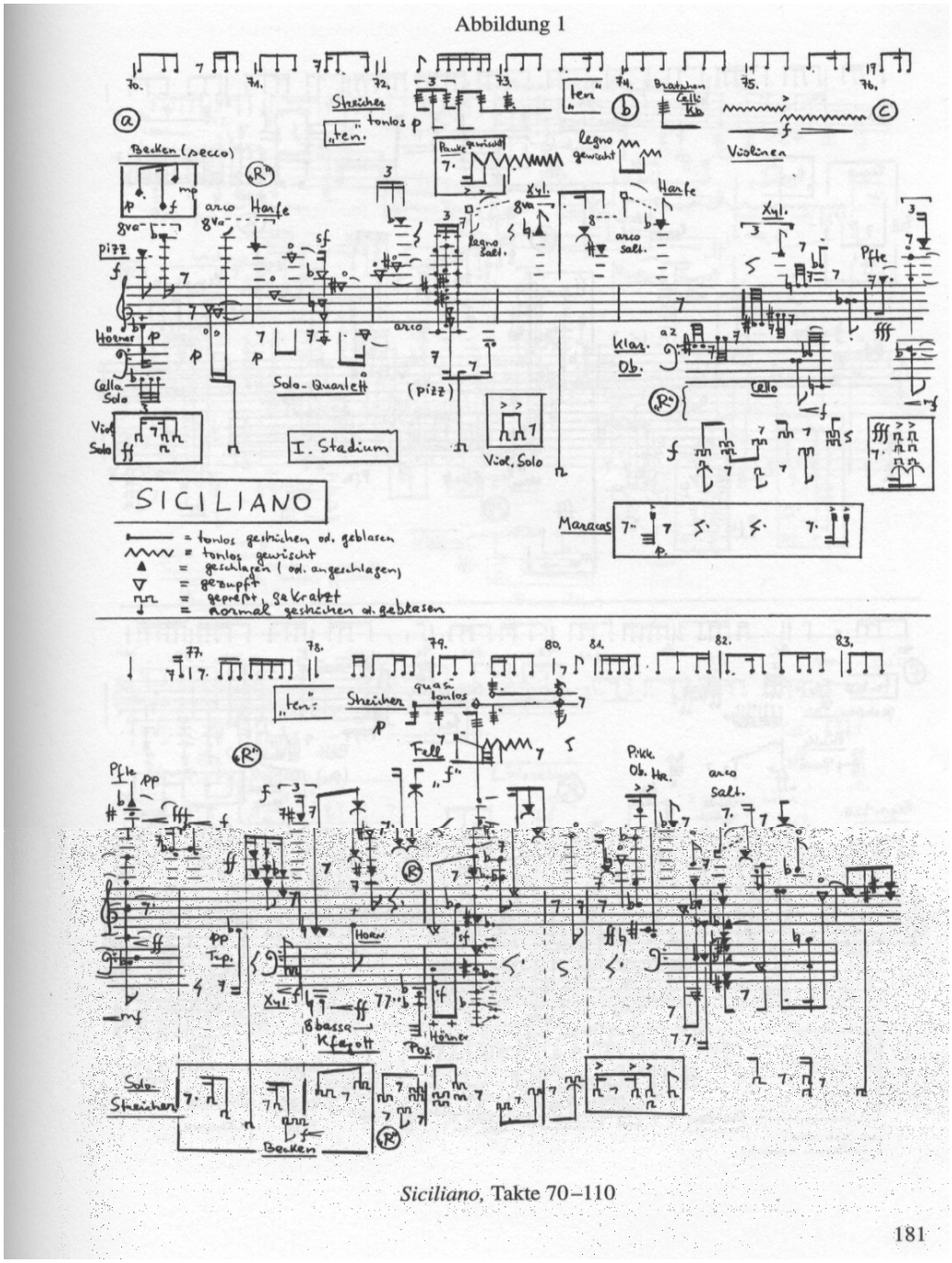

Figure 20 - Lachenmann: Analysis of Siciliano Theme in Tanzsuite mit Deutschlandlied (Reduction mm. 70-110)

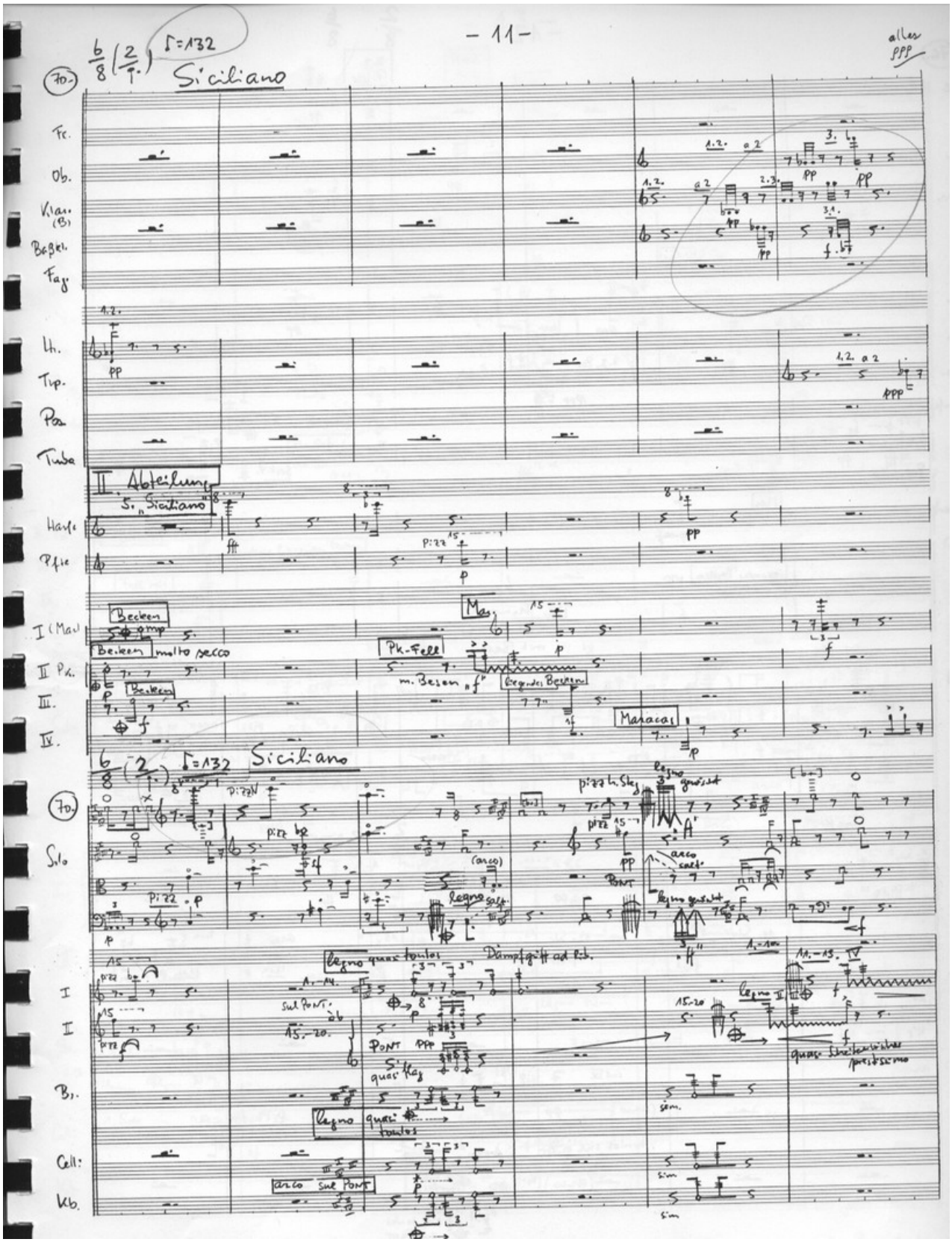

Figure 21 - Lachenmann: Tanzsuite mit Deutschlandlied (Score, mm. 70-75)

Starting at bar 117, as Heathcote's analysis demonstrates, reveals an interesting situation for the piano:

> At bar 117 the dampened minor second figure in the piano emerges from the background of the music into the foreground, with a sinister echo of the Siciliano rhythm - its hollow reduction to a metric skeleton alone. Whilst dynamics and pedaling, and the overall duration of the rhythm are clearly composed into the score by Lachenmann, the precise effect of the pedaling in this highly exposed context cannot be strictly controlled. Lachenmann takes advantage of this margin of 'chance' by instructing that the piano should be amplified in order that these subtle differences may be magnified. (Different acoustic effects will, after all, be achieved depending upon the depth of pedaling, and slight variations of attack; unavoidable given that the performer is required to repeat the material over a relatively extended period.) This passage can be understood in terms of the concept of 'liberated perception'.[429]

In terms of *différance*, this section presents a radicalisation of the performative aspect of the Siciliano rhythm and the piano. The rhythm is repeated in two different dimensions: first, in a historical sense – as it is referenced *as* a Siciliano rhythm – and secondly, within the Siciliano section in a strictly musical manner as part of the formal process. Then, in stripping the rhythmic formula off its historical musical expression, Lachenmann re-instates a new expressive quality by manipulating aspects of resonance. This is affirmed by the composer's own analysis. Heathcote translates:

> With this total narrowing down to the high piano sound a highly differentiated world of perception opens itself out afresh due to the different accentuations of the same sound and through simultaneous muting and pedaling with different levels of resonance which one cannot simply 'compose', but one has to liberate the experience first by locking out, and muting away the things that overlay it.[430]

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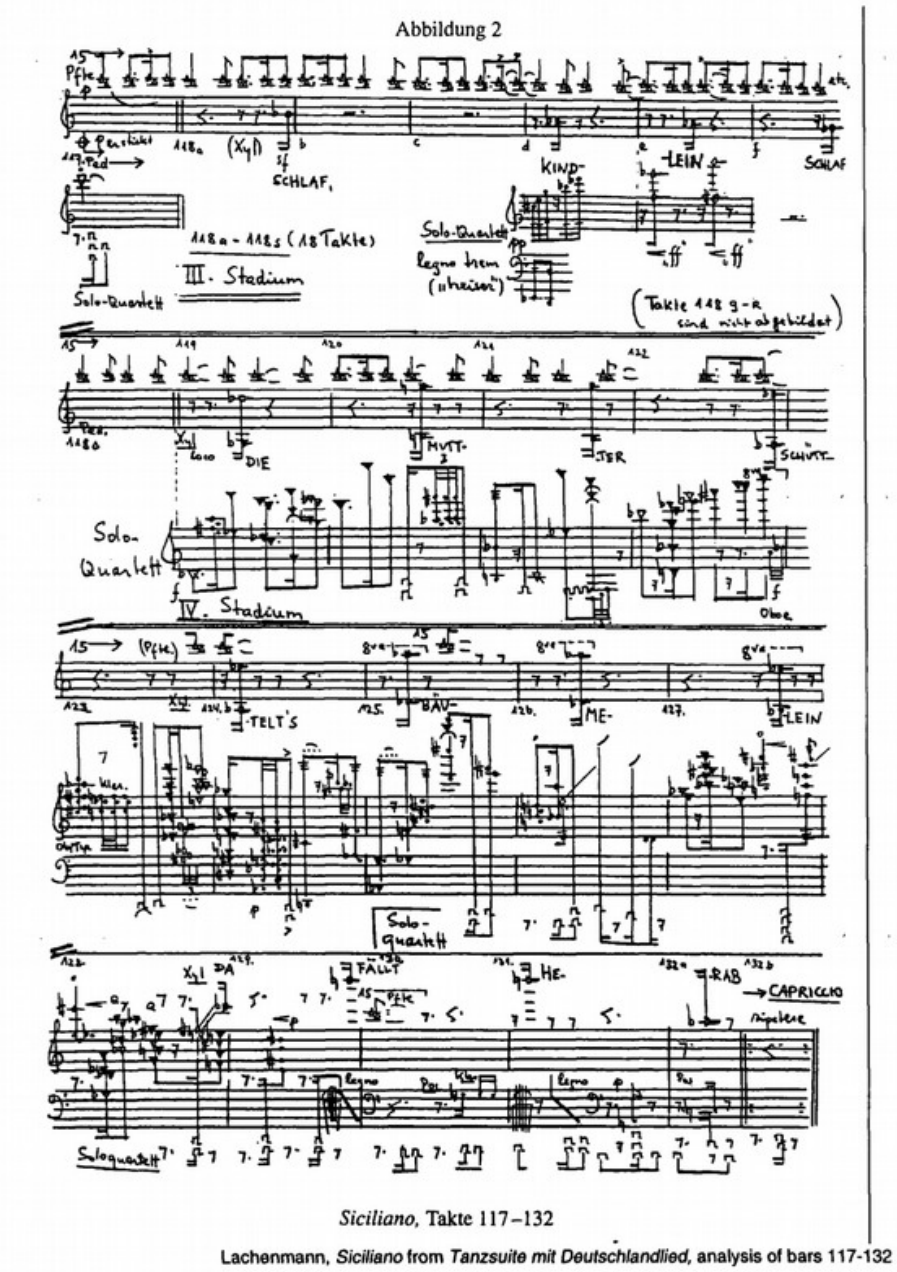
[429] Heathcote, "Liberating Sounds," 182.

[430] Helmut Lachenmann, "Hören ist wehrlos - ohne Hören," in *Musik als existentielle Erfahrung*, 134, as quoted in and translated by Heathcote, "Liberating Sounds," 183.

Ex. 34



Siciliano, Takte 117–132

Lachenmann, *Siciliano* from *Tanzsuite mit Deutschlandlied*, analysis of bars 117-132

Figure 22 – Lachenmann: Analysis of Siciliano Theme in Tanzsuite mit Deutschlandlied (Reduction, mm. 117-132)

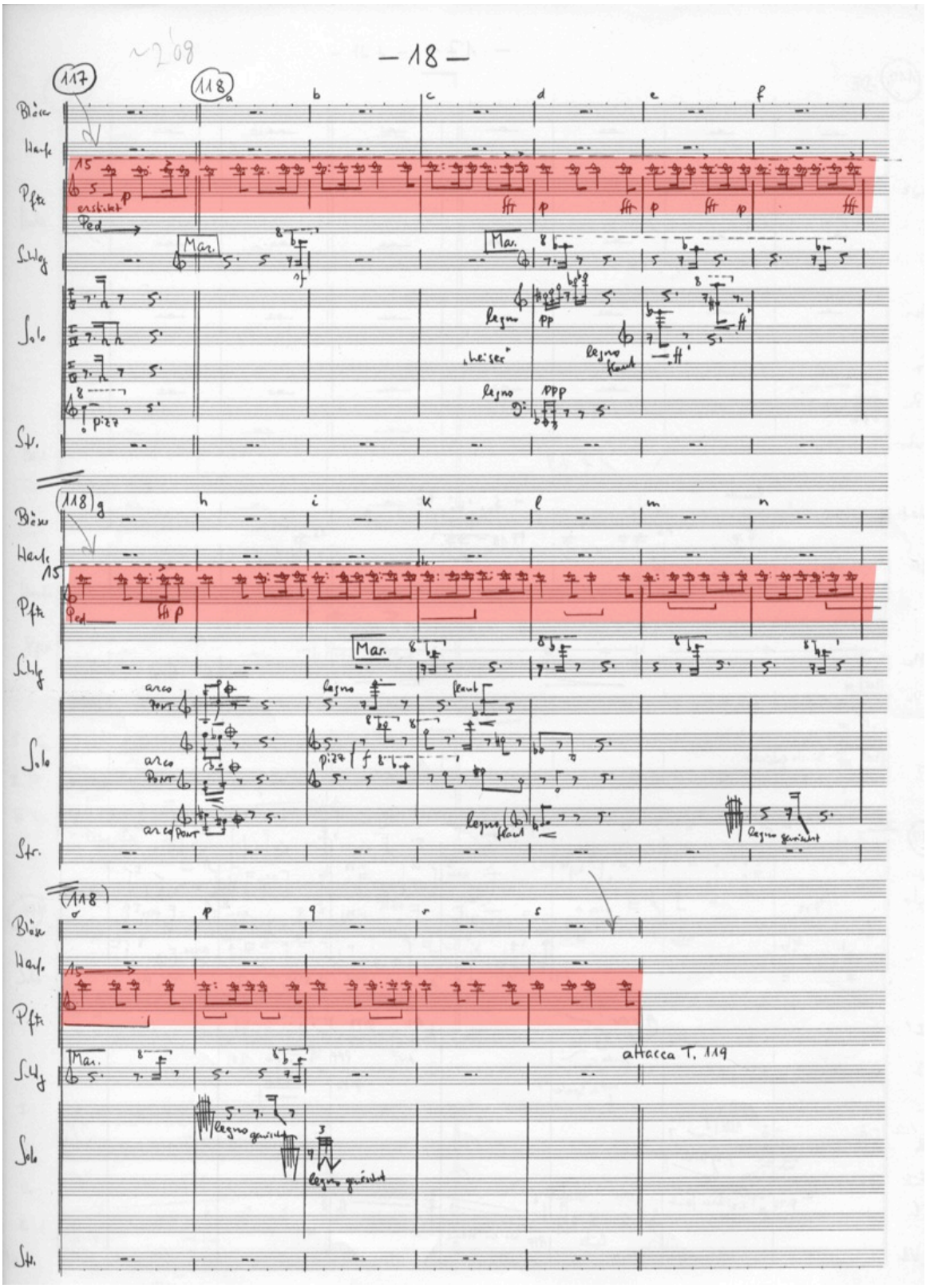


Figure 23 - Lachenmann: Tanzsuite mit Deutschlandlied (Score, mm. 117-118a)

Lachenmann's distinct approach to his material therefore not only embraces but actively engages with its historiality. This engagement is not directed at *developing* any pre-existing elements as much as it presents them within new contextual environments. This is where Campbell's broader interpretation of Deleuzian thought within musical analysis is verified, as it seems that in the Siciliano passage of Lachenmann's *Tanzsuite mit Deutschlandlied* "[m]ultiplicity is a key principle" and the material is "no longer subject to identity."[431] With reference to French musicologist and composer Pascale Criton, Campbell explains:

> [Pre-material components] are not pre-established, commonly accepted or clearly understood molar categories, but rather molecular, pre-material forces that escape from their previous placements to re-form in new heterogenous assemblages. These forces meet and enter into relations at a molecular level, below that of representational forms and in such a way that they formulate an intensive diagram composed of music's most molecular properties and components. These range from the relatively molar character of individual chords, pitch aggregates, musical gestures, single pitches, durations, timbres and attacks to the previously unattainable sub-components of sound and pitch, all of which can be connected, disconnected and transposed in multiple ways as a new diagram is traced with its functions reorganized. This means that as the forces comprising the new diagram are rearranged, new matters of expression are produced along with new compositional techniques, materials and micro-materials and the creative redeployment of already existent materials, in what Criton terms 'the overlapping of the semiotic and the material' […].[432]

This allows for an "interrelation of relations, an integration of disparate elements. It is a diagram of a process of becoming…that enables a real 'translation' to take place.'"[433] One might see the relevance of Deleuze's "semiotic scheme" – as described above – in that the "presentation" of materials in Lachenmann's *Tanzsuite* entails a multitude of "referrals from sign to sign". In this concept, processual dynamics between

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[431]See Campbell, *Music after Deleuze*, 163.

[432]Ibid., 146-147. Campbell explains the "diagram":

> "Linking Hjelmslev and Peirce, it may be said that the interface between the form of expression and the form of content presents 'a set of abstract relations between abstract points', what Deleuze and Guattari term a 'diagram'" (Campbell, 145).

[433]Ibid., 145.

materials gain overall significance and reveal a tendency of intensified *becoming*. Such outlook on the historiality of the musical material reinforces the idea of molecularity and, due to the repudiation of hierarchical and historical determination of identity the music of the *Tanzsuite* becomes rhizomatic.

It is interesting to learn that in this period of his creative output, Lachenmann's compositional choices generally involve conscious references to historical aesthetic conventions and literal figures.[434] His piece *Salut for Caudwell* (1977) for two guitarists is another example of such dialectical structuralism. In this case, the radicalisation of musical material involves the concept of speech:

> Through the reduction of the material to its lowest common denominator, and the repetition of this material, Lachenmann aims, paradoxically, to move beyond it. He seeks to break out of conventional ways of listening to it and to open perception up to its physical – rather than structural or semantic – qualities. At a specified moment in the piece, the two guitarists are required to speak aloud an extract of text by Christopher Caudwell, the dedicatee of Salut. As with the aforementioned moment in the Siciliano, time appears to tread water and the music seems to point beyond itself. The individual phonemes are so dislocated that what one perceives are not words, but the sound of each phoneme.[435]

In this next example, the text recitation involves a rhythmic setting based on irregular groups of eighths whereby the natural rhythm of speech is disrupted as is the natural flow of individual words. As a result, the voice utters musical material rather than semiotic content. For example in mm. 121, the monosyllabic word "Euch" ("your") is split up into two phonetic units of "ɔʏ" and "χ", or another monosyllabic word "Kunst" ("art") in mm. 123 is broken into three units of "kun", "s", "t͡c". Simultaneously, the

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[434]Campbell comments:

> "Even in the 1970s, when he begins to work again with elements from the Austro-Germanic tradition, manipulating associations with 'tonal gestures' from Mozart's clarinet concerto in *Accanto* (1979-80), citing elements of folk song in *Ein Kinderspiel* (1980), playing with traditional dance rhythms in the *Tanzsuite mit Deutschlandlied* (1979-80), working with the tendencies of musicians such as virtuosity or 'orchestral mannerisms (e.g. the unresolved romantic swell gesture in *Kontrakadenz*)' (1970-71), all of this is far from mere quotation and the material is transformed almost beyond recognition to the extent that, as Elke Hockings notes, 'it demands intensive deciphering' [...]" Campbell, *Music after Deleuze*, 152.

[435] Heathcote, "Liberating Sounds" 187.

predominant guitar technique used in this section involves picking the high E string very close to the bridge, so that pitches are no longer recognizable. At times, however, specific words are emphasized dynamically with sforzando accents and crescendi. By means of alternating between muted and open strings, another rhythmic layer is added. Therefore, one can observe that in this section the guitar serves the rhythmic stabilization of the text.

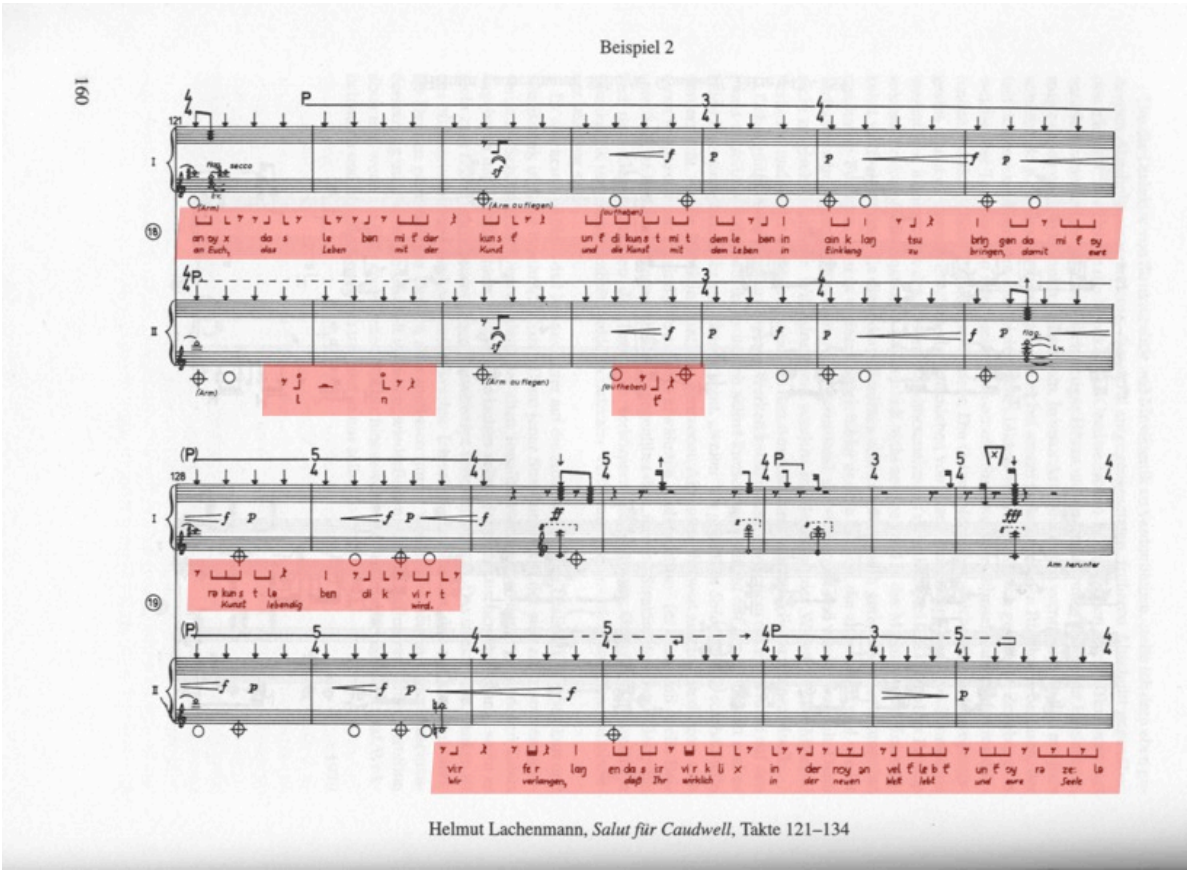

Figure 24 - Lachenmann: Salut for Caudwell (Score, mm. 121-134)

The text itself is a montage of original text taken from British writer and thinker Christopher Caudwell (1907-1937), *Bürgerliche Illusion und Wirklichkeit* (1937).[436] In

[436] The entire text in Lachenmann's piece: "Weil eure Freiheit nur in einem Teil der Gesellschaft wurzelt, ist sie unvollständig. Alles Bewußtsein wird von der Gesellschaft mit geprägt. Aber weil ihr davon nicht wißt, bildet ihr euch ein, ihr wäret frei. Diese von euch so stolz zur Schau getragene Illusion ist das Kennzeichen eurer Sklaverei. Ihr hofft das Denken vom Leben abzusondern und damit einen Teil der menschlichen Freiheit zu bewahren. Freiheit ist jedoch keine Substanz zum Aufbewahren, sondern eine im aktiven Kampf mit den konkreten Problemen des Lebens geschaffene Kraft. . . . es gibt keine neutrale Kunstwelt. Ihr müßt wählen zwischen Kunst die sich ihrer nicht bewußt und unfrei und unwahr ist, und Kunst die ihre Bedingungen kennt und ausdrückt. . . . wir werden nicht aufhören den bürgerlichen Inhalt eurer Kunst zu kritisieren. Wir stellen die einfache Forderung an Euch, das Leben mit der Kunst und die Kunst mit dem Leben in Einklang zu bringen, damit eure Kunst lebendig wird. Wir verlangen, daß Ihr wirklich in der neuen Welt lebt und eure Seele nicht in der Vergangenheit zurüchlasst. (oh Mensch gib acht) ihr seid noch

making the choice to select fragments of the text, Lachenmann did not intend to reiterate the political (Marxist) content of the text, but project its premise into his music:

> I did not intend to assimilate Caudwell's redemptive promises but rather memorialize those words, which – towards the end of an awakening script – declare what has always been at the core of composition for me.[437]

In the above section, the musical materials of voice and guitar merge via shared tempo into a unified rhythmic material. Heathcote cites Lachenmann's own analysis:

> In a kind of forward diversion I have held back all the structural complexity and given it an extremely straightforward rhythm which almost corresponds to a plain metronomic beat. It therefore acquires a simple reposeful (*gerasterte*) even tempo, in which the text almost of itself makes one aware of its phonetical structure and is drawn into the resulting musical character. The ostinato form of the even-tempoed gestures enables one to perceive for the first time the emotional life of the sound in relation to speech as an essential part of expression.[438]

In both pieces, *Tanzsuite mit Deutschlandlied* and *Salut for Caudwell* present compositional methods which focus on a continuation of *becoming* of materials which had historically been pre-formed. While the Siciliano rhythm of *Tanzsuite* is an example of primarily musical pre-formation, the deconstruction of the function of language in *Salut* presents individual units of spoken sound and thus not only empties out its semantic content – while the aspect of intelligibility remains intact – but also reaches into other outer-musical realms, scrutinizing the complex relationship between the voice, language and music.[439] Moreover, the instructions in the score demand that the players coordinate mechanized rhythms in both their instrumental and vocal performance, which additionally creates a visual layer within the entire piece. This way, both musicians act as instrumentalists, speakers and actors.

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gespalten, solange ihr es nicht lassen könnt, abgenutzte Kategorien der bürgerlichen Kunst mechanisch durcheinanderzumischen oder Kategorien andere proletarische Bereiche mechanisch zu übernehmen. Ihr müßt den schwierigen schöpferischen Weg gehen, die Gesetze und die Technik der Kunst neu gestalten, so daß sie die entstehende Welt ausdrückt und ein Teil ihrer Verwirklichung ist. Dann werden wir sagen . . ."

[437]Lachenmann, "Struktur und Musikantik," 155.

[438]Ibid., "Struktur und Musikantik," 158, as translated by Heathcote, "Liberating Sounds," 187.

[439]In having the text recited by two performers in alternation, the fragments become even more fragmented and simultaneously give rise to a kind of conversational situation.

> [...] [A] [...] perspective on Lachenmann's 'structure hallucination', [...] accurately describes the way in which stable identities are undercut from within. Of course, with the paring down of the musical material to a bare minimum and the restriction of means, such displacement is rendered all the more palpable. Structure hallucination re-enacts the slippage between sign and referent which Derrida (after Saussure) proclaims. For Derrida, meaning is endlessly deferred and disseminated. It signifies in musical terms the renunciation of the total control of the composer, an opening up to the non-identical.[440]

In the above findings, Campbell's insistence to associate Lachenmann's compositional approaches with a Deleuzian semiotic has become substantiated. To conclude, the following describes the most important points of connection:

> Both Deleuze and Lachenmann demonstrate the importance of investigating musical material at the molecular level of forces, and Lachenmann's position can be stated in Deleuzian terms as the constitution of every musical gesture by capturing and captured forces that produce the sign value of the heterogeneously assembled musical unit.[441]

By way of expressing and simultaneously subverting particular notions that have been sustained by cultural memory, Lachenmann's music is meaningful in that it directly forces the listener to perceive and understand new contexts while the musical materials themselves are in an ever-dynamic realm of two-dimensional temporality: presenting the past in a continually becoming present.

Instrumental *Différance* and Bodily Tendencies in the works of John Cage, Helmut Lachenmann and Pierlugi Billone

> The origin of knowledge resides in the body, not only intersubjective but also objective knowledge. We don't know anyone or anything until the body takes on its form, its appearance, its movement, its habitus, until the body joins in a dance with its demeanor. Thus, the corporal schema is acquired and exposed, is stored in a quick and forgetful memory, is improved and refined.[442]

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[440] Heathcote, "Liberating Sounds," 190.

[441] Campbell, *Music after Deleuze*, 153-154.

[442] Michael Serres, *Variations on the Body*, (Minneapolis: Univocal, 2011), 70-71.

As discussed in the previous chapters, it was determined that ritual-based, external carriers of memory incorporated spatial and physical realities on the basis of which symbolic meaning was repeatedly transmitted over long periods of time. Similarly, music's function as cultural memory is carried out on a performative basis and thus entails spatial and physical realities – those of venue, instrument, performer. It was discussed, how the "connective structure" was constituted by the temporal and spatial contextualization of the *who* (i.e. culture) and the *what* (a mnemotechnical prosthesis, i.e. music), and by the participatory quality of a given prosthetic supplement of cultural memory. In the case of music, it was discovered that

> the public nature of musical performance today – professionalized, ritualized, specialized though it may be – [could be regarded] as a way of bridging the gap between the social and cultural spheres […]. Performance is thus an inflected and highly determined point of convergence where the specific and the general come together, […] performance as the general, socially available form of its cultural presentation.[443]

Finally, it was said that performance required a kind of participation, which involved not only performers but also an audience at large, which eventually allowed music to function as cultural memory. Within these setups, Roland Posner's medial concepts are instructive – distinguishing between biological, physical, technological, sociological, functional, and code-related media concepts. As will be shown, the former two concepts are at the centre of musical works, which are concerned with physical, bodily aspects.

For Carolyn Abbate, the "carnal" aspect of music is represented by the live, physical performance of a composition. According to her, this is where music becomes "real" and culturally relevant, "not by insisting that musical works trace historical facts or release specific sanctioned cultural associations, but by emphasizing an engagement with music as tantamount to an engagement with the phenomenal world and its inhabitants"[444] – as she interprets Vladimir Jankélévitch. "For instance, playing or hearing music can

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[443] Said, *Musical Elaborations*, 17.

[444] Abbate, "Music – Drastic or Gnostic?," 530.

produce a state where resisting the flaw of loquaciousness represents a moral ideal, marking human subjects who have been remade in an encounter with an other."[445] With this in mind, it is necessary to investigate the function of physicality as potential musical material, i.e. to examine in what ways composers have employed "carnal" material in their music and how such implementations become meaningful via *différance*.[446]

In his essay "Siren Songs: Channels, Bodies, Noise", composer and musicologist Martin Iddon bespeaks metaphorical and semiotic concepts of noise. Noise, as Jacques Attali defines it, is "a resonance that interferes with the audition of a message in the process of emission."[447] One may deduce from Attali's definition that, in the context of music, noise is a sonic occurrence, which is not recognized as "traditional" musical sound. Bernard Stiegler clarifies: "When I hear a melody, my intention is no longer focused on the tone in the same way that, when I hear a 'noise,' it is not a pure noise but always already a noise-of-something."[448]

Here the connections between noise and physical bodies become clear, as "noise-of-something" implies the existence of a corresponding physicality. Stiegler refers to Edmund Husserl and explains that

> [t]o listen is 'phenomenally still more originary than what psychology 'initially' determines to be 'to hear,' to experience the perception of sounds. To listen also involves the mode of being of hearing that is understood as such. 'Initially,' we understand nothing of noises and complexes of sound, but we always recognize the screeching automobile or the motorbike. What we hear is the column marching, the north wind, the woodpecker pecking, the fire crackling. (Heidegger 1996 (1927), §34).[449]

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[445] Ibid.

[446] The present section will be limited to analysing compositional approaches in which acoustic characteristics of various physicalities are the main aspect of the musical piece, rather than concepts in which visual characteristics are at the centre.

[447] Attali, *Noise: the political economy of* music, trans. Brian Massumi (UK: Manchester University Press, 1985), 26, as quoted in Martin Iddon, "Siren Songs: Channels, Bodies, Noise," in *Noise, A Non-ference*, ed. Alec Hall (New York: Qubit, 2013), 62.

[448] Stiegler, *Disorientation*, 205.

[449] Ibid. Stiegler provides a complex explanation of the interrelations between time, memory, intentionality and listening as opposed to hearing. The following excerpt explains the processes behind "tone-of-

In his essay, Martin Iddon starts out by delineating how noise imparts the transmission of (musical) information, either in the form of a *reduction* or of an *addition* to the original signal, and thus affects or represents musical meaning, in a musically semantic context.[450] Accordingly, the word "noise" may be regarded as an indicator for the presence of *différance*, for noise affects a system's continuous state of *becoming* in an always differing manner.

In reference to Luigi Russolo, Jacques Attali, and Michel Serres, Iddon points out how noise is seen to typify a disruption of otherwise functional, or "healthy", systems.

> Sickness, of whatever variety, intercepts a function; it is a noise that mixes up messages in the circuits of the organism, parasiting their ordinary circulation. [...] I do not doubt that pain and complaint, anguish and screaming, are various translations of these numerous noises. [...] Sickness is a parasitic noise. And the doctor eats by translating this noise.[451]

It becomes evident then how aspects of noise may be considered as inherently impacting the communicative channels through which musical signals must proceed before being perceived. The most obvious examples of such noise may be the varying

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something" (i.e. a tone in a melody is a "note") and is useful to understand how "noise-of-something" may demonstrate a similar quality in music.

"Obviously, a poem read is not temporal in the same way as a poem heard. But if it is possible to demonstrate that all of that contributes to the constitution of every temporal object, the already-there of what is presented would thus be modified in its retentional entirety by what is presented, even though this modification would in turn alter the present's presentation, the new now as pre-ceded by the access it opens to its own already-there. This recurrence, this dynamic, is inscribed in a flux to which it is sequentially attached, and through which it attaches to other temporal objects that are already-there, in the secondary mode of no-longer- being-there, and which permit it to attach onto itself, a reference to a melody and not, as Husserl suggests, to a tone. A melody is composed of notes, and a tone can become a note only in tying itself to other tone-notes with relations similar to those by which a verse constitutes a poem.

And yet Husserl is limited to consciousness of tone—an entirely ambiguous slippage he uses to legitimize the desire to remain on the immediate aural (hyletic) level. However, a tone is still composed, not only because it remains as consciousness, but also as specter, and finally as being always already the tone 'of' something. Therefore the pure *hylēlmorphē* distinction is never possible.

And the question then, is, one of knowing how a longitudinal intentionality is possible, one that Husserl tends to apprehend in its purely hyletic intimacy, and that brings the status of consciousness (which primordially defines intentionality) back into question. Yet if tone is always tone-*of*, Husserl, effacing the complexity giving rise to this distinction of phenomena, is constrained to conceal the fact that the price of the just-having-been is to be the past-of-a-present that can take form only by separating itself from the partitions between retention, secondary memory, and image-consciousness (the *what* as a recording of the past qua tertiary memory)." See Stiegler, *Disorientation*, 204-206.

[450] For more, see Iddon, "Siren Songs: Channels, Bodies, Noise," 61-91.

[451] Michael Serres, *The Parasite.* trans. Lawrence R. Schehr (London: University of Minnesota Press, 2007) 197, as quoted in Iddon, "Siren Songs: Channels, Bodies, Noise," 69-70.

physical bodies of musical instruments, i.e. in the course of the production of a pitch on the violin the sounding pitch is always "accompanied" by the sound of noise: as a result of the friction between bow hair and string, but also as audible noises are created by the performer moving his/her body in order to produce the pitch. Iddon infers then that, as "[a] hive of disordered ordered activity, the body, even the metaphorical disembodied body, is always already noisy."[452]

Importantly, not only do the bodies of instrument and performer produce noise, but also the body of the listener:

> 'Treatment at Epidauros consisted of sleep and dreams: the patient was required to hear the sounds his sick body was emitting. He left healed if he had silenced his organs.' (Serres 2008 [1985], 106). Noise, then, in this sense, occurs when the body can hear itself. As Serres says: 'Illness comes upon me when my organs can hear each other.' (ibid., 85)[453]

Here, Posner's biological media concept is relevant: it implicitly relates to bodily organs, which are used for the production and reception of signs, i.e. the performer's and the listener's bodies.[454] Taking this into consideration within a sign system of cultural semiotics fundamentally allows for an understanding of the connections of bodies and audible noise, based on which Iddon presents three distinct ways of conceiving noise within a compositional context.

The first two concepts, he explains by the examples of the Greek fable of the Sirens, presenting the main ideas of *acceptance* and *mastering* of noise. He quotes Serres:

> Here, directly ahead, is the Sirens' pass. Ulysses enters it, but cleverly avoids it too. Once again, he becomes no-one: he slips in, immobile, lashed to a mast, in the wake of his sailors who swim through the choppy waters, their ears sealed with balls of warm wax. In myth, the monad-ship, with neither door nor opening, has already discovered Leibniz' solution. It sails past the obstacle of noise, neither transmitting nor receiving, and cancels out the Sirens. Orpheus, all ears, his lyre or cithara held before him, is more than a match for the noise. Ulysses succeeds, making it

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[452] Iddon, "Siren Songs: Channels, Bodies, Noise," 82.

[453] Ibid., 71.

[454] Posner, "Basic Tasks of Cultural Semiotics" http://faculty.georgetown.edu/irvinem/theory/Posner-basictasksofculturalsemiotics.pdf (accessed November 28th, 2014).

> through the pass in silence, but cheats by suppressing all noise, danger or temptation. Orpheus precedes him bravely, confronting the problem and resolving it with music. Orpheus transformed noise into music. And no doubt invented it too in this dangerous place.[455]

Based on a philosophical approach which suggests the *acceptance* of noise *as* music, Iddon names John Cage as a prominent figure exemplifying the Ulyssean model, and particularly his work *4'33"* (1952) as a radical demonstration of it. Iddon specifies that

> [...] Cage's outlook was certainly not a simple one based on the 'mere' acceptance of noise. It is one which requires, equally, an absolute commitment to discipline and rigour. The experience, too, is modelled in Cage's music, not least in 4'33". Cage is one of those "listeners who have written down their listening" (Szendy 2008 [2001], 6). To listen to 4'33" is, or can be, to listen to Cage listening, accepting the noise is [sic] all its messy flux.[456]

Cage's understanding of the omnipresence of noise – which, as Iddon points out, is in line with Jacques Attali's perception of noise – has led him to conceptualize noise as already-music so as to invite his audience "to treat it as meaningful", to "understand noise as meaningful sound": that the listener listens to noise with the "intention of listening to music",[457] echoing Berio's proposition and Stiegler's observation above. In fact, Cage's ideas are based on the body of the *listener* as the source of his music's noise. Cage wrote:

> There is always something to see, something to hear. In fact, try as we may to make a silence, we cannot. For certain engineering purposes, it is desirable to have as silent a situation as possible. Such a room is called an anechoic chamber, its six walls made of special material, a room without echoes. I entered one at Harvard University several years ago and heard two sounds, one high and one low. When I described them to the engineer in charge, he informed me that the high one was my nervous system in operation, the low one my blood in circulation. Until I die there

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[455] Michael Serres, *Bodies*, trans. Margaret Sankey, and Peter Cowley (London: Continuum, 2008 [1985]), 122, as quoted in Iddon, Martin "Siren Songs: Channels, Bodies, Noise", In: Hall A (eds.) Noise, A Non-ference. (New York: Qubit, 2013), 80-81.

[456] For more, see Iddon, "Siren Songs: Channels, Bodies, Noise," 61-91.

[457] Berio, *Remembering the Future*, 49.

> will be sounds. And they will continue following my death. One need not fear about the future of music.[458]

While noise is not only accepted but actually regarded as musical material itself in the Ulyssean model, the Orphic approach to noise implies a *mastering* of a perceived disturbance: noise. In this case, noise may not to be accepted but rather be controlled, as if it had to be cured from its deficiencies and made into "conventional" musical material, based on "the realisation that the noise — the rubble of the tradition — is still music, after all."[459]

Helmut Lachenmann's compositions from the early 1960s onwards are great examples for such Orphic perception of noise and delineate the development of the composer's idea of *musique concrète instrumentale*.[460] During this phase, Lachenmann was primarily engaged with exploring the physique, or anatomy, of sound, i.e. with exhibiting the very mechanic-energetic conditions which are required for the production of sound.[461]

Pression – for one cellist, is one of the most influential pieces of that period, in which the composer created a renewed musical focus on the instrument and the

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[458] Cage, John, "Experimental Music", in ibid., *Silence* (London: Marion Boyars, 1968 [1957]), 8, as quoted in Iddon, "Siren Songs: Channels, Bodies, Noise," 79.

In *Disorientation*, Stiegler discusses the aspect of listening in relation to Husserl's primary and secondary memory and in the context of the "elementary unity of a tone." This context is relevant for the consideration of noise as musical material as it presupposes that one perceives the temporality of noise in a similar way as one would perceive the temporality of a melody. For more, see Stiegler, *Disorientation*, 204-206.

[459] Iddon, "Siren Songs: Channels, Bodies, Noise," 85.

[460] Departing from the concepts of Pierre Schaeffer's and Pierre Henry's Musique Concrète, Helmut Lachenmann developed his ideas of a musique concrète instrumentale, which uses acoustic materials not from daily life, but from "instrumental potentialities". He defined it as music, "in which the sound events are chosen and organized so that the manner in which they are generated is at least as important as the resultant acoustic qualities themselves. Consequently those qualities, such as timbre, volume, etc., do not produce sounds for their own sake, but describe or denote the concrete situation: listening, you hear the conditions under which a sound- or noise-action is carried out, you hear what materials and energies are involved and what resistance is encountered." in Gene Coleman, "Musique Concrète Instrumentale: Helmut Lachenmann, in conversation with Gene Coleman." *Slought Foundation Online Content* http://www.slought.org/content/11401/ (accessed February 28th, 2013).

[461] "Perhaps comparable are the vast canvases of Anselm Kiefer (b. 1945) whose thick alluvial layers of grey-brown oil paint bury fields of scorched earth and distorted symbols of Christianity in near-abstract grotesquery, providing 'frontal engagements with the totems of German history,' or the action-driven sculptural landscapes constructed from beeswax, felt, rubber and wood by Joseph Beuys (b. 1921) that attempt to place the creative act at the forefront, relegating its material trace to a mere sign towards its original energy." Christopher Swithinbank, "Into the Lion's den: Helmut Lachenmann at 75," *Tempo 65*, no. 257 (2011): 55.

performer.[462] In the preface, the composer notes that, generally "the notation of this piece does not indicate the sounds, but the player's actions, i.e. at what place on the instrument the right hand (bowing: note-stems up) and left hand (stems point downwards) should operate. [...] In the drawings, the upper edge corresponds to the bottom of the body of the instrument; the lower edge of the drawing corresponds to the top of the body." Additionally, Lachenmann suggests that the performer play the piece by heart, so as to allow the audience to view of the violoncello and the bow. These basic prerequisites are guidelines for a musical study which

> rarely uses the conventional sound of the instrument, instead choosing to examine every other physical relationship between the player's hands, the bow, the strings and the instrument body. Sounds are linked in a highly rational fashion not by their acoustic attributes, but instead by the physical actions which cause them. Lachenmann viewed this as illuminating his perception that: 'In the case of the beautiful, professional cello tone, the relationship of action and result is – as with all sounds considered 'beautiful' in our society – particularly obscured regarding effort and resistance, whereas with the extreme pressure of the fingertips sliding along the wood of the bow the relationship is much more complicated: an almost inaudible result speaks, as it were, of a maximum effort.[463]

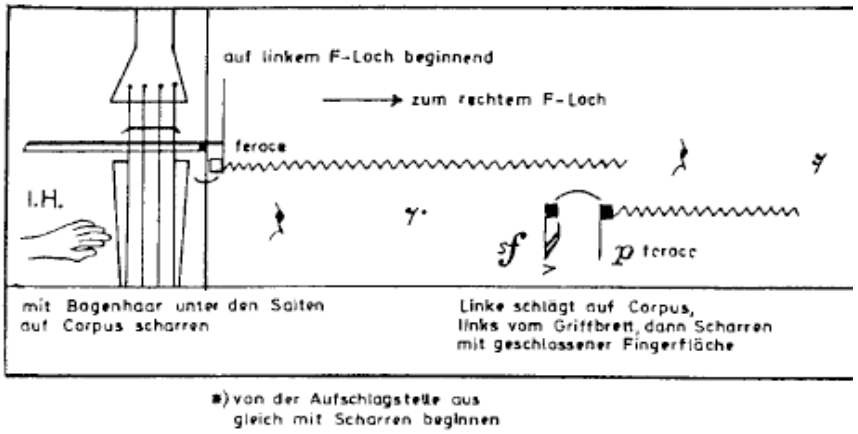

Figure 25 - Lachenmann: Pression (Score excerpt, page 6)

[462]Here, it is important to understand that the composer is re-modelling and playing with the underlying associations/preconceived notions of an historically established instrument such as the cello and a certain type/sound of music.

[463] Swithinbank, "Into the Lion's den: Helmut Lachenmann at 75," 59-60.

In *Pression*, Serres' idea of noise-as-a-sickness is present in the denial of conventionally "beautiful" cello sounds. A previously functional aesthetic system is intercepted by the exclusive production of noise. This idea does not apply to Cage's musical conceptions where noise is a "valuable desire":

> In the Orphic vein, music is preceded by noise, is born from it: Orpheus's lyre sounds to drown out the noise of the Sirens. In the Ulyssean case, noise is not mastered. Instead, Ulysses alone forces himself to experience noise as pure desirousness. One can recognise a close kinship between the Ulyssean model of experiencing noise and the Cagean one.[464]

Lachenmann's title for the piece in itself already indicates that the aspect of *pressure* (for example, bow pressure, pressure of fingering etc.) plays a central role in the piece and as such solely refers to physical features of the instrument and the performer: the composer instructs passages where left and right hand are to be operated independently, thereby separating and – somewhat freely – re-combining the activities of bowing and fingering. He transforms conventional bow movements on the bridge, tailpiece, corpus and frame, but even though the resulting sounds differ greatly from orthodox cello music, the composer does not create uncertainty by employing unconventional playing-techniques. In fact, he only uses the one technique, which has been standard for any bowed string instrument: arco-play.[465]

What is at the centre of this work then is the production and the *musicalisation* of noise via transformations of otherwise conventional means.

Martin Iddon summarizes:

> The underpinnings of Lachenmann's structural planning is, if nothing else, 'musical'. The relationships between his families of sound are, for Lachenmann, as perceptible too (for the most part) in the music of the canon as it is in 'new' music. One of the chief results of the experience of listening to Lachenmann's music is, no doubt, the realisation that the noise — the rubble of the tradition — is still music, after all.[466]

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[464] Iddon, "Siren Songs: Channels, Bodies, Noise," 81.

[465] Rainer Nonnenmann, "Das unerkannt Bekannte," *Musiktheorie* 15, no. 2 (2000): 118-119.

[466] Iddon, "Siren Songs: Channels, Bodies, Noise," 85.

Therefore, one may say that Cage's concept presents that the *Body is Music* while Lachenmann's approach demonstrates the process of the *Body becoming Music* – both notions demonstrating distinct temporal concepts of physicality within music: bodies as musical material, shaping time as static (*moment form*) and as a process of *becoming*, respectively.

As the above approaches describe noise as both poison and remedy, Iddon reminds us of Derrida's term *pharmakon*[467] – the ambiguous simultaneity of opposing opposites: in reference to bodies in connection to sound. Here, the ideas of *différance* appear to be akin to the above concepts of noise, much like Serres' description of the connections between language, noise and meaning demonstrates:

> Before making sense, language makes noise: you can have the latter without the former, but not the other way around. After noise, and with the passage of time, a sort of rhythm can develop, an almost recurring movement woven through the fabric of chance. The sea gives birth to a tidal flow, and this flow to Venus: a rhythmic current emerges from the disorderly lapping of waves, music surfaces in this place.[468]

Finally, the third possibility to conceive noise:

> [R]ather than an acceptance of noise in the Ulyssean/Cagean model, or a mastering of noise in the Orphic/Lachenmannian sense, noise might be absorbed into the body or, to be more accurate, the body immersed in noise. In Pierluigi Billone's set of pieces, all titled mani ('hands'), this is precisely what is foregrounded.[469]

Italian composer Pierluigi Billone sets out to challenge the traditional use of instruments in his musical work. By employing both unorthodox instruments and playing techniques, noisy sounds are produced. For example, in *Mani.de Leonardis* (2004) (see fig. 28) automobile springs are "played" by a performer, and in the string trio *Mani.Giacometti* (2000) the performers' hands and fingers are positioned in such a way that specific noises are produced as the score graphically indicates (see fig. 26) – as opposed to the traditional instructions of what should be done with bows and instruments.

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[467] Interestingly enough, the myth behind the *pharmakon* entails that the technic of writing is an aid for memory and simultaneously advances forgetfulness.

[468] Serres, *Bodies*, 120.

[469] Iddon, "Siren Songs: Channels, Bodies, Noise," 85.

The result is a unification of instrument and performer. In a way, one may say that Billone composes for extended instruments. In his music, however, noise is neither an accepted "state" of sonic being, nor is it mastered and corrected in order to be more musical; as Iddon points out, "it is not to exhaustion, nor to overcoming." Instead, it is suggested that

> [n]oise, not music, is here the channel, between the body and the sound. Yet, too, the body is the channel, between noise and music. Both echo and reverberate. In this way, Billone effects a reversal of sorts. Where, for Serres (and certainly not only Serres), '[t]he introduction of a parasite in a system is equivalent to the introduction of a noise. [...] The message is surrounded by nonsense, pure noise, disorder; the system crumbles and everything dies', in the case of the noise that comes about through the interaction between hands and instrument, the case is closer to that experience of eternal return which Nancy suggests is hidden, waiting to be revealed, in all musical experience.[470]

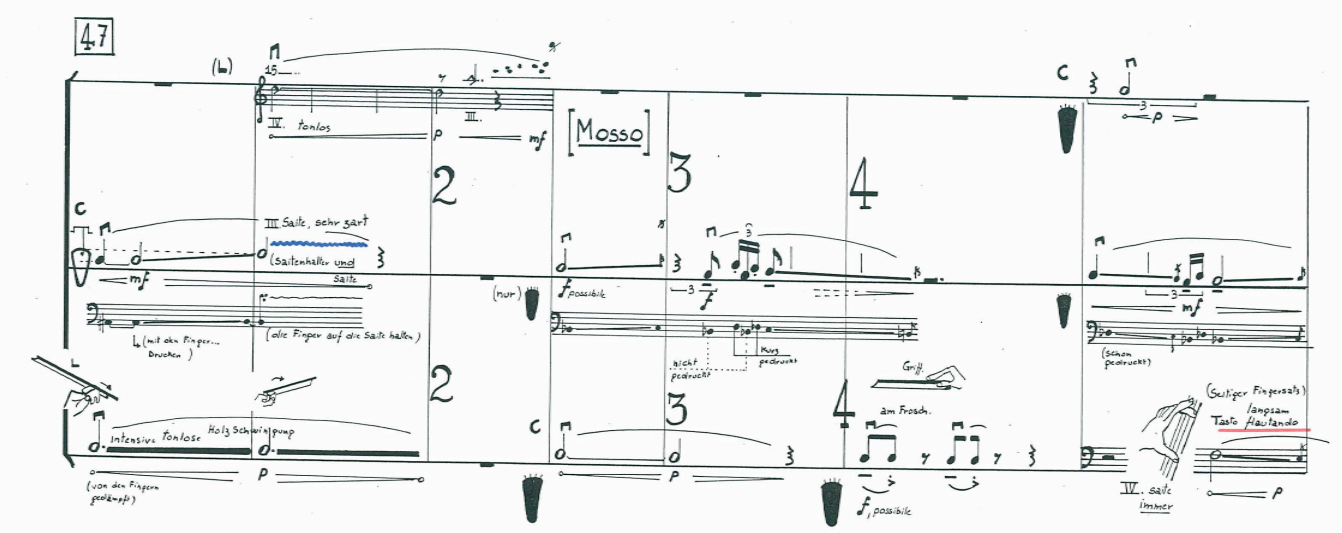

Figure 26 - Billone: Mani.Giacometti (Score excerpt, mm. 47-53)

[470] Iddon, "Siren Songs: Channels, Bodies, Noise," 86.

The referenced text by Jean-Luc Nancy reads as follows: "[I]t is the element of a formative repeat [*renvoi constitutive*], a resonance or a reverberation, a return to itself by which alone the 'self' in question can take place. To feel is always also to feel oneself feel [*se sentir sentir*], but the subject who feels 'himself' thus does not exist or is 'himself' only in this [p. x] feeling, through it and even actually as it. There is no subject that is not a sentient subject. No feeling — no sensation, emotion, or sense in any sense of the word — that does not on its own form the recursion or loop by which a subject takes place. 'Self' is never anything but to self, in self or for self: it is never anything but a return, a remainder, a relationship, a transfer, and at the bottom of all this reversion an original, genuine repetition, by which the to self occurs. (Nancy 2008 [2001], ix–x)." Ibid.

As a result, Billone's audience is challenged in their historically and socially conditioned perception of a separated instrument-performer-setup and this perception is instead caused to shift, determining space somehow in between unification and segregation. In this way, temporal perception is influenced by a constant state of flux, and *différance* is permanently present as the sounding bodies are redefined continuously throughout the pieces.

In these pieces, the ideas of difference and memory are of particular importance. Billone writes:

> In my work, I have long tended towards such an approach of listening to the particularity and the differences; I am looking for possible points of contact and connections between dimensions that nonetheless retain their autonomy. With the help of this vigilance (and an almost archeological sensitivity) I enter instrumental spaces yet unknown to me. Here, any detail can constitute an illuminating difference, a remarkable connection, the foundation for a construction, the identification of an earlier experience, a missing piece of a puzzle, a notable particularity, or an unrepeatable state that crosses the boundaries of notation; in this sense none of its aspects are unimportant.[471]

His piece *Mani.Mono* (2007) for solo spring drum highlights this idea: the spring drum is taken out of its topical association as a typical instrument for children and is put into a ritualized concert setting. Billone also devises playing techniques, which call for the employment of the percussionist's body going beyond traditional requirements. Such techniques include actions using both voice and chest – closed fist on the chest while singing, or hitting the chest with an open palm (see fig. 27).

[471]Pierluigi Billone, "1+1=1". http://www.pierluigibillone.com/en/texts/1plus1equals1.html (accessed December 10th, 2014).

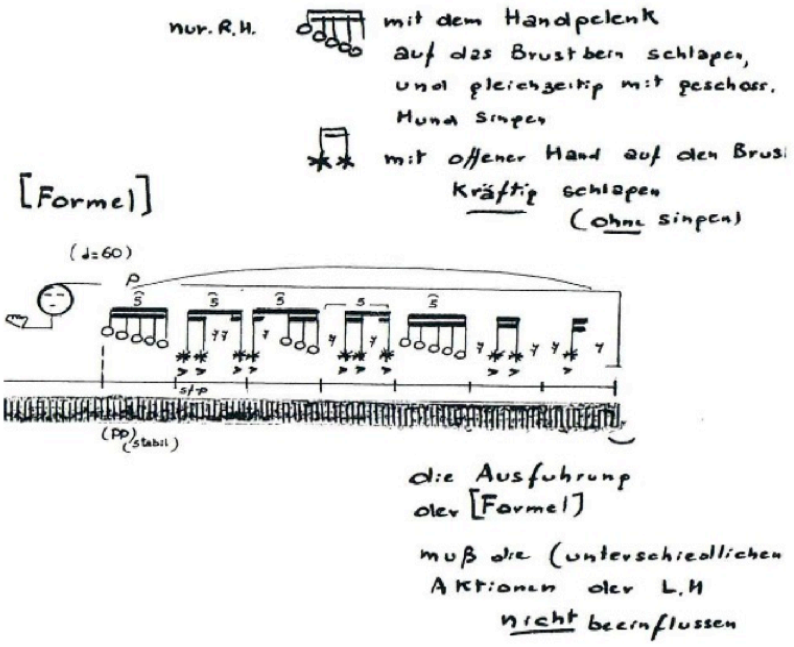

Figure 27 - Billone: Mani.Mono (Score excerpt, page 1)

Percussionist Tom de Cock points out Billone's preoccupation with extending the traditional instrumental body by incorporating the performer's physique:

> From the smallest gesture a whole universe is generated, from the slightest contact between different substances (instrument-plate-skin-hands-bones-voice) a chance to make vibrate cavities that are ready to receive and reflect the sound. In each of the three pieces for percussion, the performer takes a leading role becoming a resonating instrument himself. His chest resonates when hit by the fist (*Mani.Mono*, *Mani.De Leonardis*), or through the gong hanging over it (*Mani. Matta*). Sometimes it is the hand that becomes resonant instrument and medium of the vibrations propagating from the suspensions to the player's whole body (*Mani.De Leonardis*). A distinctive feature of Billone's music is the exceptional creative energy able to multiply the sound source. From singular (one instrument) it becomes plural, when it meets with the player's resonant body and his principal and vital instruments, without which he couldn't live or communicate – that is, hands and mouth.[472]

[472] Tom de Cock, "Mani.Mono. Program Notes."
http://www.pierluigibillone.com/en/texts/mani_mono_tom_de_cock.html (accessed February 15th, 2013).

As mentioned above, Billone's piece *Mani.De Leonardis* (2004) for four automobile springs and glass is another example where noise channels sound and music, between the body and the sound: referring to Federico De Leonardis – Breve storia della mano (short story of the hand), Billone states that he does more than pay tribute to this visual artist in that the piece "becomes a friendly (and mutual) provocation, and not just an homage."[473] *De Leonardis* presents a work based on the limited role and use of his hands. Furthermore, the composer explains how a body gradually becomes part of an instrument through rhythm, as the caused oscillation of the instrument starts to pervade the barrier between itself and the body. Thus, Billone states, one plays (sto suonando), but more than that, one also resonates (sto risuonando), thereby one plays *on* oneself. As a result the body functions as a second sound source, embodying a rhythmic intertwining of body and instrument, which is the focus of this piece, while the interesting dialectic is between the instrument´s innate rhythmicality and the rhythms initiated by the performer – without them being in opposition.

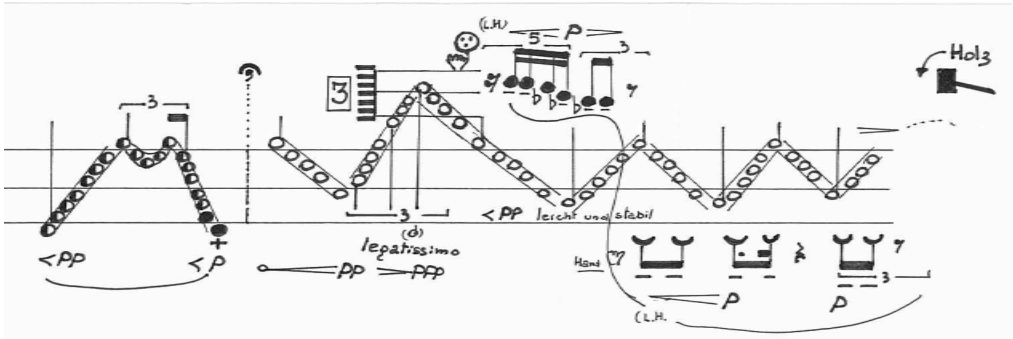

Figure 28 - Billone: Mani.De Leonardis (Score excerpt, page 1)

As pointed out by Iddon, Billone writes about the piece:

> The hand that holds the auto spring extends the impulse in the body that initiated it. When I muffle and let go, there is a moment in which the energy of the vibration is present both in the spring and in my arm, and this energy, which comes from the right hand, runs through the spring, continues in the left hand, and becomes a flow that leads to the next beat. It is a closed circuit of energy, so to speak. After several beats I vibrate with the spring and have

[473] Pierluigi Billone, "Mani.De Leonardis". http://www.pierluigibillone.com/en/texts/mani_de_leonardis.html (accessed December 10th, 2014).

> become part of the instrument. I am playing, but it is not all: I am also sounding, and in fact I am playing on my own body.[474]

It is possible to make connections between Billone's *mani*-pieces and the physical media concept proposed by Posner. This concept relates to such acoustic media, which are capable of producing an acoustic signal "to serve as a physical connection between the sign and the recipient."[475] On the basis of such physical connections, it seems, Billone challenges conventional perceptions of physical realities within *musical performance* in two ways.

First, the composer blurs the boundaries between the *performer-instrument* connection. In the pieces described, performer-body and instrument-body seem to merge into one, so that the performers themselves become part of their instruments. Simultaneously, there are moments of heightened concentration on the performers' body – such as fingers, hand or mouth – which may result in a perceived isolation of the particular body parts from the rest of the performer.

Secondly, in *Mani.De Leonardis* Billone employs untraditional materials as musical instruments within a concert setting: here, automobile springs take up a musical space as objects that culturally have not been associated with musical instruments, they are objects with distinct cultural meanings and functions that have not been musical. Therefore, *Mani.Mono* and *Mani.De Leonardis* both offer new sets of ontological significance for the given objects in that culture, as they are now used as instruments. This effect is enhanced by the fact that the new instruments are presented in solo pieces.[476]

As Husserl's earlier comment states, a listener "understands" and "recognizes" the noises as noise-of-something, thus making meaningful associations between noise

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[474] Ibid., as quoted in Iddon, "Siren Songs: Channels, Bodies, Noise," 85-86. It is interesting to note that, beyond showcasing the extension of the traditional employment of a percussionist's body, the piece also offers an ontological investigation of conventionally extra-musical material such as automobile springs and glass. Billone re-contextualizes mechanical devices of motorized vehicles in several ways by not only taking them out of its functional space inside the car and relocating them on stage, but also by redefining its functionality, now as a musical instrument.

[475] Posner, "Basic Tasks of Cultural Semiotics," http://faculty.georgetown.edu/irvinem/theory/Posner-basictasksofculturalsemiotics.pdf (accessed November 28th, 2014).

[476] It is also noteworty that in *Mani.De Leonardis* Billone choses parts of a car which are not visible, as they are *inside* the car. Thus, the composer makes musically visible an object, which is not immediately – and possibly not to everyone – recognizable.

and physical materiality. It might be useful to consider that, on these grounds, Billone's compositional approaches sustain a mutual interaction between instrument and body, between "music" and "noise" and furthermore eliminates any hierarchical notion of the ideas that "instrument" and "musical sound" may have primacy over "performer" and "noise". In this sense, Billone's carnal material engages directly with the historiality of music performance itself and therein presents a rhizomatic molecularity.

While it was earlier suggested that Cage's approach may be seen as *Body is Music* and Lachenmann's as *Body becoming Music*, it seems appropriate to regard Billone's physical material to epitomize a *Musical Body without Organs* – based on Deleuze's (and later Guattari's) image of the *Body without Organs*. The analogy between his concept and Billone's ideas becomes more evident when considering the early definition of the *BwO* image in *Anti-Oedipus*:

> The body without organs is an egg: it is crisscrossed with axes and thresholds, with latitudes and longitudes and geodesic lines, traversed by gradients marking the transitions and the becomings, the destinations of the subject developing along these particular vectors.[477]

Such rhizomatic lines seem to constitute the constantly redefined relationships between the instruments and the performer and between the music and the sound in Billone's pieces. In later writings, found in *A Thousand Plateaus*, the authors propose what a "healthy" *Body without Organs* should entail:

> This is how it should be done. Lodge yourself on a stratum, experiment with the opportunities it offers, find an advantageous place on it, find potential movements of deterritorialization, possible lines of flight, experience them, produce flow conjunctions here and there, try out continua of intensities segment by segment, have a small plot of new land at all times. It is through a meticulous relation with the strata that one succeeds in freeing lines of flight, causing conjugated flows to pass and escape and bringing forth continuous intensities for a BwO.[478]

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[477] Gilles Deleuze, and Félix Guattari, *Anti-Œdipus*, trans. Robert Hurley, Mark Seem and Helen R. Lane. (London and New York: Continuum, 2004),19.

[478] Deleuze, and Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, 161.

With regards to the musical activity itself, it is important to understand that Billone's music – particularly the *mani*-series – is specifically composed *for* a specific instrument, or rather for a particular body. For Billone's decision to venture into unknown spheres of instrumentality and the musical choices he makes, the following statement by Attali is relevant:

> In music, the instrument often predates the expression it authorizes, which explains why a new invention has the nature of noise; a 'realized theory' (Lyotard), it contributes, through the possibilities it offers, to the birth of a new music, a renewed syntax. It makes possible a new system of combination, creating an open field for a whole new exploration of the possible expressions of musical usage. Thus Beethoven's Sonata no. 106, the first piece written for the piano, would have been unthinkable on any other instrument. Likewise, the work of Jimmy Hendrix is meaningless without the electric guitar, the use of which he perfected.[479]

This relates back to Hindrichs' theories about musical material, the compositional labour, which it is determined by, and the tendencies that come with it (see Chapter 3, *Musical Material*). Therefore, it seems reasonable to maintain that Billone's musical material is fundamentally rooted in its performance-based physicality and that of the instruments and performers involved.

Importantly, all these pieces challenge our perception of performance as a historically physical, "carnal" presentation of music. Because of the heightened concentration on this musical physicality, music becomes radically contextualized within its culture and vice versa, particularly as these pieces have been performed since the latter half of the twentieth century: as Western (and to an extent global) culture has been entering a more and more bodiless culture since the advent of modern technology, the aspect of bodies is becoming increasingly more important.

In such a situation, physical *différance* underlies the various musical topoi for different composers and directly influences the formation of musical meaning – as has been demonstrated in the above examples. In unique ways, the pieces discussed are investigations of relations that constitute Posner's biological and physical media concepts.

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[479] Attali, *Noise: The Political Economy of Music*, 35.

In the next chapter, it will be discussed how the relationships between composer, performer, instruments, audience and musical material in general are affected as the "connective structure" within music has radically changed. With modern technology, further medial concepts become relevant in order to understand the changed dynamics of musical cultural memory. These are the technological media concept, the sociological media concept, the functional media concept, and code-based media concept, as proposed by Posner.

Chapter 5: Externalized Memory 2.0: New Perceptions of Memory in the Context of Digital Media

In the first volume of the series *Technics and Time*, Bernhard Stiegler succinctly points out one of his main concerns about what becomes the central point of discussion in the second volume – the technologies of *industrialized memory*:

> [...] [W]e will develop the notions of *analogical* and *numerical synthesis*, which dominate contemporary technology, oriented, inversely, by an asymptotic tendency toward real, live temporality, temporality without detour, that is, toward a *particular atemporality* – one that does not exclude the work of différance but conceals it in an essential manner. In tracing these distinctions our project of apprehending temporal synthesis – that is, synthesis as such – in terms of *tekhnē qua* synthesis becomes more sharply delineated.[480]

According to Stiegler, mechanical and electronic technologies (as technics of the analogical and numerical synthesis of memory) outline a kind of temporality, which demonstrates an "asymptotic tendency". This new temporality therefore deviates from the type of temporality that exists in connection with the pre-industrial technics of memory synthesis *(*such as ritual and written text):

In the previous chapters, such pre-industrial technics were discussed: oral tradition and written text represent the first two eras of the history of grammatization as was proposed by André Leroi-Gourhan.[481] In reference to the analytical work of Stiegler, it has been discovered that pre-industrial technics are carriers of cultural memory in which a contextualization of time and space is provided; here, the relationship between culture and technology (the *who* and the *what*) allows for the occurrence of *différance* in an unconcealed way. However, the latter two eras of Leroi-Gourhan's history of grammatization have caused a radical change in this relationship: since the middle of the nineteenth century, the two eras have introduced both analogical and numerical syntheses of memory, facilitating the transmission of memory by means of "mechano-graphics" and "electronic seriation",[482] respectively.

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[480] Stiegler, *The Fault of Epimetheus*, 230.

[481] Leroi-Gourhan, *Le mémoire et les rythmes*, 65.

[482] Ibid.

The present chapter will serve to explain how, since the nineteenth century, the developments of analogical and numerical *orthotheses* have generated: 1) an *industrialization of memory* based on 2) the introduction of technologies as devices of *telecommunication.* It will be shown that analogical and particularly numerical technics have implications for musical culture as 3) the social and temporal dimensions within cultural memory (the "connective structure") and 4) the concept of *repetition* have been altered by the new technologies.

In the following pages, the changes of musical culture within the context of industrialized cultural memory will be investigated: first, the development of mechanical and electronic technologies since the middle of the nineteenth century will be briefly outlined. Next, the politics behind the industrialization of memory will be discussed, followed by an extended investigation into how digital technologies of "real-time synthesis"[483] lead to transformed "ruptures in life"[484] and how this affects musical culture. The present chapter will conclude with a discussion of the aspect of *un-forgetting* in digital media within the context of canonicity.

The findings of this chapter will serve as the theoretical foundation of the sixth chapter, in which various pieces of electronic music will be examined in relation to digital memory as the extension of primary, secondary and tertiary memory.

Processes of Tele-Externalization: Technics of Industrialized Memory

The last two eras of Leroi-Gourhan's history of grammatization comprise the development of mechanical, electronic, and digitized automatization. In the historical context of the second Industrial Revolution, Stiegler explains:

> The actual genesis of différant analogic and numeric identities took place in the nineteenth century, when it became obvious that the paramount issue facing society was mastery of information through the conquest of speed.[485]

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[483] See Stiegler, *Disorientation*, 100, 103.

[484] Ibid., 4.

[485] Ibid., 97.

Since their early developmental stages, the new technologies of the nineteenth and twentieth century have presented a double-edged sword: the need for an increase of speed and quantity of transmitted information could be satisfied with the development of new technologies such as the telegraph in the 1830s and the gramophone and telephone only about half a century later. As will become clear throughout the present chapter, however, the mastery of speed and other structural and physical limitations – while serving capitalist demands rather than cultural necessities – has entailed a "veritable conflagration" of time and space.[486]

The new technologies of the nineteenth century signified the fast emergence of *informatics*[487] which reveal a radically different relationship to humanity and culture than did previous technics of oral and written transmission of memory: with mechanically, and later electronically, automatized processes of engraving, transmitting and decoding information, aspects of human control and physical exchange began to become dispensable. Fundamental relationships between the *what* and the *who* started to alter: the social aspect of informatics "comes into existence, in real time, from the moment that information is disseminated, penetrates all layers of a society, and fuses together numeric and analogic techniques."[488]

In 1978, Simon Nora and Alain Minc wrote a report, *L'informatisation de la Societe (La Documentation Francaise)*, for former French president Valéry Giscard d'Estaing providing an assessment of the wider societal impact of digital technologies.[489]

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[486] By the example of the photo camera, Stiegler explains: "Like the photo camera, all analogic and numeric devices are based on a mechanics – or an electronics – of clocklike precision: a mechanical technicity of the *what* – that captures the event's image in flight and instantaneously solidifies it; the result is the unending production of temporal objects and the veritable conflagration of time, the quotidian being produced by the generalized performativity of quotidians of all sorts." Ibid. 122. See also pages 123-124.

[487] Stiegler explains: "The word *informatique* ['informatics': i.e., data processing, computing] was first coined in 1962 by Philippe Dreyfus, who combined the concepts of information and the automatic. And yet we should not be satisfied with this original definition; it now needs to be expanded, as inspired by Maurice Daumas, for whom *informatics* 'designates the handling, and eventually the transmission, of input peripherals to output peripherals in any computer, of information through technical means.' […] For Daumas, the link between information and electricity is essential, and takes in informatics' historical, technical, military, and commercial dimensions. The concept of information, as we use it today, was formed in the nineteenth century along with the electronic communications network." Stiegler, *Disorientation*, 101-102.

[488] Ibid., 103.

[489] The report was later translated and published as *The Computerization of Society*. Nora, Simon, Minc, Alain. *The Computerization of Society.* (Cambridge, Mass.: MIT Press, 1980).

In the report, the authors coin the term *telematics* to describe the integration of the social into the industrial production of computer-based informatics. Bernard Stiegler uses the term in reference to his more general ideas of "networks"[490] emphasizing that the "conjoint development of telecommunications and informatics networks is essential to informatization."[491] In Stiegler's view, this results in a wide variety of cultural conflicts, some of which have direct consequences for musical culture and will be discussed in the present chapter.

In the following, a brief historical outline shall introduce the main developments of those analogical and numerical technologies that have led to equivalent innovations in the musical realm and as such have directly impacted musical culture.

Mechano-Graphics and Electronic Serialization: analogic and numeric devices

The era of mechano-graphics introduced technologies of machinized processes for the writing, copying, or recording of information,[492] which has led to considerable changes to the material and cultural levels of externalized memory. For example, the arrival of the printing press:

> [N]ot only is the reader brought into the presence of an enormous collective memory whose contents cannot be fixed, but it is frequently utilized in new writings. It thus contributes to the progressive exteriorization of individual memory; it is through the exterior that the work of written orientation takes place.[493]

The appearance of printing allowed for the mass distribution of printed texts, which necessarily entailed that printed "contents [could not] be fixed."[494] Therefore, printing introduced a mode of static reproduction, which started to replace a dynamic "transmission qua differing repetition,"[495] thereby compromising the aspect of *différance*

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[490] "Access to network-vectors of industrial memory relies on the existence of means of input and output, also called interfaces or terminals." Stiegler, *Disorientation*, 114.

[491] Ibid., 104.

[492] See "Mechanographic" http://www.webster-dictionary.net/definition/Mechanographic (accessed January 10th, 2015).

[493] Leroi-Gourhan, *Le mémoire et les rythmes*, 65.

[494] Stiegler, *Disorientation*, 81.

[495] Ibid.

within the medium of printed text. Simultaneously, as Leroi-Gourhan poignantly observes, with the arrival of printing, cultural memory is constituted by the mass-reproduction of individual memory rather than of collective memory. Such emphasis on the individual, as will be discussed, would only prove to be enhanced with digital technologies and develop a potential realm for what Adorno calls *pseudo-individualization*.[496] At the same time, printing presses began to increase the audience of authors whose work so far had only been circulated within a geographically limited community: today one may speak of a *global audience* of text, or any other content, that is accessible on the internet.

> The European eighteenth century marked the end of the ancient world in writing as well as in technology. [...] Social memory absorbed through books in the course of several decades, all of Antiquity, the history of great peoples, the geography and ethnography of a world that had become definitively round; philosophy, law, the sciences, the arts, technology and literature translated into twenty different languages. The flood goes on developing with us but, in all fairness, no moment in human history had known an expansion as rapid as that of collective memory.[497]

Importantly, printed text still had to be physically transported in order to reach its recipient. The invention of the electrical telegraph in 1832 by Pavel Schilling allowed for automatized, fast transmission over long distances. With the invention of the telephone in 1876 by Alexander Graham Bell, a sonic message could be transmitted "live" at a great distance. However, tele-transmitted messages could not yet be recorded and stored. In 1877, Thomas Edison introduced the phonograph, which was the first mechanical device to record and reproduce sound. With this invention, the end of the nineteenth century saw a technological innovation which changed musical culture in an unprecedented way:

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[496] Theodor W. Adorno "On Popular Music," in *Essays on music: Theodor W.* Adorno, ed. Richard Leppert, trans. Susan H. Gillespie (Berkeley: University of California Press, 2002), 445.

[497] Leroi-Gourhan, *Le mémoire et les rythmes*, 65. While some of these aspects were already discussed with regards to score printing in chapter three, it is important to note that Stiegler assesses the invention of printing presses as a fundamental disruption in the history of grammatization: "The advent of printing is thus a major transformation of the orthographic epoch of the already-there, clearly showing that it must be differentiated from other periods. One could, moreover, relate this specific event in the history of humans and writing (*de l'être et de la lettre*), the appearance of printing, to the birth of modern philosophy, as analysts of the emergence of Protestantism have not failed to suggest. From there it is only a small step to

while notated music was a *symbolic representation* of a pre-performed music, the recording of sound allows for a concrete presentation of the sonic phenomenon.[498] Certainly, the introduction of analogue recording and reproduction technologies had several implications for the production of music:

> In contrast to two thousand years of basically written history, the advent of audio-recording media almost immediately led to genuinely media-based projects like the music-ethnological gramophone archives established in both Vienna and Berlin around 1900. But the treasures of culture are just one aspect of such a media archive, because such recordings contain – and thus memorize – a world of signals that operate beyond and below the cultural symbolism intended by the humans involved. [...] The moment a singer of epics sings into a current recording device, two different regimes clash as human performativity is confronted with technological algorithmical operations. Although philological analysis of the marvels of oral poetry (Homer's epics in antiquity, Serbian guslari in the present) remains within the logic of cultural technologies (alphabetic writing and musical notation), media-archaeological analysis, by computer-aided fast Fourier computations, of speech below the elementary units of what can be expressed by letters (vowels, consonants) gives access to the material dimension (the physical world) of a cultural moment.[499]

The development of analogic and numeric technologies has impacted musical culture, and culture in general, in a dramatic way. Analogue recording devices such as the

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saying that modern technics qua metaphysical achievement emanated from the letter's reproducible mechanization and could only be preceded by it." Stiegler, *Disorientation*, 79.

[498] The following narrative about Edison reveals an interesting juxtaposition between (analog) sound recording (the automatized sonic transmission) and the notation of music (the written record):

"In his novel dating from 1880, *L'Eve future*, Vielliers de l'Isle-Adam lets the inventor of the phonograph, Thomas Alva Edison, lament the loss of sonic information, which was lost in world history as long as cultural memory was indeed reduced to what could historiographically be written down by the alphabet alone: 'A phrase coined approximately seventy-two centuries ago (and which, besides, according to the immemorial tradition – perhaps invented, perhaps not – could never have been picked up by any recording machine).' The phonograph (Emil Berliner's gramophone) registers the whole range of acoustic events. Whereas in musical notation (developed by the Greeks in analogy to the alphabet and later differently by Guido of Arezzo) a symbolic recording takes place, the phonograph registers the physically real frequency. The alphabetic symbolism reduces acoustic events to the 'musical' (harmonical order), whereas the register of the real encompasses the sonic (including noise, arhythmical temporal phase shifting, the 'swing,' differing amplitudes and frequencies) – an anarchive of sound in technological storage as opposed to the archival order of musical notation." Wolfgang Ernst, "Toward a Media Archaeology of Sonic Articulations," in *Digital memory and the archive*, ed. Jussi Parikka. (Minneapolis: U. of Minnesota Press, 2013), 173-174.

[499] Wolfgang Ernst, "Media Archaeography: Method and Machine versus the History and Narrative of Media," in *Digital memory and the archive*, 59.

tape machine or the photo camera present capacities to *archive* moments by bypassing the actual experience of performance.[500] These technologies are able to store the information of the *present* before it becomes the *past* in the input-stage and reproduce this *past* at any moment in the output stage in the *future*.

The inventions of the twentieth century began to conflate the different dimensions of time and influence temporal perception: the new communicative networks were characterized by a decreased delay between input and output, "while the literal orthothesis [text] implies an essential delay between what might be called the event or its entry as data on the one hand and its reception or reading on the other."[501] Stiegler explains more specifically:

> The first analogic, then numeric, machines did not have such instruments for entry from and output to a network: photographic and phonograph apparatuses are instruments for analogic input, not for transmission of data at a distance. However, advances in photographic techniques rapidly led to belinography, then to advances in cinematography, which in turn led to the direct and then to on-line transmission of images, while the combining of the principles of telegraphy and phonograph resulted in the telephone, then in direct radio-diffusion.[502]

At this point, the fifth era of Leroi-Gourhan's history of grammatization is reached in which computer-based operations make possible networks which entail almost simultaneous stages of input and output: the transfer of information from input to output occurs at "light-time" speed.

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[500] See Stiegler, *Disorientation*, 122.

[501] Ibid., 114.

[502] Ibid.

Electronic Serialization as Telematics: Light-time as Real-Time[503]

The concept of *telematics* by Nora and Minc extends the concept of *informatics* (the idea of automatized information-transmission) by embracing contemporary forms of computerized transmission of information. As such, the concept of *telematics* involves a critical evaluation of social implications of digital technologies and confirms that the change of culture via the introduction of computer-based technics is – to quote Stiegler – "of an exceptional magnitude."[504] The Nora-Mincs report reads:

> The 'computer revolution' will have wider consequences. The computer is not the only technological innovation of recent years, but it does constitute the common factor that speeds the development of all the others. Above all, insofar as it is responsible for an upheaval in the processing and storage of data, it will alter the entire nervous system of social organization. Until fairly recently, data processing was expensive, unreliable, and esoteric. [...] Nowadays, a multitude of small, powerful, and inexpensive machines are on the market. [...] This transformation can be traced to two technological advances [...] : decreasing size and vastly expanding networks.[505]

The introduction of computers has made the transmission and storage of an increased amount of data possible. An important factor for the proliferation of society's computerization is affordability: with the increasingly economical production of computers, they have infiltrated most homes, schools and businesses and are, in many ways, indispensable machines of everyday life.

> [F]ifteen years ago, nobody would have imagined the proliferation of cheap devices available to everybody and essentially to students. Today, the question is no longer whether mental calculation is

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[503] "Numeric performativity is [...] constructed, through the coincidence and conjugation described previously as analogic media functioning. A computer keyboard is a data-upload terminal in which a datum's input virtually coincides with its processing since the machine operates in real time, in what I have called 'interactivity.' […] [A] parallel instantaneous network, the combination clearly indicating that the system's reactive speed excludes, a priori, all human decision-making. And this no longer applies merely to the transmission and input achieved 'in light-time': data processing occurs as a real-time calculation. This is the essence of the numeric relative to the analogic – but the analogic has now been integrated into the numeric, which affects all decisions, and, most important, all collective decision-making." Stiegler, *Disorientation*, 125.

[504] Ibid., 106-104.

[505] Simon Nora, and Alain Minc, *L'informatisation de la Societe (La Documentation Francaise)*, 3, as quoted in Stiegler, *Disorientation*, 106-104.

> going to become less important but when it is going to disappear.[506]

The development of such numeric technologies has generated several changes in the field of music production:

With regards to music *reproduction*, digital recording devices were invented in the 1970s. Vinyl records and magnetic tapes have become collector's items as their previous function as analogue storage media for sound has been taken over by digital storage media such as CDs, Minidiscs, DVDs etc. While these types of media still retain a physical reality outside the peripheries of computers, audio data can also be stored directly on computer hard drives. Here, advances have been made with the development of various formats of compressed audio files, which allow for increased quantities of audio files in an equal amount of digital memory.[507]

With these technological developments, computerized music production and reproduction only requires one computer that provides both input and output. At the same time, music can be digitally transferred in "light-time" without physical carriers, as several digital formats can be used for the distribution of music on the internet. With steadily increasing data bandwidths, both transfer and distribution of compressed and uncompressed audio-files have become more and more standard.[508]

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[506] Jean-François Lyotard, *The Postmodern Condition,* trans. Geoff Bennington, and Brian Massumi (Minneapolis: University of Minnesota Press, 1979), 130, as quoted in Stiegler, *Disorientation*, 109.

[507] So-called lossless compression algorithms are used primarily during processes of audio production and include formats such as .FLAC, .APE, .m4a, .wma lossless. Lossy compression algorithms produce formats with reduced file sizes, which are particularly useful for internet streaming. Examples of lossy formats are .mp3, .aac, .vorbis, .wma lossy etc.

[508] Stiegler comments on the omnipresence of digital media devices:"Today the great majority of these processing operations, often distinct from data-entry and reception operations, use electromagnetic technology. These instruments, truly and fully realizing writing's function by supplementing simple recording operations, are also necessarily duplication devices, what is already the literal writing 'apparatus' – the writer as reflected in writing (that is, in being copied and cited precisely). The writing of memory is always implementation of a montage of 'cut' and 'paste,' basic concepts for text processing. As use of these reproduction devices (first tape recorders, tape decks, video recorders, then laptops, cell phones, MP3 players, I-Pod's, the IPhone, etc.) spreads, all of these reproducible magnetic devices invade shop windows. These media, to which must also be added others produced even through photonic technologies (compact discs, etc.), which thus become multimedia and are now to be found in libraries as new technologies alongside the phonographic and photographic and, to a lesser degree, film." Stiegler, *Disorientation*, 106-127.

With regards to music *production*, new instruments[509] were invented based on analogue technologies, which not only changed the sound of music but also the existing music production processes. An even more profound transformation came with the development of digital technology in the 1970s. The use of software,[510] computer hardware and digital electronics[511] comprehensively restructured the landscape of music and sound creation as a new technical standard called MIDI (musical instrument digital interface) allowed for complex digital networks to support a variety of musical processes (event and sound processing).[512] These processes will be explained in detail in the next chapter.

Regarding the various cultural changes, which have resulted from the introduction of digital media, it is important to note that digital instruments, such as sample-based synthesizers that emulate acoustic instruments, present economically advantageous instruments which are cheaper in production and available to the *consumer* at a price that is much lower than their acoustic counterparts.

With this development, traditional concepts of the functionality of what an *instrument* or a *performer* is has gradually changed: with a single computer it is possible not only to compose and notate music, but also to "perform" music, for example, for large orchestra and, in addition, to archive ("save") it on the same computer. All that is required is one individual and a computer. In fact, the *performance* itself does not even necessitate the presence of a physical instrument or instrumentalist: the playback occurs purely digitally, processing various combinations of 0s and 1s, and by means of

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[509] For example, modular, integrated and polyphonic synthesizers were used for the emulation of traditional instruments and for the generation of entirely new sounds and timbres.

[510] For example: MIDI instruments, recording and editing software such as Pro Tools, Sequoia, Pyramix etc.; sequencer programs like Cubase, Logic, Ableton Live etc.; patchable environments like Max/MSP, PD for analysis, synthesis and processing; AudioSculpt, Spear, and notation programs like Sibelius, Finale etc.

[511] Robotics, microcontrollers (Arduino) etc. In addition, so-called DIY (Do-It-Yourself) culture benefits from the affordability of electronic components and from the accessibility of building instructions through the internet. Circuit bending, noise music, and digital modular synthesizers are forms of music-making which not only financially allow a broader consumer-base (note: "consumer" has replaced "composer"/" musician"). For more, see Nicolas Collins, *Handmade Electronic Music*. *The Art of Hardware Hacking* (New York: Routledge, 2006). At the same time, such technological innovations also engender, even though inadvertently, a slight shift of aspects of contemporary classical music towards pop culture, allowing for a musical aesthetic favouring noise, and indicating a departure from conventional instrumental sounds.

[512] More recently, instrument applications (apps) for smartphones are available and offer similar (while very limited) possibilities for musical creativity to any smartphone user.

convolution reverb, the music may be *performed* in any desired concert hall or location, at any time – as long as there exists the corresponding impulse response file.

Currently, online platforms for audio distribution (such as SoundCloud, or Bandcamp), social networking sites (like Facebook, Twitter, LinkedIn) or music subscription services (for example, Rdio, Spotify or Grooveshark) act as the primary sources for music consumption in the digital world. This form of distribution increases the number of listeners as its availability is not restricted to one particular time and place or to a limited number of people. Music is now accessible on demand and, for the most part, at a cheaper price than live performances.

These are only a few of the recent developments in the realm of digital audio, which affect the production and perception of music. As has been mentioned, one of the advantages may include economical accessibility to the general public,[513] which enables enhanced possibilities for the circulation of newly-created music. At the same time, music of seemingly any desired era and culture is available through the internet and music from anywhere in the world can be listened to *virtually* at practically any time of the day.

However, constant availability and unlimited accessibility come at the price of de-contextualization, as aspects such as venue, audience, performance practice, historical context etc. dissolve. Thereby, important aspects of cultural memory vanish: as has been explained earlier, de-contextualization leads to disorientation, which in any context of tertiary or cultural memory is a necessary component for the constitution of the *who*. De-contextualization allows for a reflective representation (a re-contextualization) of the *who* by means of the *what*. However, contemporary technics of industrialized memory conceal the *différante* aspect of this reflection. Their "prostheticity and the orthopedics that [they produce] when [they become] ortho-thetic"[514] remain unseen and indiscernible: the relationship between the *who* and the *what* is changed, in that the *who* becomes negligible and passive. "Contemporary disorientation is [...] linked to speed, to the industrialization

[513] A prerequisite for this is having access to a computer, software and/or internet.

[514] Stiegler, *Disorientation*, 27.

of memory resulting from the struggle for speed, and to the specifics of the technologies employed in that struggle."[515]

Technics of tertiary memory in the form of light-time synthesis present a kind of "rupture of life" which significantly alters the "connective structure" of cultural memory. Before investigating these transformations, it will be useful to examine the political impetus behind the cultural forces of digital technology, as the industrialization of memory is one of the outcomes of geo-political industrialization, which originated and remains concentrated in the Western world.[516]

> [I]nformation systems have become global, the result having been – through the development of the telegraph, telephone, photography, phonography, cinema, radio broadcasting, television, and the information technology whose emergence is currently taking place – that global memory has itself finally been subsumed into an industrialization directly affecting our psychic processes and collective identifications and differentiations; that is, individuation itself.[517]

Politics – The Industrialization of Memory and Music

Economic Motivations: Memory=Information

> It remains that knowledge, 'informationalized,' contrary to what occurred with the advent of writing, is placed in the direct service

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[515] Ibid., 7.

[516] Edward Said comments on the impact of Western domination of culture media, which makes clear that the West not only occupies physical land but also the digital/virtual world of the media:

"This twinning of power and legitimacy, one force obtaining in the world of direct domination, the other in the cultural sphere, is a characteristic of classical imperial hegemony. Where it differs in the American century is the quantum leap in the reach of cultural authority, thanks in large measure to the unprecedented growth in the apparatus for the diffusion and control of information. As we shall see, the media are central to the domestic culture. Whereas a century ago European culture was associated with a white man's presence, indeed with his directly domineering (and hence resistible) physical presence, we now have in addition an international media presence that insinuates itself, frequently at a level below conscious awareness, over a fantastically wide range. The phrase 'cultural imperialism,' made current and even fashionable by Jacques Lang, loses some of its meaning when applied to the presence of television serials like *Dynasty* and *Dallas* in, say France or Japan, but becomes pertinent again when viewed in a global perspective." Edward W. Said, *Culture and Imperialism* (New York: 1993, Vintage books edition 1994), 291.

[517] Stiegler, *Disorientation*, 3.

> of a power that can no longer be understood from a political point of view, but as an economic power […].[518]

The emergence of written text – the literal synthesis of memory – had constituted a technological development which, as Aleida Assmann explains, complied with

> [t]he conviction that written texts may outlast the ruins of civilizations [which] is, of course, a topos much older than the Renaissance. The ancient Egyptians, looking back over more than a thousand years of their own culture, could not help noticing that, while colossal buildings and monuments had fallen to pieces, texts from the early period were still being copied and praised.[519]

Correspondingly, one may say that writing was considered as a means to preserve cultural knowledge and values, and that writing served to sustain collective, cultural identity. At the same time, it was understood that the active participation of society was just as essential a component of the preservation of cultural memory as the technic of writing itself, as one of Shakespeare's sonnets insists, "'the living record of your memory'" is the "antidote 'gainst death and all oblivious enmity.'"[520]

The development of telecommunication technologies has changed the relationship between culture and cultural memory primarily because memory's value has become an increasingly economical matter: the Nora-Minc report identified that the recent technological revolution has caused "[t]he industrialization of *memory* and *language, that is, of knowledge*, and specification of information as merchandise"[521] which has ultimately lead to a cultural revolution. Accordingly, the primary purpose of the development of analogic and numeric technics is creating new means for profitable transactions of valuable information, instead of sustaining a cultural heritage for the sake of cultural identity. With *telematics*, the connection between culture and memory is transformed into a connection between information and profit.

> Telematics provides the real possibility of the transmission of all types of data immediately and globally through its linkage to satellite transmission, the final step in a transformation begun in

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[518] Ibid., 110.

[519] Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 124.

[520] Ibid., 125.

[521] See Stiegler, *Disorientation*, 106.

> 1866 with the first transatlantic cable between Brest and New York. […] Industrialization of memory exists insofar as it becomes 'information' in the limited sense employed in information theory, as merchandise whose value is correlated with its time and space of diffusion. It can thus be 're-opened,' making all previous forms of memory, all of the already-there, into 'raw material,' such that general knowledge itself becomes information.[522]

In the context of Jan Assmann's theories, this transformation reveals a larger problem within the wider scope of culture and identity. In his essay "Globalization, Universalism, and the Erosion of Cultural Memory" (2010), he explains memory within the contexts of globalization and maintains that memory exists in a network of

> specific horizons of time and identity on an individual, a generational, a political and a cultural level. If this relationship is absent, then we are dealing with knowledge rather than memory. Memory is knowledge with an identity-index, it is knowledge about oneself; that is, one's own diachronic identity, be it as an individual or as a member of a family, a generation, a community, a nation or a cultural and religious tradition.[523]

To him, globalization entails

> a process of general dissemination (of merchandise, technologies, news, political influence, religious ideas) across political and cultural boundaries and of the ensuing integration of various, previously isolated zones into one system of interconnections and interdependencies, where all nations, empires, tribes and states cohere in some way or other through political, economic or cultural relations.[524]

Within this frame of reference, the industrialization of memory functions to the advantage of a process of globalization that is moving towards the assimilation of different "political, economic or cultural" identites.[525] In this sense, analogic and numeric

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[522] Ibid., 106-107.

[523] Assmann, "Globalization, Universalism, and the Erosion of Cultural Memory," 123. Assmann uses the term "knowledge" which, in this context, represents a similar meaning as the word "information": it is a non-memory that is lacking identity-based references.

[524] Ibid., 121.

[525] The specific connection between technologies, colonialism and globalization is discussed by Leroi-Gourhan. "The history of this assistanciste [of technics to memory], which is also the technological history of territorial conquest up to and including contemporary globalization, is André Leroi-Gourhan's focus in *Le mémoire et les rythmes* (Memory and Rhythm)." See Stiegler, *Disorientation*, 65.

technics not only expedite a "conflagration"[526] of temporal distinctions but also facilitate the gradual disappearance of "political, economic or cultural" autonomy – therefore, one may say that on a global level *différance* is at stake. To Jan Assmann, this means that globalization and memory culture cannot coexist:

> Memory functions in the direction of identity which, in all of its fuzziness, always implies a notion of difference. Globalization, on the other hand, works in the direction of diffusion, blurring all boundaries and bridging all differences. Since something like global identity cannot exist, the concept of global memory is a paradoxical notion.[527]

The consequences of this socio-political development against a (traditional) memory culture will be discussed later in the various contexts of specific technologies and in relationship to musical culture.

At this point, it has become clear how the industrialization of memory integrates economic as well as political matters.[528] Importantly, the commodification of memory requires mnemotechnological structures which involve contemporary technologies "as elements of the mastery of speed through the stabilizing, processing, and transmission of signals that are recordable and storable in electronic memory, making possible the control of information's circulation through the establishing of networks."[529]

Technological devices with the capacities to meet the requirements of this "mastery" entail processes of computation, i.e. "'real-time networks' […] all operating at the speed of light precisely because events and information are merchandise whose value is a function of time."[530] In a particularly musical context, such technologies include devices for music reproduction and broadcasting (any digital devices for recording,

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[526] Stiegler, *Disorientation*, 106-122.

[527] Assmann, "Globalization, Universalism, and the Erosion of Cultural Memory," 123.

[528] Stieger goes so far as to point out that memory has become capital:"[T]he thermodynamic revolution brought about the mobilization of rapidly decontextualizable capital; in order for that to occur, it was first necessary to constitute a network of stock exchanges as the infrastructure of information. This economico-informational imperative then catalyzed the genesis of analogic and numeric syntheses, converging with possibilities newly opened up by the technical tendency. From this resulted a new conception of value and thus of the funds constituting collective memory qua patrimony. Memory, as patrimonial capital required as part of a political imperative, thus centrally becomes commercial capital." Stiegler, *Disorientation*, 98.

[529] Ibid., 102.

[530] Ibid.,111-112.

processing and playback; i.e. any modern computer with internet access), music production (i.e. modern computers with particular music production software), etc. as discussed above.[531]

As the distribution of information as merchandise gains value with the speed of its transmission, Stiegler contends, capitalized memory is evaluated and circulated based on contradicting principles:

> [C]riteria for information selection and diffusion are measured relative to their plus-value, their degree of appreciation: any statement's value must be *calculable*. Yet if information value is tied to the time of its diffusion within a given system, that is, its speed, clearly knowledge is precisely what, as différance, absolutely contradicts any calculation of its value and of any anticipated experience of temporality. This would mean a conflict, perhaps an aporia – Lyotard would say a differend – of which the de-naturing of knowledge would be only one index.
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> In such a context, one with these 'values,' the transmission 'from generation to generation' of a cultural patrimony basing its historial unity on its territorial unity would not be possible – it would be as if speed's effect would be to de-realize space and time as such. No one foresaw this outcome and its enormity more clearly than – and as early as – Heidegger. And no one more clearly and early on than Derrida reinscribed the radical necessity, a definitive gap, of its being presented as an absolute rupture with normality: 'The future can only be anticipated in the form of absolute danger. This is what produces the absolute break with constituted normality and can thus be announced, presented, only as a monstrosity.'[532]

Here, Jan Assmann's observations overlap with those of Stiegler: digital technologies execute the industrialization of cultural memory and as such advance globalization. With this cultural development, aspects of difference – *différance* – become suppressed, and the industrialization of memory turns out to be the antithesis of cultural identity and

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[531] Conspicuously, modern music distribution is nowadays often advertised in relation to financial aspects such as costs and profit. Many of the new options involve internet-based broadcasting, funding options, self-promotion etc. An example for a list of such resources is "Ways To Make Money With Your Music That Didn't Exist 10 Years Ago," Digital Music News, http://www.digitalmusicnews.com/permalink/2014/12/11/10-ways-make-money-music-didnt-exist-10-years-ago (accessed December 10th, 2014).

[532] Stiegler, *Disorientation*, 111.

cultural memory. Eventually, the individuation of cultural meaning becomes similarly impossible.

Such cultural tendencies were discovered early on in the development of analogic and numerical technics in the musical realm. Theodor W. Adorno and Walter Benjamin, among many others, discussed past as well as probable future transformations of music caused by technological innovations.

The Industrialization of Music: Culture Industry and Commodity Listening

In 1936, as a response to fascist politics in Germany, Walter Benjamin formulated his ideas about art – by the examples of film and photography – at a time of mechanical reproduction in his essay "The Work of Art in the Age of Mechanical Reproduction". His concepts are relevant to the present dissertation as they are concerned with aspects of time in application to mechanical (technological) reproduction of art:

> Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be. This unique existence of the work of art determined the history to which it was subject throughout the time of its existence. This includes the changes which it may have suffered in physical condition over the years as well as the various changes in its ownership. The traces of the first can be revealed only by chemical or physical analyses which it is impossible to perform on a reproduction; changes of ownership are subject to a tradition which must be traced from the situation of the original.[533]

It is important to note that at the time this text was written – and leading up to this point – several forms of media were consciously employed through Joseph Goebbels' propaganda strategies. As a result, art and the idea of aesthetic perception were anything but ignored by the fascist programme, instead they were perverted and fundamentally reorganized in service of the acquisition and maintenance of power by the National Socialist German Workers Party (NSDAP). In the essay, Benjamin based his postulations on the observation that aesthetics were inherently formed by political practice and that one of the most powerful tools for the prevailing fascist politics was mechanical reproduction.

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[533] Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in *Illuminations*, ed. Hannah Arendt, tr. Harry Zohn (New York: Schocken Books, 1969), 220.

Benjamin sees a "self-alienation" of mankind as a result of fascist modes of art (re)production:[534] in mechanically reproduced objects, he insists, the *presence* of the original is absent, for "the presence of the original is the prerequisite to the concept of authenticity."[535] In addition to attributing to the concept of *presence* the idea of authenticity, Benjamin assigns his often quoted notion of *aura*: "that which withers in the age of mechanical reproduction is the aura of the work of art. […] [f]or aura is tied to [its] presence; there can be no replica of it."[536]

To Benjamin, the aspect of reproducibility not only terminates authenticity but also changes the original function of art. No longer "being based on ritual", art "begins to be based on another practice – politics."[537] Interestingly enough, Benjamin retains an optimistic perspective in believing that reproduced pieces of art may challenge their audience and elicit a sharper sense of criticism.[538]

However, Adorno criticized Benjamin for "underestimat[ing] the technicity of autonomous art and overestimat[ing] that of dependent art."[539] In fact, Adorno reveals an emphatically pessimistic view towards mechanical reproduction as regards the commodification of music. He expresses his concerns in the article "On the fetish-character in music and the regression of listening" (1938) which was published two years after Benjamin's critical essay. While Benjamin's ideas focus on the aspect of art

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[534] "Fascism attempts to organize the newly created proletarian masses without affecting the property structure which the masses strive to eliminate. Fascism sees its salvation in giving these [proletarian] masses not their right, but instead a chance to express themselves. The masses have a right to change property relations; Fascism seeks to give them an expression while preserving property. The logical result of Fascism is the introduction of aesthetics into political life. The violation of the masses, whom Fascism, with its Führer cult, forces to their knees, has its counterpart in the violation of an apparatus which is pressed into the production of ritual values.

All efforts to render politics aesthetic culminate in one thing: war. War and war only can set a goal for mass movements on the largest scale while respecting the traditional property system. This is the political formula for the situation. The technological formula may be stated as follows: Only war makes it possible to mobilize all of today's technical resources while maintaining the property system. […] Its [mankind's] self-alienation has reached such a degree that it can experience its own destruction as an aesthetic pleasure of the first order. This is the situation of politics which Fascism is rendering aesthetic." Ibid., 241.

[535] Ibid., 220.

[536] Ibid., 229.

[537] Ibid., 224.

[538] "They demand a specific kind of approach; free-floating contemplation is not appropriate to them. They stir the viewer; he feels challenged by them in a new way." Ibid., 226.

[539] Theodor W. Adorno, "Letters to Walter Benjamin," *New Left Review*, no. 81 (1973), 67.

reception, Adorno writes about the industrialized production process, which, according to him, generates a music that is commodified and therefore standardized.[540] Adorno considers the aspects of musical aesthetics determined by developments in capitalist economy, which serves to transform the audience of music into *consumers* of commodified music. Within the context of what he later calls the *culture industry*,[541] Adorno sees such dynamics reveal

> [t]he new fetish [which] is the flawlessly functioning, metallically brilliant apparatus as such, in which all the cogwheels mesh so perfectly that not the slightest hole remains open for the meaning of the whole. Perfect, immaculate performance in the latest style preserves the work at the price of its definitive reification. It presents it as already complete from the very first note. The performance sounds like its own phonograph record. The dynamic is so predetermined that there are no longer any tensions at all. The contradictions of the musical material are so inexorably resolved in the moment of sound that it never arrives at the synthesis, the self-production of the work, which reveals the meaning of every Beethoven symphony. What is the point of the symphonic effort when the material on which that effort was to be tested has already been ground up? The protective fixation of the work leads to its destruction, for its unity is realized in precisely that spontaneity which is sacrificed to the fixation.[542]

Adorno's observations bespeak the crucial relationships between time and several aspects of *différance*, such as the idea of music's "carnal" reality and the importance of music's performance-character, or questions of musical material, all of which have been discussed earlier in the present dissertation. According to his critique, the mechanical reproduction of music distorts originary temporality and as such endangers musical

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[540] For more on the two different perspectives of Benjamin and Adorno, see Richard Leppert, "Commentary," in *Essays on music*, 245.

[541] Max Horkheimer and Adorno coined the term in their book *Dialectic of Enlightenment* (1944).

Critical theorist David Held explains the relationship between the *culture industry* and its consumers as follows:

"The culture industry produces for mass consumption and significantly contributes to the determination of that consumption. For people are now being treated as objects, machines, 'outside as well as inside the workshop'. The consumer, as the producer, has no sovereignty. The culture industry, integrated into capitalism, in turn integrates consumers from above. Its goal is the production of goods that are profitable and consumable. It operates to ensure its own reproduction." See David Held, *Introduction to Critical Theory: Horkheimer to Habermas* (Berkeley, Los Angeles: University of California Press, 1980), 91.

[542] Theodor W. Adorno, "On the Fetish-Character and the Regression of Listening," in *Essays on music*, 301.

meaning itself – as is emphasized in his example of Beethoven's symphony. At the same time, musical reproduction via mechanized technology engenders an ever-repeating sameness, which turns music into a fetish object. Adorno continues that, as a fetish object, music affects the listener in that it leads to

> a regression of listening. […] [I]t is contemporary listening which has regressed, arrested at the infantile stage. Not only do the listening subjects lose, along with freedom of choice and responsibility, the capacity for conscious perception of music, which was from time immemorial confined to a narrow group, but they stubbornly reject the possibility of such perception. They fluctuate between comprehensive forgetting and sudden dives into recognition.[543]

Industrialized music impairs the active involvement of the listener because it is pleasant to listen to, as it is compliant with a fetishized standard. Because of this, the listener listens to "Muzak" passively – without being ever having to feel challenged.[544] The idea that standardization leads to a music within which differences are cancelled out, where "extremes […] actually meet," is again consequential for several aspects of *différance*. With regards to musical culture, Adorno concisely explains that this

> means it is no longer possible to succeed in an old style, but only in imitation as such. […] There is no room […] for the 'individual'. […] The liquidation of the individual is the real signature of the new musical situation.[545]

Some thirty years after the essay on the fetish-character of music, Adorno wrote "Culture Industry Reconsidered" (1963) in which he explains the important difference between techniques of the *culture industry* (such as mechanical reproduction) as opposed to the techniques within works of art (i.e. compositional approaches to musical material).

> The concept of technique in the culture industry is only in name identical with technique in works of art. In the latter, technique is concerned with the internal organization of the object itself, with its inner logic. In contrast, the technique of the culture industry is,

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[543] Ibid., 303.

[544] "They already know what they will hear even before they hear it. […] Standardization, [Adorno] argues, is driven by imitation which, by repeating, in essence musically speaks against the foundation of originality upon which individuality depends." Leppert, "Commentary," 245.

[545] Adorno, "On the Fetish-Character and the Regression of Listening," 293.

> from the beginning, one of distribution and mechanical reproduction, and therefore always remains external to its object.[546]

Adorno's distinction is pertinent to Gunnar Hindrichs' definition of musical material in that "the technique of the culture industry" – that of mechanical, and now digital reproduction – does in effect not correlate with the "inner logic" of the works of art which it reproduces. At this point, it is possible to apply Adorno's observation to Hindrichs' definition of music's double social function: the social function of the musical piece of art and the social function of functional music, while "the social function of music is not the counterpart of material inventory. On the contrary, it is one of its determinants,"[547] and therefore both social functions inform musical meaning. It may seem plausible to associate Adorno's notion of the "technique in works of art" with the inner-musical, social function of the musical piece of art, and "the technique of the culture industry" with the outer-musical, social function of functional music. From this, one may deduce that analogic and numeric technics – the technologies of industrialized memory and the *culture industry* – are "not the counterpart of material inventory" but rather part "of its determinants."[548]

In light of such correlations, one may ask: if industrialized memory transforms memory into "information" and if – as has been demonstrated – the technologies of industrialized memory are in part determiners of music's material inventory, to what extent then is music as cultural memory merely musical "information"? And if the political force behind industrialized memory is one of economic incentives, has the twofold social function of music also shifted to obey a capitalist imperative?

Undoubtedly, such questions are contained in Adorno's thorough critique of the *culture industry* and music in mass-culture. His analysis demonstrated that the commodification of music has certainly affected poietic and esthesic processes of music,[549] which – as per Nattiez's semiology – are fundamental stages in the communication of musical meaning.

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[546] Adorno, Theodor W. "Culture Industry Reconsidered," in *The Culture Industry: Selected Essays on Mass Culture* (London, New York: Routeledge, 1991), 101.

[547] Hindrichs, *Die Autonomie des Klangs*, 66.

[548] Ibid.

[549] In the essay *A Social Critique of Radio Music* (1945) he reflected:

With regards to the material trace – "the material reality of the work […] i.e. the physical *traces* that result from the poietic process"[550] – it is necessary to renew the contemporary discourse about music and musical materiality in conjunction with various observations about contemporary technologies: with almost a century having passed since the writings of Benjamin and Adorno, many more technological innovations have expanded the instruments of industrialized memory and have come to define the essence of contemporary culture.

Music in the Age of Web2.0

Referring to the current effects of the internet on communication, computer scientist Jaron Lanier remarks:

> The World Wide Web was flooded by a torrent of petty designs sometimes called web 2.0. This ideology promotes radical freedom on the surface of the web, but that freedom, ironically, is more for machines than people. [...] Anonymous blog comments, vapid video pranks, and lightweight mashups may seem trivial and harmless, but as a whole, this widespread practice of fragmentary, impersonal communication has demeaned interpersonal interaction. Communication is now often experienced as a superhuman phenomenon that towers above individuals. A new generation has come of age with a reduced expectation of what a person can be, and of who each person might become.[551]

Lanier's observation of the fragmentation of the individual substantiates his view that in contemporary culture a "collective" is established no longer on the basis of shared experiences. Instead, collective identity is created via digital encounters of fragmentary

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"How did music become, as our first axiom asserts it to be, a commodity? After music lost its feudal protectors during the latter part of the 18th Century it had to go to the market. The market left its imprint on it either because it was manufactured with a view to its selling chances, or because it was produced in conscious and violent reaction against the market requirements. What seems significant, however, in the present situation, and what is certainly deeply connected with the trend to standardization and mass production, is that today the commodity character of music tends radically to alter it. Bach in his day was considered, and considered himself, an artisan, although his music functioned as art. Today music is considered ethereal and sublime, although it actually functions as a commodity. Today the terms ethereal and sublime have become trademarks. Music has become a means instead of an end, a fetish. That is to say, music has ceased to be a human force and is consumed like other consumers' goods. This produces 'commodity listening,' a listening whose ideal it is to dispense as far as possible with any effort on the part of the recipient – even if such an effort on the part of the recipient is the necessary condition of grasping the sense of the music." Theodor W. Adorno, "A Social Critique of Radio Music," *The Kenyon Review* 18, no. 3/4 (1996): 231.

[550] See Nattiez, *Music and Discourse*, 15.

[551] Jaron Lanier, *You are not a gadget* (New York: Alfred A. Knopf, 2010), 3-4.

personalities during which "bits are presented as if they were alive, while humans are transient fragments."[552]

Collective identity is partly constituted by the communicative aspect of collective memory: communicative memory generates group identity and unites individuals within the realms of "the family, the neighborhood [sic], the generation, the society, the state, and the culture we live in. […] Humans aquire these [communicative] memories not only via lived experience, but also via interacting, communicating, learning, identifying, and appropriating."[553] In essence, such communication is contingent on a situation where spatio-temporal *différance* can be re-contextualized, i.e. where individuals share the dimensions of time and space and as such have the same "connective structure" and ethnic unity.[554] Re-contextualization, Stiegler says, has "originarily" functioned as "cardinal orientation." "Seen as originary, disorientation is always constituted by identifiable, characteristic orientation-markers (*cardinalité*)."[555]

In the context of internet-based communication, however, it appears that collective identity is established without a shared "connective structure," the result being as follows: "[…] This cardinal orientation is not successfully occurring today; thus we are suffering from *disorientation as such*."[556] In addition, this new type of "collective" is emphasized in contemporary culture, to the extent that "[t]he digital hive is growing at the expense of individuality."[557] With this, the prognosis of the Nora-Minc report is verified in that "[t]he computer […] [has] altere[d] the entire nervous system of social organization."[558]

Interestingly, what Lanier discovers to be characteristic for contemporary society notably aligns with Adorno's realization of "the liquidation of the individual" with

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[552] Ibid., 26.

[553] Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*, http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014). Additionally see Assmann, *Das Kulturelle Gedächtnis,* 37.

[554] See Stiegler, *Disorientation*, 130-131.

[555] Ibid., 2-3.

[556] Ibid.

[557] Lanier, *You are not a gadget*, 26.

[558] Nora, and Minc, *L'informatisation de la Societe*, 106- 104.

regards to the de-differentiation of artistic aesthetics. Thus, one may say that society has caught up with Adorno's prediction of technology's developments.

From this perspective, one may understand that, since the beginnings of the technological revolution, society has undergone radical changes and that "[t]he first tenet of this new culture is that all of reality, including humans, is one big information system."[559] Today, society and culture are defined in their relationship to computers and to communication systems that are internet-based/online. Importantly, "[t]hat doesn't mean we are condemned to a meaningless existence."[560] Instead of advancing Adorno's and Benjamin's concerns in even more pessimistic directions, Lanier suggests there exist opportunities to re-contextualize their analyses.

Similarly, Luciano Berio reconciles Benjamin's ideas with his contemporary perspective as a composer who has made first-hand experiences with the current system of industrialized music reproduction. In one of his Charles Eliot Norton Lectures, he states:

> The increasing diversity of the forms of musical consumption, the evolution of techniques and audiences, and the consequent instability of possible points of reference are the product, to a certain extent, of the available means of recording, reproducing, and conserving music. […] It is not so much a musical phenomenon as a phenomenon of acoustic amnesia that has nothing to do with any musically valuable territory we are interested in exploring. If Walter Benjamin were still among us, he would have nothing to worry about, he could set his mind at rest: the same means that contribute to the reproducibility of the work, and hence to the crisis of its authority, its authenticity, its 'aura,' may perhaps be the very means that contribute in the future to a different definition of its authority, its authenticity, its 'aura.' Through new technologies, one can enter new acoustic and musical dimensions.[561]

While echoing Stiegler's concerns about culture's "suffering from *disorientation as such*", Berio points to the possibility that the disruption of "the familiar reference

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[559] Lanier, *You are not a gadget*, 27.

[560] Ibid.

[561] Berio, *Remembering the Future*, 66.

points of which all culture exists"[562] may indicate a departure into an era of redefining entirely new reference points. In a similarly optimistic tone, Frank Cox comments on the question of aura:

> However, I would argue that the Brave New World has arrived, is with us; we now have a slew of electronically-produced artworks with not a trace of aura, but unfortunately lacking all life as well. […] In direct contrast to Benjamin's post-auratic model, I would maintain that one fundamental project for electronic art music should be neither that of programatically eliminating aura nor creating an electronic simulacrum of it, but rather that of creating a new sort of aura guided by the projective ideals inherent in the piece, appropriate to this medium yet not merely an already-apparent property or capacity of it.[563]

In the same vein, one may respond to Adorno's concern about the *regression of listening* by pointing back towards Benjamin's belief in the liberating tendencies of mass art. However, this should not reinforce a tendency to "underestimate the technicity of autonomous art" or to "overestimate that of dependent art."[564] Instead, a renewed evaluation of contemporary musical culture must remain attentive and critical towards Stiegler's idea that "technics as such provides some hope of at least the thought of difference, if not of its welcome."[565]

In this sense, the following sections will serve to identify the current cultural situation within which aspects of memory, technology and music have been relocated, while adopting redefined functions and revealing new relationships, which in turn reflect contemporary musical culture.

Transformed Ruptures in Life

> The rupture, as defined by Maurice Blanchot, occurs along with that of phonologic and linear writing. The event itself is rendered possible in the emergence of a specific characteristic of différance, of a new function of artificial memory that will be investigated here through the concept of the orthothesis, which is simultaneously maintained and altered within 'modern modalities

[562] Stiegler, *Disorientation*, 2.

[563] Cox, "Aura and Electronic Music," 54.

[564] Adorno, "Letters to Walter Benjamin," 67.

[565] Stiegler, *Disorientation*, 177.

> of archivization' (analog and numeric) – the 'connection to the future' it contains being commensurate with this maintenance and this alteration.[566]

Stiegler implies that the differentiation between modern and pre-modern modalities of archivization is contained in the "identifying characteristic" of a given technic "specifically regarding a connection to the future."

An integral part of any technology,[567] the process of *becoming* presents such a "connection to the future" since it entails a vectorial tendency towards the future, as explained in the second chapter. It is "within the becoming-social" that Nora and Minc deem modern technologies to be "causing an unprecedented rupture in the greater history of technics."[568] It is therefore implied that the process of *becoming* has altered, setting apart contemporary technologies from pre-modern technologies.[569] How, one may ask, is the process of *becoming* different in analogic as well as numeric technics? A primary cause for this may be identified in the broader matters of *différance* and time: Stiegler identifies that

> [t]his is clearly a question of the autonomization of *tekhnē* and its automobility, of which the law could only be an accident qua breakdown (qua default) of essence, of being, of time – of an*other* time. The gaining or saving of time places time in default. […] On the networks, information circulates at the speed of light across network interfaces, processing systems also working at light-time, and this data-processing is anticipation: under these conditions, the usual receiver of information, the thinking *who*, seems to be dismissed, since it cannot think fast enough and must automate the process of anticipation. In order to do that, it employs the cybernetic tool called 'real time.'[570]

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[566] Ibid., 32.

[567] With regards to socio-ethnic identification, André Leroi-Gourhan "describes [...] becoming as the 'liberation' of memory articulated at three levels: specific, socio-ethnic, and individual." Ibid. 70.

[568] Ibid., 105.

[569] This is verified also by Derrida and Stiegler, specifically in the second volume of *Technics and Time*, where Stiegler quotes from Derrida's *Of Grammatology*: "This is what produces the absolute break with constituted normality and can thus be announced, presented, only as a monstrosity. Derrida (1976 (1967), 5)" Stiegler, *Disorientation*, 111.

[570] Stiegler, *Disorientation*, 140.

Industrialization of memory is the automatization of cultural memory through forms of analogic and numeric technologies. In the form of what Stiegler defines as "real time", temporality itself is transformed, as is the very condition of *différance*. Regarding cultural memory, this affects various aspects of the "connective structure". These affects will be discussed in the next section and placed into a musical context.

De-Contextualization and Conflagration of Time and Space

> We have seen that deterritorialization, which has always already begun from the first moment of exteriorization, consisted of the development of networks. Industrial retentional finitude requires networks of a new sort, one tending to eliminate delays and distances, insofar as information value is correlative to the space and time of its diffusion [...].[571]

As discussed in the third chapter, collective memory is limited by the retentional finitude of humans and is assisted by various forms of supplementary retention to compensate for this limitation. These supplements are tertiary memory – externalized, cultural memory. It has been discovered that, "[a]s supplement[s], [they open] out a gap that can be seen as in-finite, but that in fact is not infinite but rather, more precisely, indefinite [...]."[572]

Similarly, industrialized memory presents an "industrial synthesis of retentional finitude".[573] In various ways, however, this type of retentional finitude causes what Stiegler calls a "veritable conflagration of time":[574] for example, a live transmission of an event via internet-streaming "is an immediate past making the present pass by, thus constituting an already-there."[575] This means that, "within the industrial synthesis of retentional finitude," formerly sequential instants of memory are "short-circuited by the immediacy of tertiary retentions, which [...] co-incide with primary and secondary

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[571] Ibid., 100.

[572] Ibid., 11.

[573] Ibid., 97.

[574] Ibid.,106-122.

[575] Ibid., 241-242.

retentions."[576] The kind of non-temporality engendered by industrialized technics is what Stiegler refers to as "real time":

> What we today call 'real time' is industrial time, the industrial production of time by the programming industries whose products suspend all traditional programs. […] Thus so-called real time is not time; it is perhaps even the de-temporalization of time, or at least its occultation; yet it is still nonetheless time, industrially 'won,' and thus also lost – which is to say radically understood as apart from the *clock*, as *capital*, the extreme modality of 'preoccupation.'[577]

"Real time" is the concealment of time, which affects *différance* correspondingly in that it "does not exclude the work of différance but conceals it in an essential manner."[578]

German media theorist Wolfgang Ernst contributes to the observations about live transmission in his 2013 essay "Archives in Transition: Dynamic Media Memories". He describes how the archival modalities of live streams have further repercussions for how contemporary society perceives temporality:

> The shift from emphatic cultural memory (which is oriented toward eternity) to intermediary media memories becomes apparent in recent mass media. In August 2007 German public TV channel ZDF announced a new online service: the ZDF Mediathek, which allows for online review of programs already broadcast as far back as one week (deconstructing the very format of classical TV itself, which is the strict temporal program 'flow,' as described by Raymond Williams). A similar service of providing individualized TV-watching time, Entertain Comfort, announced by German Telecom, offers a choice of TV programs from an online archive. When a national German football league game already can be accessed only one hour or so after the event itself—thus almost in the present—near-live (like the live-on-tape concept previously) time shifting for temporally deferred TV at home takes place.[579]

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[576]Ibid.

[577]Ibid., 63.

[578] Stiegler, *The Fault of Epimetheus*, 230.

[579] Wolfgang Ernst, "Archives in Transition: Dynamic Media Memories," *Digital memory and the* archive, 99.

Similar services exist for the access of live transmissions and of archived recordings of concerts. Websites such as YouTube, or music subscription services like Rdio or Spotify offer an eclectic array of music (as video or audio), while online archives such the *Naxos Classical Archives* "present hundreds of otherwise unavailable recordings from the LP era, including many great performances from the past and some priceless rarities."[580] In 2014, the *Deutsche Grammophon* launched their application *DG Discovery*, which promises to "bring you a carefully and lovingly curated app of the finest classical music from the archives of the world's leading classical music label."[581] *Grammophon* editor and publisher Martin Cullingford states that "[r]apid developments in online music – first downloads, then streaming – have made most of the history of music available for free or at the very least through an astonishingly good value subscription model."[582] The *Berlin Philharmonic Digital Concert Hall* advertises to potential subscribers by inviting them to "[g]et closer to the music – Watch and listen to classical music's finest conductors and soloists performing with the Berliner Philharmoniker – live as it happens or on-demand as it suits you."[583]

Ernst explains that digital archives reveal a particular infrastructure in which temporal depth has become increasingly shallow. Simultaneously, the organization of digital archives itself displays a kind of one-dimensionality, contracting aspects of time as well as space:

> With the retroconversion of past analog media into digital storage (mostly for preservation reasons) there will be different ways to hack into these digital memories because the digital archives, once online, are no longer separated from the actual infrastructure of Web-based data circulation. In a way, of course, this means the disappearance of the emphatic notion of the archive; it dissolves into electronic circuits, data flow. This also means that the 'deep'

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[580] Naxos, "Naxos Classical Archives," http://www.naxos.com/feature/Naxos_Classical_Archives.asp (accessed January 15th, 2015).

[581] DeutscheGrammophon.com, "DG Discovery App – Deutsche Grammophon," (http://www.deutschegrammophon.com/en/album/dg-discovery-app.html (accessed January 15th, 2015).

[582] Rebecca Schmid, "Deutsche Grammophon launches own streaming service called DG Discovery," *Deutsche Grammophon.com*, http://www.gramophone.co.uk/classical-music-news/deutsche-grammophon-launches-own-streaming-service-called-dg-discovery?pmtx=green-red&utm_expid=32540977-3.FNZqseMjTvyRLIewfMgTiA.1 (accessed January 15th, 2015).

[583] Berliner Philharmoniker, "Digital Concert Hall." https://www.digitalconcerthall.com/ (accessed January 15th, 2015).

> archives are transformed into flat' archives – flat in the sense of the micro-chip architecture. There has always been data circulation between the needs of an inquiring present and the archival documents; only online does this circulation become a closed circuit. There is an increasing spatiotemporal entanglement: the gap between traditional resident emphatic archives and ultra-speed transfer narrows; emphatic memory is progressively undermined by a shift of emphasis toward *memorizing*, the dynamic process based on a network of micromemories and interacting micromemorial hierarchies.[584]

Importantly, while Ernst identifies the "disappearance of the emphatic notion of the archive" he echoes Stiegler's concern about the increasingly flawless representation of events or memories facilitated by contemporary technologies: these generate "clumsy, gauche memories, especially when they are accurate."[585] Digital reproduction of music using high-speed and high-fidelity (hifi) algorithms leave little room for *différance* as deferral is minimized and difference removed.

Stiegler summarizes the processes of digital technologies and applies an expanded version of Ernst's idea of "spatiotemporal entanglement", describing the conflation of space with time within a two-dimensional plane:

> These three moments ['event', 'input', 'reception'] coincide in a single spatiotemporal reality such that all delay, all distance, between them, is eliminated – but so is all locality, since locality is constructed from differentiation, like calendarity and spatiality, and differentiation is therefore, from the outset, what happens there. But if what happens *there* seems to tend to be the same everywhere, 'locality' tends to become universally identical, that is, to disappear: no longer would decontextualization be solely that of the initial story, however distant globally, but that of its 'reception,' which would thus be a tendency toward, purely and simply, the complete loss of context.[586]

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[584] Wolfgang Ernst, "Archives in Transition: Dynamic Media Memories," 100.

[585] Stiegler, *Disorientation*, 27.

[586] Ibid., 116. Furthermore, Stiegler writes: "Real time is a derealization of time, as if time were really real only in remaining unreal, chronically diachronic, asynchronized, late for itself. Time's derealization qua real time is delocalization. The onset of a crisis of space by a time that affects all architecture and architectonics, tectonics in general being then being constructed on a technological architexture erasing the difference between nearby and far away." Ibid., 124.

Finally, mass media archives – in particular the internet as a globally accessed (input and output) digital archive – represents what Roland Posner calls the *technological media concept*[587] and affects the *functional media concept* and the *code-based media concept*.[588] Modern archives such as YouTube, Rdio etc. rarely distinguish between entertainment (as per Adorno's culture industry) and culturally critical artworks; one can find recordings of Anton Webern, Galina Ustvolskaya or Pierluigi Billone as easily as those of Ludwig v. Beethoven, Lady Gaga or Elvis Presley. In that sense, digital archives often don't distinguish between *functional* content. The same lack of differentiation affects the *code-based concept* of media and the "code-related differentiation in Western music" becomes imperceptible with the contraction of spatiotemporal dimensions. This leads to back the paradoxical notion of globalized memory and raises questions about how *extratextual* memory might function within the context of the contemporary musical culture. This question will be discussed in the context of extended musical material in the next chapter.

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[587] "The technological media concept characterizes sign processes according to the technical means used to modify the contact matter involved. […] In auditory sign processes, the technical means include musical instruments, microphones and loudspeakers, radios and receivers, as well as vinyl records, reel-to-reel tapes, cassette tapes, and CDs, which is why one speaks of records, reel-to-reels, cassettes, CDs, and so forth as different media." See Posner, "Basic Tasks of Cultural Semiotics,"

http://faculty.georgetown.edu/irvinem/theory/Posner-basictasksofculturalsemiotics.pdf (accessed November 28th, 2014).

[588] Ibid. "The *functional media concept* characterizes sign processes according to the purpose of the messages which are transmitted by them. We are here dealing in a generalized form with what is known as 'styles', 'genres', or 'discourse types' in literature, art, and musicology (see Morris 1946=1971: 203-232). [...] The distinction between serious art and entertainment products appears in cinema as arthouse films versus Hollywood movies, in music as classical versus pop, and in fiction as literary fiction versus airport novels. [...] This raises the more general question of how the limitations to which a message is subjected differ when one publishes it in the context of a news item, a commentary, criticism, a reportage, a feature story, or an advertisement. The fact that such limitations are fairly stable justifies speaking of news, commentary, criticism, reportage, feature reporting, advertising, and so forth as functional media (see Hempfer 1973 and Rolf 1996).

The *code-based media concept* characterizes sign systems according to the types of rules by means of which the sign users manage to assign messages to the signs. We are dealing with a code-related division when an institution such as a radio network differentiates between departments for broadcasting spoken texts versus music, or when an international publishing house organizes itself into sections for English, French, German, and Spanish. A code-related differentiation in Western music is the distinction between monophony and polyphony, as well as that between tonal and atonal music; […] A publisher's decision to publish a book in English, French, German, or Spanish, a composer's decision to compose tonally or atonally, a painter's decision to paint representationally or nonrepresentationally, or an architect's decision to build a house in a neo-Romantic, neoGothic, or neo-Functional style can be understood as a choice between various media of publishing, composition, painting, or building, respectively. Each medium determines the types of messages which can be transmitted in it."

Participatory Quality: New Connections Bridging Fragmentation, Isolation

In the third chapter, it was examined how pre-modern technologies of cultural memory impact the social and temporal dimensions of the "connective structure".[589] As has been discovered above, digital technologies have pervaded social structures of communication, and it is important to examine the particular participatory structure of the current "connective structure".

The development of methods of analogic and numerical memory synthesis has yielded technologies which automatize various processes of information transmission. The gradual introduction of continually advancing technics has demonstrated a consistent development towards a "delegation of knowledge to automatism."[590] For example, as Leroi-Gourhan explains, while the printing press enabled the mechanized reproducibility of text, "[t]he raw book is [still] comparable to the hand tool: it is so perfected that it requires complete technical participation on the part of the reader." Ensuing technological innovations have then produced the "simple file set" which "already responds to a manual machine, since parts of the operations are transformed and contained in a virtual state in the files, which it is necessary only to open. Punch-card files are a supplementary step, comparable to that of the first automatic machines."[591]

Based on this observation, Leroi-Gourhan sees various issues regarding the traditional relationship between humans and knowledge, identifying a tendential move

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[589] Concerning the social dimension of cultural memory, a given technics reveals a given "structure of participation" involving distinct hierarchical properties. With regards to music, it has been concluded that, between performer and audience, there exist a number of participatory gradations while, as Edward Said concludes, "[p]erformance is [...] an inflected and highly determined point of convergence where the specific and the general come together, music as the most specialized of aesthetics with a discipline entirely specific to it, performance as the general, socially available form of its cultural presentation." Said, *Musical Elaborations*, 17.

This point was later corroborated by Aleida Assmann's statements about the necessary coexistence of "'active memory' [...] set up against the background of an archival memory." Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*,

http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014).

In the context of cultural memory, "active memory" implies that cultural memory be implemented in communicative interactions. For example, live performances permit historical pieces to be an "active memory" of the history of musical culture. An important aspect for this is the accessibility to the public as opposed to a type of exclusivity due to institutionalized points of access etc.

[590] See Stiegler, *Disorientation*, 78.

[591] Leroi-Gourhan, *Le mémoire et les rythmes*, 65.

from "'knowing' humans" to "'objective' knowledge" along with "transformations of understanding – of consciousness itself."[592]

While Stiegler concludes that analogical and numerical technics involve "a (further) loss of participation by the *who*, or at least a modification of its modalities, since the *what* teleguides the reading that *is* the *who,*"[593] it is still possible to differentiate between various degrees of lost participation through modern technologies. In his 1964 book *Understanding Media: The Extensions of Man*, Marshall McLuhan provides such a distinction in his concept of *hot* and *cool* media:

> There is a basic principle that distinguishes a hot medium like radio from a cool one like the telephone, or a hot medium like the movie from a cool one like TV. A hot medium is one that extends one single sense in 'high definition.' High definition is the state of being well filled with data. A photograph is, visually, 'high definition.' A cartoon is 'low definition,' simply because very little visual information is provided. Telephone is a cool medium, or one of low definition, because the ear is given a meager amount of information. And speech is a cool medium of low definition, because so little is given and so much has to be filled in by the listener. On the other hand, hot media do not leave so much to be filled in or completed by the audience. Hot media are, therefore, low in participation, and cool media are high in participation or completion by the audience.[594]

One may say that modern technologies affect contemporary musical culture in both hot and cool media. The reproduction of music – mechanical and digital – may be regarded as a hot medium: processes of reproducing of music (i.e. recording and playback) are "low in participation" as they entail the externalization of the performance of music – the musical "activity" is replaced by the technology. The more "hifi" the recording, the hotter the medium and therefore the lower the participation. Consequently, music reproduction renders music into an archive as opposed to an active form of cultural memory.

Inversely, one may find cool media in musical technologies, which don't preclude a performance – the active aspect of music. Technologies which are employed in the

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[592] See Stiegler, *Disorientation*, 78.

[593] Ibid., 79.

[594] McLuhan, *Understanding Media*, 37.

course of a performance are examples of cool media; i.e. electric and electronic (analogic and numerical) instruments for sound-generation (such as amplified instruments or synthesizers), as well as interfaces for the real time generation and manipulation of sound, typically described as live electronics (for example Max/MSP as an interactive music performance software). It is noteworthy to add that cool media may still present "high definition" quality as contemporary processes of synthesized instruments have reached a "hifi" standard at which synthesized instruments are barely distinguishable from the "real" instrument. Contrary to McLuhan's idea that cool media equal low definition, cool media can therefore still be "high in participation" and have "high definition".

Interestingly, there exist setups which present a combination of hot and cool musical media: for example, Stockhausen's *Gesang der Jünglinge* (1955/1956) is a composition for magnetic tape and five loudspeakers. The piece consists of a number of different acoustic materials such as pre-recorded and edited human sounds as well as various electronically generated sounds (sine waves, pulses, noise, synthetic vowel sounds etc.). A performance of the piece involves the playback of the produced tape (or of a sound-file off a computer hard disk). The presence of "real live performers" is therefore thoroughly substituted (hot medium) and the concert aspect is still maintained. At the same time, Stockhausen's treatment of the voice recordings, the result of which is then played back from tape or computer, wrenches the voice out of its former contexts and requires a recontextualization through the listener. Through the use of vowels as harmonic spectra and consonants as plosives and fricatives, Stockhausen creates a direct connection between the voice and the synthesized sine tones, clicks, and noise. In this way, the boundaries between human and machine are blurred. One might say, that this turns the piece into a cool medium.

In summary, contemporary digital technologies comprise processes, which influence the participatory structure regarding inner-musical aspects (in terms of processes within a given piece of music) and outer-musical aspects (in terms of reproduction and distribution) alike.

In his work *Noise: The Political Economy of Music* (1985), Jacques Attali refers to these changed participatory structures in their relationship to musical procedures

('internal to existing [musical] codes') and musical media ('external to existing codes'). He makes the observation that music becomes more de-ritualized in forfeiting its social function due to simultaneous transformation of both aspects:

> This double process of the rupture of codes (by internal and external noise) has destroyed, network by network, the socializing function of music. Music has not remained an 'archipelago of the human' in the ocean of artifice that commercial society has become. The sound object itself has become artifice, independent of the listener and composer, represented, then repeated. Music used to cadence birth, labor, life, and death; it used to organize the social order. Today, it is too often nothing more than the consumption of past culture or a structure of universal mathematical invariants, a reflection of the general crisis of meaning. […] We have gone from the rich priest's clothing of the musician in ritual to the somber uniform of the orchestra musician and the tawdry costume of the star, from the ever-recomposed work to the rapidly obsolescent object.
>
> The ritual status of music has been modified by the network it subtends. It has become a simulacrum of the solitary spectacle of the sacrifice.[595]

Attali's statement seems to relate to Hindrichs' theory of music's double social function: music's inner-musical and outer-musical functions have simultaneously been affected by contemporary technics. At the same time, the music ("the sound object") is now separated from composer, listener and – as Attali did not mention – the performer. Simultaneously, Posner's *sociological media concept*[596] becomes relevant in this situation as it reveals that, with the transformation of music's social function, digital technologies

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[595] Attali, *Noise: The Political Economy of Music*, 36.

Attali's concept of "noise" in this context is that it substitutes "new differences for the old differences. Noise is the source of […] mutations in the structuring codes. For despite the death it contains, noise carries order within itself; it carries new information." Ibid., 33.

[596] "The sociological media concept characterizes sign processes according to the social institutions that organize the biological, physical, and technical means involved in producing signs. Social media for visual sign processes include galleries, museums, and libraries promoting exhibitions; press syndicates, book publishers, and book stores releasing printed products; as well as film distributors, movie houses, and rental stores providing films and videos. Social media for auditory sign processes include concert halls, jazz clubs, and piano bars, as well as record companies, radio stations, and telephone centers. […] Most of these social media organize more than one type of sign process; just think of theaters and opera houses, sports arenas and fitness centers, churches, broadcasting companies, and websites (see Giesecke 1988 and Baltzer 2001)." Posner, "Basic Tasks of Cultural Semiotics" http://faculty.georgetown.edu/irvinem/theory/Posner-basictasksofculturalsemiotics.pdf (accessed November 28th, 2014).

have influenced the landscape of cultural institutions: as digital archives of music present *virtual* concert halls, the *actual* concert hall as physical venue becomes redundant. The audience of virtual concert halls becomes the "hive".

Technics of the Hive

As has been pointed out in reference to Jaron Lanier, contemporary culture yields "hives" rather than collectives. Since the "digital hive is growing at the expense of individuality,"[597] one may conclude that the digital "hive" is a transformation of the traditional dualism between individualism and collectivism[598] in that it implies a pixelated individualist existence which is turned into a kind of collectivist existence: according to Lanier, an accumulation of innumerable fragmented individuals make up the digital "hive". Participation structures within digital media function because and to the advantage of the "hive" rather than the traditional "collective". In the context of culture, this entails a deviation from its historical lineage, wherein communities were still based on ethnic unity and shared history. A type of paradoxically global culture[599] is the consequence of this deviation from the traditional "collective", and its musical culture necessarily encounters a similar fragmentation of earlier notions of musical "collectives": in a digitized global musical culture, composers, performers, and audience are able to collaborate while being separated spatially and temporally – in this way, they constitute a musical "hive" collective.

As industrialized memory gains value in proportion to the economic profits it yields, its functionality within capitalist structures is assessable in relation to its consumption. In the context of an industrialized music culture, this applies to the audience of reproduced music. With an increase of music consumption via recordings or

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[597] Lanier, *You are not a gadget*, 26.

[598] This has been discussed in chapter one with regards to individual and collective identity in reference to Jan Assmann's theories: "The interaction with others is simultaneously an interaction with ourselves. Only through communication and interaction can a sense of self, i.e. personal identity, be secured. Personal identity is an awareness of oneself, which is an awareness of the others at the same time [...]. In order to be able to develop a personal identity in the interaction with others, one has to be living in a shared 'symbolic world of meaning.'" Assmann, *Das Kulturelle Gedächtnis,* 135.

[599] See, "Globalization, Universalism, and the Erosion of Cultural Memory," 123.

live streams from home,[600] a large portion of contemporary audiences consists of numerous individuals who consume music in social isolation. This verifies Attali's observation about the de-ritualization of music. One may say that music's extra-musical function (as functional music) is omitted since the digital transmission of reproduced music occurs via high-speed networks and excludes the moment of performance.

Musical culture in digital networks presents a "hive" collective, i.e. the audience of a given piece of music consists of ethnically diverse individuals. This means that a given composition may be perceived by one individual as "cultural code" exhibiting a given traditional (inner-musical) social function. Or, it may be heard as "cultural noise" by a foreign listener to whom the piece seems to depart from a familiar musical social function. With the technical possibility to consume recorded music from any time and any place, contemporary audiences may not perceive music as cultural memory but merely as a commodity. This, to quote Attali, is "a reflection of the general crisis of meaning."[601]

Both observations reveal that the digitization of musical culture causes the social function of music to deviate from its previous characteristics as functional music. This indicates that the pre-formation of musical material is affected as socio-cultural frames of reference may no longer inform musical meaning that depends on extratextual memory. This will be considered in the musical analysis in the sixth chapter.

Accessibility

In chapter one, it has been explained that cultural memory depends on its circulation. In oral traditions, knowledge of the past is circulated via ritual and repetition, while written text serves a similar role by means of engraving and distributing text – text is orthothetic representation. In these cases, the social dimension of the given "connective structure" reveals an open system in which cultural knowledge is accessible to the members of its community.

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[600] See Marco Frei, "Mausklick statt Aufführung? Neue Medien erobern die Live-Musik," *Das Orchester: Magazin Für Musiker Und Management* 56, no. 9 (2008): 30-31. Availabole online: http://www.dasorchester.de/de_DE/journal/showarticle,26571.html (accessed January 20th, 2015).

[601] Attali, *Noise: The Political Economy of* Music, 33.

In reference to Aleida Assmann, it has been pointed out that cultural memory has an archival (passive) dimension and an active dimension:[602] archival memory is less accessible to members of a culture than active memory, since the former involves "specific practices and institutions against the dominant tendency of decay and general oblivion."[603] Both the active and archival dimensions must be connected in order to constitute cultural memory.[604]

In reconciling Aleida Assmann's concept with notions of the industrialization of memory, Stiegler makes an important statement about the technical capacities of contemporary technologies and the decommunitization within culture:

> When collective memory becomes analogic or numeric, the relationships between messages, senders, and receivers is appreciably changed. At first, the receiver can be exempted from any specific formulation of these memory syntheses (from what in the century of generalized literacy was called a Bildung) […]. With the advent of networks of input and reception devices, these operations ['recording' and 'reading'] tend to be separated. These two poles are the extremities of a network: at one pole, industrial manufacturers, at the other, consumers. [...] Since consumer access to a network is only through an intermediary output device, reading analogic and numeric memory traces requires that the receiver have an appropriate device. When it was merely a matter of written marks, the 'reading device' was the receiver him- or herself: the reader, once literate, interiorized techniques of decoding, and at the same time of encoding, in the form of a competency acquired in school, of a knowledge in the literal sense: in literal synthesis, to know how to read is also to know how to write, and this is the equivalence implied by the instrumental characteristics of this synthesis. With technologies of light-time, 'competency' has become buying power, no longer political (which is always orthographic knowledge) but economic. The minimal reciprocity that connected the reader of a text with its author, namely, that they share a techno-logic competency (that of literal/literate technology), is severed. In this sense, analogic and numeric

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[602] "While [...] active forms of re-creating and maintaining a cultural memory are generally accessible and reach a wider public, the documents of the cultural archive are accessible only to specialists." Aleida Assmann, "Memory, Individual and Collective," in *The Oxford Handbook of Contextual Political Analysis*, http://www.oxfordhandbooks.com.ezproxy.library.uvic.ca/view/10.1093/oxfordhb/9780199270439.001.0001/oxfordhb-9780199270439-e-011 (accessed October 20th, 2014).

[603] Ibid.

[604] Ibid.

> technologies suspend the participative aesthetic of ethnic communitarian forms and enter a process of decommunitization.[605]

While verifying Adorno's idea of the "regression of listening,"[606] Stiegler identifies a crucial disconnection between the author/composer and audience based on the disappearance of shared skill or "techno-logic competency". Music's *social* function is lessened by the *social* as the "receiver can be exempted" and access to music is given based on the possession of a technical reading device rather than skill and the capacity of comprehension.

As has been explained in the third chapter, a given "structure of participation" translates into the modalities of cultural transindividuation within the same "connective structure". The following section will discuss the consequences of contemporary culture in which low and passive participation and decommunitization are prevalent.

TransIndividuation

Modern technologies have caused former structures of memory culture to be dissolved into discrete units: through numeric technics, individuals, community, space and time become disconnected entities. On this basis, this section will investigate how the process of individuation itself – transindividuation – is affected by digital technologies, as it is the process, which constitutes the connections within cultures of memory.[607]

With regards to the technics of industrialized memory and their above-mentioned social and cultural implications, the following questions are pertinent: what do modern processes of individuation connect? Are individuals and cultural knowledge still in a relationship, which entails a process, a *becoming*? With the pervasiveness of decommunitization and the prevalence of a "hive" identity, how do identity and the

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[605] Stiegler, *Disorientation*, 130-131.

[606] Adorno, "On the Fetish-Character and the Regression of Listening," 288-317.

[607] Stiegler explains transindividuation in reference to Gilbert Simondon who "says that if you want to understand the individual, you need to inscribe the individual in a process of which he is only a phase. [...] So what is this process? It is the process of individuation, that is of transformation, and for Simondon, everything is a [sic] caught up in and brought into a process of individuation. [...] '[T]echnics' are also processes of individuations." Stiegler, and Rogoff, "Bernard Stiegler and Irit Rogoff – Transindividuation," http://www.e- flux.com/journal/transindividuation/ (accessed May 25th, 2014).

meaning of cultural objects individuate, or *become* under the consideration that "my individuation can only be as effective as my socialisation"?[608]

Possible answers to these questions are rooted in the following observations: since socialisation "can take a lot of time",[609] one may suppose that the dissolution of time profoundly affects the process of socialisation: "short-circuited by the immediacy of tertiary retentions,"[610] the principle of process itself undergoes fragmentation – the process of socialisation and individuation. This also substantiates Adorno's idea of the loss of individuality in the context of *culture industry*.[611]

Accordingly, Stiegler explains that

> it is the mechanisms of transindividuation that are grammatized, that is, formalized, reproducible, and thus calculable and automatable. Now, transindividuation is the way psychic [of the *I*] individuations are meta-stabilized as collective individuation: transindividuation is the operation of the fully effective socialization of the psychic [the *I*].[612]

It can therefore be said that modern technologies externalize the performance of music, which means that a recording of music is essentially the grammatization of "the mechanisms of [musical] transindividuation". One may understand this to be an externalization of the externalization of memory: a meta-externalization of memory.

Furthermore, the current "hive" culture constitutes the "meta-stabilized" individuation of individuals, verifying "that the new digital hypomnesic milieus enable a collective individuation that does not take already individuated individuals as its starting point, but rather directly individuates the collective and sustains the ongoing

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[608]The full statement reads: "This signifies that my individuation can only be as effective as is my socialisation. But the latter can take a lot of time: belonging constitutes itself here as difference, that is to say as différance – as time. And there is co-individuation in so far as the I shares with the we a pre-individual milieu." Stiegler, "Technics of decision an interview," 162.

[609] Ibid.

[610] Stiegler, *Disorientation*, 241-242.

[611] See Adorno, "On the Fetish-Character and the Regression of Listening," 293.

[612] Bernard Stiegler, "Within the limits of capitalism, economizing means taking care," *Ars Industrialis: association international pour une politique industrielle des technologies de l'esprit*, online (2006), http://arsindustrialis.org/node/2922 (accessed January 15th, 2015). The website of the group *Ars Industrialis*, consisting of a number of philosophers, was created on the initiative of Stiegler in 2005.

individuation of this collective."[613] Here, the notion of the pre-individual[614] is altered, which has further implications for the pre-formation of musical material and will be discussed in detail in the next chapter.

Contemporary technologies have altered "the mechanisms of transindividuation" based on a fragmentary, or pixelated, collective structure. In the following quote, Stiegler outlines the shift from former modalities of transindividuation to the current modalities. From this, it is possible to draw conclusions regarding musical transindividuation:

> […] [I]n my point of view, the twentieth century began in the nineteenth century. There was a change, a very deep change, in the organology of transindividuation. Such was the text of Adorno and Horkheimer 'The Culture Industry: Enlightenment as Mass Deception,' in which suddenly – through what is currently called mass media: television, cinema, radio, now digital technology and networks as well – the development of a new organology was forged, which in turn creates a new organization of the circulation of the symbolic. Within this new mode of organization, suddenly the production of the symbolic becomes industrial, subject to industrial processes. Here you encounter the production of symbols on the one hand, and the consuming of such symbols on the other – an aporia because it is impossible to consume a symbol. The symbol is not an object of consumption; it is an object of exchange, of circulation, or of the creation of circuits of trans-individuation. So this situation suddenly produced what I call short-circuiting – of trans-individuation. And it is a very long story, it is not framed by a short historical period, but extends over a long time.[615]

At this point, it is possible to summarize that in contemporary culture, the social dimension of the "connective structure" has become fragmented while its temporal dimension – of both tertiary memory and its process (transindividuation) – is short-circuited. This has repercussions for the mechanisms of transindividuation of musical

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[613] Bernard Stiegler, "Memory," in *Critical Terms for Media Studies*, eds. W. J. Thomas Mitchell, and Mark B. N. Hansen (Chicago: The University of Chicago Press, 2010) 86, note 39.

[614] See Stiegler, *Disorientation*, 206-208.

[615] Stiegler, and Rogoff, "Bernard Stiegler and Irit Rogoff – Transindividuation,"

http://www.e- flux.com/journal/transindividuation/ (accessed May 25th, 2014).

Furthermore, "it is the situation for families now, for schools, for everything. Because, yes, it is true that I originally investigated musical questions through those topics, but later I opened this question, I proposed a more general theory of society today, of contemporary society, which is that we are in a society in which organology has become industrial. And that this industrial organization results in an organization through the production of consumers and producers." Ibid.

culture as the *experience* of music production and perception is short-circuited and therefore fragmentary.

During his work at IRCAM (Institute for Acoustic and Musical Research and Coordination) and IRI (Institute for Research and Innovation), Stiegler has been making relevant observations and states:

> I try to develop what I call an 'organologic' approach to the question of musical experience, not only for the musicians, but for the public. [...] [T]he musicians, the composers, working in IRCAM had only a very limited public, a very small public. […] only a public of professionals. […] Not a general public, and not a public of amateurs. And it was really extremely problematic for me, politically problematic but also artistically and philosophically problematic. So I decided to try to understand how this situation was possible. It was at this moment that I decided to rethink and reactivate the tradition of what in the field of musicology is called 'organology,' but I decided to propose what I call an expanded organology, that is, an organology that didn't study only instruments but also the conditions of music's reception by the public – for example with hi-fi apparatuses, the impact of radio networks, possibilities created by mp3 players, [...] and also software, because IRCAM was a research center in which software had a prominent conceptual place.[616]

According to Stiegler's observation, audiences no longer represent the general public but only a small part – the minority – of the given cultural group. The general public today perceives music no longer only at live events but also through the playback of archived sound via digital devices. At the same time, music software is frequently employed in the production of music – for example at IRCAM – which entails, to some degree, the exclusion of live performance. In both cases, the production and reception of sound by means of computerized processes present "short-circuited" social frameworks of musical transindividuation.[617] The use of digital technologies causes a specific

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[616] Ibid.

[617] Stiegler makes an interesting statement, explaining the emergence of similar issues resulting from technologically mediated interactions, short-circuiting social relationships: "Initially, the most common, everyday experience of education is the relationship between parents and children, or we could say that the space of the family is the first space of education. And here we can already begin to identify problems, which are very close, very connected to problems that you can see at other levels and modalities of education, in schools and in museums and in other similar institutions. And so I would like to speak about those three levels; this "family" education; academic education, lets say; and "cultural" education, that of cultural institutions. And in these three different levels, you can encounter the same problems—problems of

experience of various processes of music production which mirrors the fragmented social structure of contemporary culture: the musician as an individual and a member of a specific (musical) culture is lost. The production of sound and music may forgo *real* musicians since sound can be a) generated via analogue or digital sound synthesis, or b) recorded once, archived and then reused virtually unlimited times, after the recorded sound has possibly been manipulated to such an extent that the sound is no longer associated with a musician at all.

For musical culture, this demonstrates the "industrial reticulation of transindividuation that short-circuits traditional and institutional social" and musical "networks."[618] Current digital technologies have been thoroughly absorbed by society and determine the fundamental structures on which cultural memory used to be built.

> Industrial hypomnesic memory now comprises the very heart of contemporary societies, and it is striking to see objects of daily use become ever more closely linked to media by becoming communicative: iPods, smart phones, GPS navigators, and many other devices using micro- and nanotechnologies – all of these are hypomnesic objects.[619]

New social relations have caused a change in the "relationship between artworks and their publics". This change relates to the "carnal" aspect of music in that the "real" experience has been relieved: the experiences of *producing sound* by playing an instrument and of *perceiving* a live performance on a public stage are outsourced and externalized to computers.[620]

However, Stiegler advises his reader to continue "being critical and producing critique" and to retain "[t]he ability to critique and the capacity to discern. […] If you are

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circuits, long and short. Today, the problem of education at the level of the family is the short-circuiting of the relationship between generations through the operations of the media." Ibid.

[618] Stiegler, "Within the limits of capitalism, economizing means taking care," http://arsindustrialis.org/node/2922 (accessed January 15th, 2015).

[619] Stiegler, "Memory," 83.

[620] Stiegler terms this omission of physical experience *biological synthesis*: "Here, rather, synthetic opposes real in the sense that a synthetic stone is false and valueless, non-real, that which leads in world such as ours to a sense of the real that is reduced […]. Thought in this way, the real becomes the possible, not the other way round – and as we shall see, this issue is at the heart of the biological synthesis. Stiegler, *Disorientation*, 235. Additionally, it may be said that industrialized media, the *what*, are a threat to culture in that it may prevail over the human, the *who*: a hierarchy in which machinization "wins", in which music does not require the human anymore. This substantiates the dystopian views of Adorno and McLuhan.

able to engage critically, then a process takes place that would otherwise remain static."[621] Critical engagement may then enable composers, performers, and listeners to establish new, meaningful relationships to musical artworks in which musical transindividuation necessitates and not excludes the *who*. Stiegler imagines

> a new age of memory in which memory once again becomes transindividual. The catalyst for this new age is the liberation of hypomnesic memory from its industrial function. For if dissociation is what causes the short-circuiting of transindividuation, then the associated hypomnesic milieus of digital networks mark a crucial point of rupture: insofar as they are cooperative and participative, they can reconstitute the circuits necessary for transindividuation. Such a transformation, I want to suggest, requires a change of industrial model, a new economy of hypomnesis and anamnesis that underscores their fundamental complementarity. Cooperative digital technologies can be placed in the service of individuation, but only if the industrial politics of hypomnesis are implemented in the service of a new age of anamnesis.[622]

In the sixth chapter, it will be investigated how the use of digital technologies in music engender a grammatization of transindividuation which, in accordance to chapter three and four, refers to the individuation of inner-musical and outer-musical meaning alike. As such, the employment of numerical technics affects inner-musical aspects (in terms of processes within a given piece of music) and outer-musical aspects (in terms of reproduction and distribution).

The End of "Zweizeitigkeit": The Emergence of Dynamic, Chaotic Time

In the third chapter, it has been discussed that music exhibits *différance* – and becomes culturally meaningful – based on the condition that it fulfils its cultural function in providing 1) contextualization and re-orientation, 2) active participation of the members of the cultural group, 3) circuits for transindividuation, and 4) an inherent two-

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[621] Stiegler, and Rogoff, "Bernard Stiegler and Irit Rogoff – Transindividuation," http://www.e- flux.com/journal/transindividuation/ (accessed May 25th, 2014).

[622] Stiegler, "Memory," 83.

dimensional temporality [*Zweizeitigkeit*] therefore facilitating both ritualistic (anachronism) aspects and communicative or social interaction (synchronism).

With regards to the two dimensions of temporality, Jan Assmann illustrates that, since the age of Enlightenment, secularization in Western civilization has led to a gradual disappearance of ritualistic practices. As a result, the *anachronistic* dimension in Western culture has decreased, whereby a kind of one-dimensionality based on *synchronism* has permeated contemporary perceptions of temporality. During the early stages of technological industrialization this linear type of temporality was particularly reinforced:

> Analog mass media imposed an industrial calendarity, with schedules and programs that also served as cardinalities, orienting us in the images of the world through the hierarchization of news and of demographics.[623]

This development is grounded in the technological merging of formerly geographically and culturally independent identities into one transnational identity sharing a kind of global memory.[624] Jan Assmann writes about the difference between *globalization* and *universalism*:

> Under the term globalization, I understand a process of general dissemination (of merchandise, technologies, news, political influence, religious ideas) across political and cultural boundaries and of the ensuing integration of various, previously isolated zones into one system of interconnections and interdependencies, where all nations, empires, tribes and states cohere in some way or other through political, economic or cultural relations.
>
> Under universalism, on the other hand, I understand the rise of theories, ideas or beliefs with a claim to universal validity. […] Universalism, [...] suggests an intellectual and spiritual phenomenon, globalization; on the other hand, a political, economic and civilizational process (implying material rather than spiritual culture).[625]

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[623] Ibid., 83-84.

[624] "[A]t the heart of the Industrial Revolution, information systems have become global, the result having been – through the development of the telegraph, telephone, photography, phonography, cinema, radio broadcasting, television, and the information technology whose emergence is currently taking place – that global memory has itself finally been subsumed into an industrialization directly affecting our psychic processes and collective identifications and differentiations; that is, individuation itself." See Stiegler, *Disorientation*, 3.

[625] Assmann, "Globalization, Universalism, and the Erosion of Cultural Memory," 121.

Assmann goes on to outline the effects of globalization on cultural memory: globalization brings about a contraction of national difference and the disappearance of difference. He contends that, in this sense, globalized identity and globalized memory are not possible but rather present contradictions in terms.[626] As has been argued in the previous four chapters, memory, identity, and time depend on the perception of difference.

Globalization, however, neutralizes difference by replacing the non-identical with the non-different. Such processes of *assimilation* have particular effects on society and culture and therefore on music as well. As *industrial temporal objects*,[627] the broadcasting and distribution of recorded sound has few obstacles and boundaries to overcome, which is a consequence of internet-based services such as online streaming. Sound is transmitted globally at high speed, which has caused a dramatic reduction of temporal and spatial distances and thereby creates a paradoxical notion of global identity and global memory. Inauthentic temporality and the disappearance of place[628] have given rise to the transnational and transcultural character of the perception of space and identity.

Since globalization affects identity and memory in ways which – according to Jan Assmann – contradict the very essence of identity and memory, asynchronism (cyclical time) within a globalized context is not conceivable: the issue arises since anachronism presupposes a shared past which has been circulated into the present via cultural memory. A shared past, however, can only become a memory – as opposed to information – when there exists "an identity-index, [...] that is, one's own diachronic identity, be it as an individual or as a member of a family, a generation, a community, a nation or a cultural and religious tradition."[629]

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[626] "[...] memory and globalization work in opposite directions. Memory functions in the direction of identity which, in all of its fuzziness, always implies a notion of difference. Globalization, on the other hand, works in the direction of diffusion, blurring all boundaries and bridging all differences. Since something like global identity cannot exist, the concept of global memory is a paradoxical notion. Ibid., 123.

[627] Based on a disorienting decontextualization, industrial temporal objects are created from and performed through an already objectified memory, "from an anonymous elsewhere, a satellite with neither here nor now […]." Stiegler, *Disorientation*, 241.

[628] Ibid., 8.

[629] Assmann, "Globalization, Universalism, and the Erosion of Cultural Memory," 123.

The current situation reveals a kind of *pseudo-identity* of communities ("hives") in a globalized space and has therefore yielded a number of controversial approaches to musical creation and perception.

For example, the accessibility of music from foreign cultures has frequently resulted in a type of musical *tourism* and facilitated cultural appropriation, based on a lack of the "ability to critique and the capacity to discern".[630] Without critical engagement, musical perception merely serves the purpose of *consumption* rather than the *understanding* of music, which must be rooted in a pre-formed place of cultural knowledge. Without this knowledge and the capacity to understand music as cultural memory, a dissolution of *différance* is the result – a "diffusion, blurring [of] all boundaries and bridging [of] all differences."[631]

In addition, it is crucial to understand that digital systems of modern technology themselves produce a new kind of temporality, one which does not comply with former orders of cyclical repetition or linear progress. Instead, the constant accessibility of digital technology creates a *disorder* of fragmented bits of time – a *discontinuity*. Wolfgang Ernst describes:

> What separates the Internet from the classical archive is that its mnemonic logic is more dynamic than the cultural memory in the printed archive. Although the Internet still orders knowledge, apparently without providing it with irreversible hierarchies (on the visible surface), the authoritative archive of protocols is more rigid than any traditional archive has ever been. Thus the remaining Internet somewhat adopts the so-called *chaotic storage* method in economy. According to an editorial in *Scientific American*, 'The World Wide Web and the rest of the Internet constitute a gigantic storehouse of raw information and analysis, the database of all databases. [...] The more serious, longer-range obstacle is that much of the information on the Internet is quirky, transient and

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[630] Stiegler, and Rogoff, "Bernard Stiegler and Irit Rogoff – Transindividuation," http://www.e- flux.com/journal/transindividuation/ (accessed May 25th, 2014).

[631] Assmann, "Globalization, Universalism, and the Erosion of Cultural Memory," 123. Also: "The temporal industrial object is [...] the reification of a quasi-integrally de-localized rhythmics emerging, through telecommunications networks, from an anonymous elsewhere, a satellite with neither here nor now: the occultation of différance is the indifférance of a non-place ('no future' does not mean 'nothing *happens* anymore')." Stiegler, *Disorientation*, 241.

> chaotically 'shelved' – leading to archival phantasms of disorder.[632]

With a temporality that outlines chaos, numerical technics as digital archives of music present "an *anarchive* of sound in technological storage as opposed to the archival order of musical notation."[633] Such understanding does not necessarily call for condemnation of digital technology. Rather, Ernst sees in this an opportunity for a renewed experience of externalized music:

> 'Message or noise?' There is something like the 'media-archaeological ear' that listens to the sound of material tradition, in fact the technically mediated sonic processuality of what is otherwise called history, an alternative to the cultural emphasis on listening to musical semantics.[634]

Never Forgetting: Recording-Reproduction – Repetition ad infinitum

Aleida and Jan Assmann explain that, the act of remembering is complemented by the act of forgetting. Forgetting is a necessary component within the various processes of memory,[635] and is correspondingly present in music, as has been explained in chapter three.

As discussed, musical forgetting affects 1) compositional processes within a given piece of music and 2) the continuation of musical canons in a culture. Accordingly, "to forget" within a given composition is manifested in developmental and formal aspects such as motivic variation, thematic work, the shaping of form, etc. It has been discovered that the emergence of *différance* is constituted equally by forgetting and

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[632] Wolfgang Ernst, "Discontinuities: Does the Archive Become Metaphorical in Multimedia Space?," in *Digital memory and the archive*, 139.

[633] Wolfgang Ernst, "Toward a Media Archaeology of Sonic Articulations," 174.

[634] Ibid., 181.

[635] Ruptures in the continuity of time – caused, for example, by a change of a historical tradition – prompt a perceived present to be perceived as the past. Some aspects of this past are continued by memory while others are discontinued by forgetting. It has been established that forgetting pertains to short-term memory (individual and social memory) as well as to long-term memory (cultural memory). Importantly, since "we define ourselves by what we collectively remember and forget," it is implied that memory processes entail selective processes based on identity. See A. Assmann, *Erinnerungsräume*, 32 and 62; or J. Assmann, *Das Kulturelle Gedächtnis,* 36.

remembering: compositional forgetting allows for the occurrence of *différant* repetition which then individuates musical meaning within a given composition.

As regards musical canonicity, it has been explained that forgetting influences both the "Critical Canon" of a given music-performance culture and the "Official Canon" of music-theoretical discourse of the same cultural group.[636] The second chapter has been concluded by the observation that the production of music which is culturally relevant is possible only if the conceptualization and compositional progresses are informed by a remembering paired with forgetting.

In scrutinizing prosthetic supplements of the digital era, it must be understood that recorded sounds and images present identical repetition. Digital memory therefore excludes the aspect of forgetting. This is why, as Stiegler contends, memory captured on a computer hard drive must not be considered *real* memory.[637]

Technologies of industrialized memory have been developed on the premise of gaining more "high-speed" and offering a "better quality": the use of denominators such as "hifi" or "lossless" aims to suggest authenticity of the automated replica. Paradoxically, though, the "better" the recording the "more identical" the repetition (reproduction) of the original, and the higher the degree of the misrepresentation of the original. As a consequence, digital (numerical) technologies are more problematic in providing a supplement to memory than are mechanical (analogic) technologies. Stiegler explains in great detail:

> If a real distinction between story, event, story of event, and event of story – between event, input, and reception of output – is never possible and cannot be more than formal (its form is the law); if the event is never more than its captured data, and if these data *are never more than* their dissemination and reception, just as a text does not exist independently of its reading, and what *that* text says does not exist outside of the text or *before* its reading, as it were in history (i.e., in the literal recording of time), it can only appear as delay, [...] collapsing the possibility of any localization as well as any law differentiable from 'fact.' […] Just as territory only exists

[636] See Komara, "Culture Wars, Canonicity," 238-239.

[637] Stiegler, "Technics of decision an interview," 152. While Stiegler's following statement refers to analogical as well as numerical technics, the present section will only consider digital technologies. "The advent of recorded sounds and images reveals that an identical repetition must – like the original forgetting or default that produces memory – be received each time as a modification, as a difference."

> when it is crossed, memory exists only when it is recalled. […] And just as a map can never coincide with physical space 'point by point,' as its equivalent, its identical reproduction, just as 'this Expanded Map [would be] useless' (Borges 1965, 198), bringing nothing *more* to an *orientation*, memory must reduce the memorizable in order for it to be memorable: in order to be oriented in the already-there of memory it is necessary to forget (it). A memory that would not forget would be like that of Funès (Borges 1962, 115), who cannot *leave* the present, can neither make it pass nor memorize it, nor even fully access the present: this would be a non-memory – a nonthought. Funès 'was not quite capable of thought. To think is to forget differences, to generalize, to abstract. In Funès' super-charged world, there were only nearly immediate details.'[638]

The reduction of memory in order to render it "memorable" presents the necessity of forgetting in the process of memory. Stiegler's assertion reaffirms that modern technologies conflate temporal differences: numerical technics produce a kind of "technical remembering" which precludes the present by omitting the aspect of forgetting. At the same time, an un-forgetting memory eliminates the aspect of identity, as digitally stored memory bypasses any process of selection – after it has passed, as information, a measurement "relative to their plus-value, their degree of appreciation."[639] Digital archives are therefore, in Stiegler's eyes, depersonalized.

Contemporary musical culture is impacted by several aspects of numeric technics as the digital, *unforgetting* memory affects the current musical canon, which will be discussed in the following section. The new un-forgetfulness also influences aspects of inner-musical structures and creates new questions as well as possibilities with regards to musical material. This will be discussed in the sixth chapter in which musical analyses will demonstrate the relevance of the loss of forgetting in relation to aspects of memory within a given piece of music.

Forgetfulness VS. Remembering Everything: Canonicity Today

It seems that the promise of digital technology has been perceived to ensure memory's *athanasia* (immortality), to extend the human beyond its limitations by means of a type of retentional *infinitude*. As Luciano Berio points out, however, this promise has

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[638] Stiegler, *Disorientation*, 117.

[639] Ibid., 111.

remained unfulfilled while the current music industry has caused backlashes against the tradition of musical culture. Paradoxically, music is now being forgotten rather than remembered.

> Today, the listener has a tendency to make use of the whole of past music as if it were a consumer commodity. This makes sense because for the listener the past is the most available resource of musical knowledge, although this tendency often carries the signs of an unconscious ideological frustration, since it is rooted not in a plausible code of musical values but in the way we are conditioned by the market. […] But conservation of the past also makes sense in a negative way, becoming a way of forgetting music. It provides listeners with an illusion of continuity; [...] This is why musical performance often seems to have autonomous life: it becomes a sort of merchandise, indifferent to the music it is supposed to be serving. However diversified these kinds of performing life appear to be, they are all deeply rooted, I insist, in a conditioning consumer society rather than in the world of ideas.[640]

Berio's ideas about the current consumer society beg the question about selectivity within contemporary musical culture and culture in general: according to which criteria does a piece of information – or a piece of music – find entrance into the consciousness of the social realm?

In the following, criteria related to a) contemporary economic politics and b) the current practice of musical experience will be discussed.

Economic Politics of an Industrialized Canon

> The result is the veritable planetary dimension of selection and diffusion, at the speed of light, of the industrial construction of the present. An event can only rise to the level of being an event, can only actually take place as an event, if it receives 'coverage'; even if time cannot be totally reduced to artifice, it is always at least co-produced by the media. 'Coverage' results from selection criteria

[640] Berio, *Remembering the Future*, 61-62. Furthermore, Wolfgang Ernst describes this as follows: "Although the term archive seems to describe all sorts of data banks on the World Wide Web almost universally, it also blurs the (dis)similarities between old (print) and new (digital) archives. It is exactly the multi of multimedia that separates old from new archives. In contrast to two thousand years of basically written history, the advent of audiovisual recording media has led to genuinely multimedia "global memory" projects like the music-ethnological Berlin gramophone archive (E. M. v. Hornbostel) around 1900 and the film Archive de la Planète of world cultures (A. Kahn) around 1930, resulting in the Encyclopaedia Cinematographica of moving nature (Institute for Scientific Film in Göttingen after World War II), which turned the archive into a discrete matrix of life itself." Ernst, "Discontinuities: Does the Archive Become Metaphorical in Multimedia Space?," 125.

> determined by the production of plus-value. This kind of memory, as a permanent flood, conceals itself to the degree to which it is produced; 'one piece of information chasing another,' its basic principle is its own massive and immediate self-forgetting.[641]

Industrialized memory employs a mechanism of *remembering everything*, which is economically viable, thereby replacing selective mechanisms of forgetting which were formerly culturally informed. Industrialized technologies create agglomerates of information and an excess of data. The self-forgetting that Stiegler considers a consequence of this surplus implies a distinct sort of mortality of digitally transmitted memory: while the data factually remains as a binary expression (code) in the network and exists as a kind of *apocrypha*[642] of the present, the content of the data decays into a forgotten past.[643]

For example, a recording of a performance of music may be available for consumption through digital media. Unless this performance is e*valuated* as interesting to a potential audience and hence deemed profitable by the music industry, the data may never be accessed, the recording may remain unheard. The "happening" of the performance event is therefore dependent on its rank in the hierarchy of economic value: if this value does not satisfy the demands of the current market, according to Stiegler, it could be argued that the performance has essentially not happened.

> [...] the current events industries' information not being satisfied with recording 'what happens,' since then everything that 'happens' would have to be recorded, but 'what happens' only happens in not being 'everything,' in being differentiated from everything. Information only has value as the result of a hierarchization of 'what happens': in selecting what merits the name of 'event,' these industries co-produce, at the very least, access to 'what happens' through giving it the status of event. Nothing 'takes place' or 'happens' except what is 'covered.' Thousands of (potential) events, at a minimum, happen without happening, take place without taking place, or take place without happening – and thus will not have taken place, will not have

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[641] Stiegler, *Disorientation*, 112.

[642] Apocrypha are "writings or statements of dubious authenticity." In http://www.merriam-webster.com/dictionary/apocrypha (accessed January 20th, 2015).

[643] This resembles Aleida Assmann's theory of memory traces. However, memory traces actually make visible the mortality of memory while – as has been pointed out – digital technology obscures this aspect. See Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 129-132.

> happened – but rather will go to their anonymous and improbable destinations.[644]

Not registered by the industrialized memory of contemporary culture, a musical performance is not preserved as memory and can hence not enter the current canon. As a consequence, the traditional standards of canonicity are inhibited.

In his 1998 essay "Neue Musik am Beginn der Zweiten Moderne", Claus-Steffen Mahnkopf characterizes the musical culture of the current generation as follows:

> [A]n apolitical new generation, intimidated or immediately opportunistic; a careerism which is sometimes rewarded with catastrophically premature professorships; an activism of commissions and premiers which are not followed by further performances, as the production of uselessness; an industriousness of the always overworked [composers] who still cram in one or two more pieces. The pieces that are written are primarily mere design of a machinery of premiers that is fixated on publicity; they are hardly of interest to anyone, not even to the individuals involved – what counts is the name of the composer or the event as event.[645]

Mahnkopf's perspective substantiates Stiegler's idea about contemporary event culture which has replaced the traditional performance culture and as such the canon of *performed*, "real" music: musical culture today is made up of an accumulation of singular events (premiers) rather than repeated performances of compositions which become canonized as a result.

The Current Practice of Musical Experience

In light of the ubiquity of reproduced and broadcasted music, it is important to reflect how the possibility of listening to a piece of music from home affects current

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[644] Stiegler, *Disorientation*, 115.

[645] Mahnkopf, "Neue Musik am Beginn der Zweiten Moderne," 867. Furthermore, a selection of German new music festivals have recently been dedicated to work against this dynamic and present not only premiers but specifically works which have been deemed too important to not be re-programmed and therefore be forgotten about. See for example festivals *Spieltriebe 2* in Osnabrück in 2007:

"After the success of the festival of premiers [*Uraufführungsfestivals*] in 2005, the next festival'Spieltriebe 2' will host second-performances [*Zweitaufführungen*]. The reason: the priority of the novelty aspect in today's media landscape causes the public's interest in a new piece to subside quickly after its premier. Against this acceleration of the artistic market, the festival will focus on a 'deceleration', on the reflexion of that which could potentially persist to exist, outside of trends." Nachtkritik.de, http://www.nachtkritik.de/index.php?option=com_content&view=article&id=427:spieltriebe-2-ein-festival-der-zweitauffuehrungen-&catid=170:theater-osnabrueck (accessed May 15th, 2014).

practices of music perception. With the ability to listen to music "live as it happens or on-demand as it suits you"[646] "through an astonishingly good value subscription model"[647], contemporary audiences are tempted to surrender the opportunity to hear "real" music, to experience it with all its drastic dangers and rewards, as Carolyn Abbate has proposed.[648] The economic benefits of reproduced music affect concert and performance culture in ways, which cause audiences of the twenty-first century to learn to *forget* the "carnal" aspect in musical experience. Abbate explains:

> That technology, codes, inscription metaphors, and mechanisms flow into musical hermeneutics is not, however, just an entertaining foible. They represent the excluded presence of real music, the material and carnal as displaced onto technology.[649]

As the experience of the "presence of real music" is slowly being relinquished, the sustenance of the traditional performance culture is of decreasing interest to the *culture industry*.

Music consumption through digital archives facilitates a socially isolated perception of music and therefore to a decommunitization of musical experience. As a consequence, music does not fulfil a social function but only satisfies an economic demand. The resulting canon is therefore formed not culturally, but economically.

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[646] "Digital Concert Hall." https://www.digitalconcerthall.com/ (accessed January 15th, 2015).

[647] Martin Cullingford in Schmid, "Deutsche Grammophon launches own streaming service called DG Discovery," http://www.gramophone.co.uk/classical-music-news/deutsche-grammophon-launches-own-streaming-service-called-dg-discovery?pmtx=green-red&utm_expid=32540977-3.FNZqseMjTvyRLIewfMgTiA.1 (accessed January 15th, 2015).

[648] See Abbate, "Music – Drastic or Gnostic?," 532.

[649] Ibid., 527. This statement becomes particularly clear when contrasting the cultural perceptions of early analogue devices of sound recording and playback (such as the gramophone) as *archives* and the following emergence of broadcast radio as a *live medium*, at which point only the term "live" began to gain real cultural relevance. This is pointed out in Philip Auslander's work, which concentrates on explicating the historical – and with that, cultural – contingency of the term "live". In "Digital Liveness: A Historico-Philosophical Perspective," Auslander suggests a "phenomenological perspective," which, he argues, "enables us to understand that digital liveness is neither caused by intrinsic properties of virtual entities nor simply constructed by their audiences. Rather, digital liveness emerges as a specific relation between self and other, a particular way of 'being involved with something.' The experience of liveness results from our conscious act of grasping virtual entities as live in response to the claims they make on us." Philip Auslander, "Digital Liveness: A Historico-Philosophical Perspective," *PAJ: A Journal of Performance and Art* 34, no. 3 (2012): 10.

Trash and New Possibilities

Aleida Assmann defines *memory traces* as objects of memory, which are no longer accessed by remembering but have not been fully forgotten. *Memory traces* are inactive components of cultural memory and the given canon. Projected into the modern culture of data surplus, such *memory traces* become what she calls *trash*:

> Making a daring leap from the nineteenth to the twentieth century, we might say that some contemporary writers, searching for authentic traces of the past in a mass media culture, are discovering these in trash.[650]

In this may lie an alternative approach to the current situation of art, in contrast to the above-mentioned arguments which have presented rather dystopian approaches to the question of contemporary canonicity and the cultural pervasiveness of digital technology. During a presentation in 2006, Michael Gallope offers his understanding of Stiegler's critique of digital technology, encouraging the discovery of new artistic possibilities:

> Not only can we [...] anticipate, technically, for the first time, a perfect repetition of sound, but the technical identity of perfect repetition, or absolute sonic form, becomes the normative musical-cognitive program – it passes through and haunts all particular, imperfect, human, performances. Performance suddenly appears nostalgic, more real, vulnerable, expressive, 'ephemeral' or 'drastic' (as in the recent writing of Carolyn Abbate). Modern musical performance, whether on the classical stage performing a composed work, touring an album, or reproducing a traditional style, it must be *anxiously marked live*, authentic, organic, real as if to preserve the difference of humanity against the constant haunting of immortal, insomniac recordings that seem to proliferate in ever-increasing numbers, seeming to come out of nowhere. […] Listening to recorded music [...] involves merely hearing the end product as human, extending the definition of human music out through the prosthesis of recording, extending the definition of *the music itself*.[651]

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[650] Assmann, "Texts, Traces, Trash: The Changing Media of Cultural Memory," 132.

[651] Michael Gallope, "Heidegger, Stiegler, and the Questions of Musical Technics" (presentation at *Music and Consciousness* (conference), University of Sheffield - UK, 2006), 9. Available online: https://www.sheffield.ac.uk/polopoly_fs/1.17416!/file/Gallope-Sheffield_paper.pdf (accessed November 20th, 2014).

Conclusions

In this chapter, it was discussed how numerical technics create a new kind of reality where spatio-temporal contexts and traditional social and cultural relationships are dissolved. In such a reality, the establishment of new contexts becomes urgent in order to sustain the possibility of creating and perceiving meaningful art. Replaced by a different type of temporality (*discontinuity)* and a transformed understanding of collective identity (the "hive"), the old "connective structure" gives way to a new modality of cultural memory in which musical function and musical meaning transpire in new ways.

The next chapter will investigate new connections between digital technologies and contemporary culture in which a re-contextualization and re-orientation of musical and cultural *différance* are possible.

Chapter 6: Time_and_Meaning_in_Music_2.0 – Digitized Memory

> Today we live with calendars at hand but, at the same time, we live with the feeling that everything in history occurs without particular regard for its chronology, and that even music is a sort of warehouse of samples, whose shelf life – whose relative permanence or oblivion, whose chronological placement – is ultimately irrelevant because, when we get down to it, it can be pushed around according to our inner needs and desires as listeners, performers, and composers.[652]

Luciano Berio's statement reflects the idea that digital technologies are carriers of memory with a dynamic temporal structure: moments of data input and output coincide while information retrieval is possible at any point in time and from anywhere with access to the given network. This "chaotic storage method"[653] reveals a coincidence of primary, secondary and tertiary retentions[654] and makes the chronology of stored music "ultimately irrelevant", as Berio puts it. His reflections about modern technologies certainly demand further consideration in the context of music's social function as cultural memory. In Berio's words, the outcome of the current practice of music consumption is

> that the shelves of our musical space imply that the past and future, the 'before' and 'after,' are relative and even interchangeable entities. […] We are experiencing a twilight of the distinction between long-term and short-term memory, between before and after.[655]

As has been discussed in the previous chapter, the ubiquitous use of digital technologies has pervaded and changed society in existential ways. Since computers function as a supplement to memory, they have become a significant carrier of cultural memory. It has been determined that this function serves economic rather than cultural interests, and that digital technics have subsequently been transforming the current "connective structure": a form of temporal and spatial contraction has led to a de-

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[652] Berio, *Remembering the Future*, 63-64.

[653] See Ernst, "Discontinuities: Does the Archive Become Metaphorical in Multimedia Space?," 139.

[654] See Stiegler, *Disorientation*, 241-242.

[655] Berio, *Remembering the Future*, 64, 65.

contextualization of cultural objects, while redemptive re-contextualization often does not occur. Simultaneously, the participatory structure within contemporary culture evolves into a "hive" collective deprived of a shared past and ethnic unity. Necessarily, this reveals a notion of a "global memory" which, as Jan Assmann discerns, creates a paradoxical image of cultural memory. This leads to the question how extratextual memory in music has been affected by globalized memory and how it works in contemporary musical material. This question will be discussed in the present chapter.

Moreover, the aforementioned cultural developments have affected musical culture such that the new social structure has demanded a reconsideration of the relationship between music and its audience. It has been observed that the current music industry produces a commercialized music and employs technology in a manner, which creates a fetish standard and conceals[656] the occurrence of *différance*. The present-day *culture industry* produces objects which are continuous, identical repetitions of its own copy, where "the event is never more than its captured data," and the technological *what* is mistaken for the "real" *who*.[657]

Nonetheless, it has been discovered that there exist opportunities for composers to utilize digital technologies in ways which allow for *différance* and emphasize the *who* in relation to the *what*. Berio encouragingly suggests that

> [w]e can refuse history, but we cannot forget about it, even with the new technologies, when we deal with sound 'molecules,' even when we digitally design new sounds or when we synthesize or hybridize familiar sounds that do not carry with them traces of musical usage.[658]

The present chapter will discuss the practical implementation of new technologies in music and inquire into the question of technologically generated musical materials "that do not carry with them traces of musical usage" in the context of music as cultural memory. This inquiry necessarily involves an understanding of the various shapes and functions that technological prosthetization takes in the realm of musical culture. When the production of musical works of art employs technological instruments, or algorithms

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[656] See Stiegler, *The Fault of Epimetheus*, 230.

[657] Stiegler, *Disorientation*, 117.

[658] Berio, *Remembering the Future*, 67.

of sound processing or synthesis, those compositions are conventionally regarded as electronic music. This entails a classification into the historical appearances of musique concrète, computer music, live electronics and hybrids between any of these styles.[659] Gunnar Hindrichs' definition of the reciprocal influence of both social functions of music (inner-musical and outer-musical) on the individuation of musical material necessitates the examination of the extensive functions of technology in musical culture.

In his essay "Material Shift" Michael Beil synthesizes Hindrichs' concepts and McLuhan's aphorism "the medium is the message."

> […] the *meanings* of a composition's musical material are more important today than the material itself; I can no longer consider material primarily a reservoir of building elements within an organized structure of sounds. In my view, its important properties for composition lie in the medial domain; this makes the material a means, not an end in itself.[660]

Beil suggests to consider digital media as part of the contemporary inventory of musical material. In the context of Stiegler's theory of technology as "an originary supplementarity of this form of life,"[661] there is an underlying notion that technologically derived musical materials *and organically* derived musical materials lie in the medial domain. Therefore, technological musical materials shall be investigated in their relationships to organic musical materials within a piece of music. This must therefore include a consideration of the omnipresent use of technology in today's culture, with regards to the reproduction and distribution – the documentation – of music. As Frank Cox poignantly contends: "[I]n Western societies at least, electronically-generated, mastered and/or propagated music is the norm, and purely acoustic music is the exception."[662]

Accordingly, the discussion of the present chapter will involve an examination of 1) technology as the carrier of music, in terms of musical documentation or realization, and 2) technology within a given piece of music in terms of externalized processes such

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[659] See Cox, "Aura and Electronic Music," 52.

[660] Michael Beil, "Material Shift," in *New Music and Aesthetics in the 21st Century*, vol. 8 *Musical Material Today*, eds. Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim: Wolke Verlag, 2012), 9.

[661] Stiegler, *Disorientation*, 4.

[662] Cox, "Aura and Electronic Music," 53.

as live electronic, real time applications and performance interfaces (instruments). As will be shown, the two aspects are equally essential in the creation of musical meaning in electronic music since only in conjunction do inner-musical and outer-musical aspects constitute the grammatization of "the mechanisms of [musical] transindividuation".[663]

An analysis of a number of music compositions will then serve to substantiate the findings about digital technology in relationship to musical memory.

Technology Mediating Music: The Transmission of Externalized Memory

As has been discovered in the fifth chapter, recorded and broadcasted music generates an immediacy between primary, secondary and tertiary retention. While this short-circuitry of memory processes causes a compression of temporal depth, it also affects the interrelations between the *who* and the *what*. The perception of the *what* – instead of the *who* – facilitates primary and secondary memory:

> Stiegler's point is that in the gramophone record, more generally in the recorded temporal object, it is not perception which makes possible memory and the artefact but the artefact that makes possible both primary and secondary retention: the record allows both the perception of the melody and, crucially, the constant modification of that perception through repeated auditions.[664]

As will be shown, the mediation of music through technology occurs within two distinct but interrelated frameworks in musical culture:

First, the documentation of music which serves the propagation and distribution of music. This framework entails the recording, editing, storing and broadcasting of musical data and, as a result, renders dispensable the aspect of live performance. With regards to Walter Benjamin's concepts, the aspect of the *aura* of the broadcasted music becomes debatable: to what extent are present-day technologies capable of documenting

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[663] Stiegler, "Within the limits of capitalism, economizing means taking care," http://arsindustrialis.org/node/2922 (accessed January 15th, 2015).

The differentiation between technology as externalization of cultural memory and technology as externalization of performativity corresponds to the dichotomy between memory in music and music as memory, as has been discussed in the second and third chapter. The corresponding distinction may be considered as between *technology in music* and *technology mediating music as/mediating memory*.

[664] Roberts, "Cinema as mnemotechnics: Bernard Stiegler and the industrialization of memory," 58.

the work's "presence in time and space, its unique existence at the place where it happens to be"?[665]

The second framework within which music is technologically mediated is that of musical realization: a piece of electronic music may be entirely or in part dependent on the playback of pre-recorded, edited and manipulated sound. In this case, technology is a crucial tool for the manipulation of sound, which cannot be achieved by the performance of human musicians alone. Importantly, the aspect of live performance is eliminated in this framework as well. The result, the edited and processed sound, is stored as an audio file and played back either in a concert setting or, if intended as such, in a private environment – be it via speakers in the listener's living room or headphones etc. Within the framework of technological realization, the use of digital technology evidently serves a twofold function, first as a tool for musical mediation and second as a musical material.

From this perspective, the aspect of realization constitutes an intersection at which technology's function as (extra-musical) memory interacts with its function as a musical material, operating as inner-musical memory and therefore informed by music's double social function – as per Hindrichs' definition.

In the following, the two frameworks of technological mediation will be explained.

Documentation

As has been described, the aspect of exteriorization of cultural memory involves a process of mediation and therefore requires prosthetic technologies. With regards to the exteriorization of music, modalities of musical preservation have historically entailed distinct forms of ritualized music, namely musical notation and reproduction, while the latter format has led to a drastic shift in how exteriorization itself comes about: in her analysis of contemporary processes of technological documentation and distribution of music and sound art, German musicologist Marion Saxer discovers aspects of "limitation, fragmentation and transformation."[666] She begins her examination noting that, in the two centuries before the prevalence of modern technology in society, the circulation of

[665] Benjamin, "The Work of Art in the Age of Mechanical Reproduction," 220.

[666] Saxer, "Lücken, Brüche, Transformationen," 26-29.

composed music was primarily reliant on concerts and an ongoing theoretical exchange based on musical scores, allowing for interpretive analyses or concert reviews. At that time, musical creation and perception were embedded within an interactive social context involving an interrelation between composers, performers and audience: music actively served as a carrier of cultural memory in favour of cultural transindividuation.

With the advances of industrialized technologies, the twentieth century saw the emergence of sound recording techniques, which began to allow for more efficient methods of musical dissemination. Overcoming previous limitations in terms of speed and geographical boundaries, these technological innovations also gave rise to an entirely new analytical category: reviews of records and CDs – often involving an evaluation of technical aspects of the recording – and the comparison of different musical interpretations, performers, and concert venues presents a new niche of musical discourse, attesting a critical awareness that the use of technology extends the scope of musical matters.

The mediation of reproduced music through speakers – whether through monitors or headphones – reflects a radical shift of exteriorization, as it causes musical experience as a social event to be substituted by a grammatization of that experience: "the record allows both the perception of the melody and, crucially, the constant modification of that perception through repeated auditions."[667] As has been determined before, recorded sound is thus an externalization of an externalization of memory; it is doubled tertiary memory. Stiegler describes this complex condition like this:

> Memory's industrialization exploits all available supports, the technological tendency invading all materials (including the organic), and for this reason one must speak of a différant biological identity investing and synthesizing the somatic and germinative underpinnings of human life, which are no longer an exteriorization only through the organizing of the inorganic but also through the *dis*organization of the organic in order to reorganize it – and in this sense, it is equally a re-interiorization of human being's technical exteriority.[668]

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[667] Roberts, "Cinema as mnemotechnics: Bernard Stiegler and the industrialization of memory," 59.

[668] Stiegler, *Disorientation*, 99.

The consumption of preserved and reproduced music induces a renewed organization of exteriorized musical meaning which necessitates an ongoing analytical discourse in order to keep pace with the ever-changing relationships between the organic – the creators, performers and recipients of music – and the musical works of art.

By removing both aspects of concert venue and social interaction from the experience of performed music, the reproduction of the event only applies to the *aural* experience. Acoustic signals alone are transferred to a decontextualized space equipped with the technological means for the output of audio signals and their amplification: any space may become a surrogate venue.[669]

As technological developments have furthered the possibilities of distributing and circulating music outside the concert hall, they have also influenced traditional constellations of live performances inside the concert hall. While arrangements of performers and instruments in a given venue used to be *reflected* in the spatio-acoustic sound image resulting from the production of sound, there now exist performance situations which consist of the playback of reproduced sound and require amplification in combination with a number of speakers. Such "performances" are related to pieces for tape, which, in a way, are staged situations for broadcasted music. Here, the relationship between the acoustic properties of the venue and the spatio-acoustic impression given by the amplified sound output is altered. For example, the use of a multichannel surround-sound setup overrides spatial perception of given room acoustics[670] in favour of a composed, artificial representation of the venue space.

The documentation and mediation of such works – electroacoustic spatial music or other site-specific installations that use technologies to transform spatio-acoustic properties – present fundamental difficulties: recording and mixing techniques intended for common storage formats such as CDs, records and mp3s[671] are technically inadequate

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[669] Saxer appropriately points out that this type of music consumption bears an "affinity to the idea of absolute music, which assumes that music 'has nothing to do with the eyes' and that it is 'pure, sounding form.'" Saxer, "Lücken, Brüche, Transformationen," 26.

[670] Space-specific acoustical characteristics, i.e. via reverb, influence how individual sounds unfold and persist in time: a space's acoustics possesses particular reverb-related characteristics like early reflections, delay times, reverb time, density, frequency behaviour; localization etc. which directly influence how a perceived sound is contextualized within a space.

[671] Online music consumption involves mostly mp3 files: virtual music stores or streaming websites usually sell recorded music in form of compressed audio files. Better quality audio files us a lossless compression

to record multichannel music or sound installations due to limitations resulting from stereophonic reproduction. The use of specific spatial configurations, which generate acoustic depth creates problems for above-mentioned recording formats by demanding more than a two-channel, stereo acoustic image.[672]

Recent developments have focused on the improvement of surround-sound systems allowing for a satisfactory documentation of spatial works, which can then be transmitted into any desired listening venue.[673] Technological developments like this prove that the current practice of music reproduction and the conceptualization of electro-acoustic works mutually influence one another. Saxer contends:

> [T]oday's technically most progressive developments are oftentimes the most difficult to document and transport medially. A new sort of live-character has evolved, a second level [*zweiter Ebene*] live-experience which is commonly technically mediated and staged because of technical innovation. In this new situation, established practices of mediation can only operate insufficiently. As a consequence, there is a tendency that not only the medial distribution of new music and sound art is limited but also the

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algorithm, such as .FLAC, .APE, .m4a, .wma lossless, while (often almost unnoticeably) inferior formats use lossy compression, such as .mp3, .aac, .vorbis, .wma lossy etc.

[672] It should be noted that earlier pieces, without technical enhancements such as amplification and complex spatialization, have revealed characteristics similar to modern electroacoustic works involving spatialization: a prominent example is the practice of the Venetian polychoral style, established in the 16th century as a response to the architectural features of the Basilica San Marco di Venezia in Venice. This composition technique focused on the peculiar acoustics of the building, which create a delay effect based on the distance between the choir lofts. Eminent composers of this style were, for example, Adrian Willaert, Gioseffo Zarlino, Giovanni Gabrieli, Claudio Monteverdi and Heinrich Schütz who composed polychoral music for extended ensembles consisting of multiple choirs and instrumental groups. In performance, these ensembles are distributed throughout the church in such a way that the audience is basically engulfed by the sound.

Though not at all a problem in the pre-technological 16th century, today's culture of documenting, recording and broadcasting is confronted with difficulties. Decades ago, record companies started to amass a variety of recorded interpretations of historical – and, to some extent, contemporary – music. Today, recording and mixing technicians are facing issues intrinsic to the procedures involved in the attempt of capturing the essence of a musical piece on tape. In the case of recording polychoral Renaissance music: the problem is how to adequately reproduce the spatial properties of the music's venue.

[673] In 1999, Sony and Philips released the SACD (Super Audio CD) as a multichannel audio storage format that additionally surpasses the quality of audio delivered by the CD. Unexpectedly, however, SACD has not established itself in the market successfully, which not only results in decreasing consumer numbers but also in a decline in surround-sound recordings offered by record companies.For further information on the failure of this format in the audio marketplace, see Jack Schofield, "No taste for high-quality audio," *The Guardian*, http://www.theguardian.com/technology/2007/aug/02/guardianweeklytechnologysection.digitalmusic (accessed June 16, 2014).

> aesthetic discourse about it. This is because a 'medial logistics' for their transport into the public realm has not yet been established.[674]

Increasingly complex works of multimedia inversely lead to increasingly insufficient documentation. An example of this is David Tudor's multimedia work *Rainforest IV*. It was first conceptualized in 1968 while a final fourth version was realized in 1973. As an installation involving visual, acoustic and haptic aspects, *Rainforest IV* is "[a] collaborative environmental work [involving 6 composers], spatially mixing the live sounds of suspended sculptures and found objects, with their transformed reflections in an audio system."[675] The audience of the installation walks freely through the room, while every individual makes their own audio-visual and haptic experiences in perceiving the sounding sculptures which are distributed throughout the space.

It is possible to find various videos of *Rainforest IV* on YouTube.[676] Seated in front of a computer screen, one becomes a witness to any of the thoroughly different realizations of the installation. In watching, one's self-perception reveals a peculiar experience as a spectator *of an audience* perceiving the piece. The YouTube videos provide an edited second-hand experience: one is stripped of the liberty of guiding one's own experience of the installation, always aware of the two or five or however many years between the present and the videotaping. A reminder of this temporal and spatial decontextualization is the technical quality with regards to resolution and colouring. This experience, presumably inadvertently, reveals another layer of the piece – one of remoteness and passivity in perceiving a piece that was originally conceptualized as an interactive work. The experience of detachment is caused by the fact that the video reproduction of the event magnifies and renders discernible its aspect of documentation.

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[674] Saxer, "Lücken, Brüche, Transformationen," 26.

[675] John D.S. Adams, and D'Arcy Philip Gray. "TUDOR compositions." http://davidtudor.org/Works/rainforest.html (accessed June 10th, 2014).

[676] For the present dissertation, the following two videos were viewed and compared: "David Tudor's Rainforest IV - Berlin May 26 2011," http://www.youtube.com/watch?v=D2hQ_de5nwk (accessed July 30th 2014) is a realization by participants of the Nordic Sound Art program in Berlin, May 2011;

and "Rainforest IV - DAVID TUDOR / NO-ENSEMBLE - Factorev june 2013," http://www.youtube.com/watch?v=D6ry8BcxIAE (accessed July 30th, 2014) was realized by the NO-ENSEMBLE - Factorev june 2013.

As a result, *Rainforest IV* can only be perceived as an immobile memory. The YouTube documentation allows for an observation – not an experience – of an art installation.

It should be noted that, in her interpretation of the installation's relationship to its documentation, Saxer claims that the audio recording of a realization from 1980 reveals a "sound with strong intrinsic value" transforming the work's sound reproduction into an autonomous piece of music. Unable to identify objectively at which exact point the documentation obtains artistic sovereignty, she suggests:

> In Tudor's case it is possible to assume the following: having been one of the most virtuosic pianists of his time, who has premiered almost every important piece of the 1950's avant-garde – from Boulez' *Deuxieme Sonata* to Cage's *Music of Changes* – Tudor resigned from playing piano in the sixties and turned towards composing or rather conceptualizing electroacoustic works, as is well known. His pieces often involve dense textures of rhythm and sound with a character of an installation [*mit installativem Charakter*], it almost seems as if he wanted to perpetuate or outperform his piano playing. It is then possible to conclude that his concepts have developed out of a strong musical idea which is why these concepts still generate such strong aural impressions through the insufficient documentation of the real experience of *Rainforest IV* in the purely acoustic form of a CD recording. One shall not forget, however, that this involves a process of transformation, or rather translation, through which the sound document of the spatial installation becomes a work of musical art.[677]

In comparing the two different types of documentation of *Rainforest IV* – the audio-visual YouTube clip versus the audio recording – it seems that the audio recording offers a more satisfying experience than the audio-visual representation via YouTube. Even though the audio recording reduces Tudor's installation work to its acoustic component and thus transforms it into an entirely different form of art and a different piece, one may say that the benefit lies exactly in the alleged defect of the medium: the audio recording does not claim to give an unabridged impression of the multimedia event, it does not pretend to be more than it is, which is, an inaccurate mirror.

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[677] Saxer notes that the successful outcome of the audio recording may perhaps only have been possible thanks to Tudor's musical ideas and intuition, and a decision to similarly omit the visual aspect for another piece's documentation may easily fail, possibly exhibiting conceivable shortcomings on either end. See Saxer, "Lücken, Brüche, Transformationen," 27.

> [...] the mirror stage is essential unaccomplishment; the mirage is deformation. All mirrors are deforming ones, just as much the *tekhnē* of the gaze as of time. There are only clumsy, gauche memories, especially when they are accurate.[678]

Instead, because of its deficiencies, the acoustic documentation of *Rainforest IV* has the capacity to open up new horizons for the audience's perception: according to the principles of *différance*, the recording presents a differing and deferring work identity in relation to Tudor's original, performed work.

In a few other cases of multimedial works of art, the medial documentation proves to serve as or trigger a variety of compositional ideas. At this point, technology transitions from being a reproductive tool to operating as part of the musical realization.

Documentation to Realization

Saxer discusses the multimedia work *HPSCHD* (1969) written by John Cage and Lejaren Hiller for 7 harpsichords, 51 tapes, and several projectors for film and slides. In this piece, as in Tudor's *Rainforest IV*, the audience is asked to walk through the space of the venue whereby the audience's perception of the acoustic and visual objects of the installation is continuously transformed: each audience member engages in a unique experience in which their movements through the space produce specific audio-visual impressions. This complexity of individualized experience, Saxer points out, cannot be captured by the recording of the installation (Nonesuch, H-71224). The reproduction can merely archive and document the work's sonic aspect. Interestingly enough, the two composers were aware of this circumstance and hence presented the record as a "projected recording of the music."[679] The first published recording came with a printed program called *KNOBS* which was written by Cage and Hiller so as to enhance the listener's experience of the recording: the "program notes" consisted of a series of random settings for volume, treble and bass for both channels (left and right) at intervals of 5 seconds.[680] Eventually, Cage and Hiller handled the reproduction of their multimedia

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[678] Stiegler, *Disorientation*, 27.

[679] Stephen Husarik, "John Cage and LeJaren Hiller: HPSCHD, 1969," *American Music* 1, 2 (1983): 7.

[680] The liner notes read: "'Program (KNOBS) for the listener,' 1 of 10,000 different computer output sheets indicating balance and volume changes to be made by the listener […]." John Cage, Lejaren Hiller, "HPSCHD: for harpsichords & computer-generated sound tapes," on *HPSCHD: for harpsichords &*

project as an altogether independent piece of interactive art: in 1971 they released the LP *KNOBS*. "*HPSCHD* is for harpsichords and computer-generated sound tapes. A performance of *HPSCHD* is the source of the recorded material found in *KNOBS*, but [...] *KNOBS* is a distinct piece."[681] Philosopher Stephen Davies notes that

> [...] instructions specifying how the record player's dials are to be manipulated as the disk plays. The instructions accompanying each individual disk are unique to it. A performance of the work results when the disk jockey follows the instructions. This does not mean that the person who fiddles with the graphic equalizers of her hi-fi as she listens to a recording of Beethoven's Fifth, or of a rock song, or of Eimert's *Four Pieces* thereby is a performer. Either the performance is over when the disk is issued or the work on the disk is not for performance. *KNOBS* is different. What is on the disk is neither a finished performance nor an encoding of a work that is not for performance; the disk contains a pre-performance input and the work is instanced only when this input is modified in accordance with the accompanying instructions.[682]

With regards to the musical material of *KNOBS*, the acoustic material consists of a sampled rendition of *HPSCHD* which is a kind of meta-pre-formed material as its first individuation took place at the time of its recording, when the pre-formed materials of *HPSCHD* were performed. This pre-formation gains further meaning in the actualization of *KNOBS* as the listener is "playing" the equalizer.

In a peculiar way, the use of technology in *KNOBS* works in two different ways: first, it individuates the musical material as pre-recorded samples are played by the tape machines. Secondly, the pre-recorded sound of the various instruments and tape machines employed in *HPSCHD* creates a sonic accumulation of multiple live "pre-performances". This remembered acoustic material does not simply sound as a passive documentation of a past live event. Rather, the memory is a malleable, dynamic element which is performed by the listener, while the record player in itself serves as a technological instrument. Technological, inorganic memory in *Knobs* therefore only appears in an ever-changing way – *KNOBS* is an anamnesis of its own material as it

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computer-generated sound tapes/John Cage & Lejaren Hiller. String quartet no. 2/Ben Johnston., Nonesuch H-71224. Liner notes.

[681] Stephen Davies, *Themes in the Philosophy of Music* (Oxford: Oxford University Press, 2003), 38, note 2.

[682] Ibid., 38.

allows for an intimate relationship between the otherwise passive mechanisms of sound reproduction and its audience who now becomes the performer.

In conclusion, it should be said that several multimedia projects make use of the acoustic properties and visual features of a particular space which presents inherent issues in terms of documentation, as has been discussed. Saxer points out that aural and visual experiences in *reproduction* will always only *co*exist on the physical medium of tape or data file but hardly amalgamate into a replicated, unified experience of the space. Neither microphones nor camera can imitate the highly personalized experience of any individual audience member had they been at that given venue for the event: idiosyncrasies cannot be documented.[683]

Moreover, a space offers more than acoustic and visual aspects. There exist installations that employ temperature, humidity, lighting conditions, smell etc. All these are characteristics of a given space that offer themselves as artistic material. It will seem evident that the documentation of such aspects presents not simply a technical difficulty but, currently, an impossibility. To date, there is a technical limit to the reproduction of sound and image. Therefore, translating multimedial works into transmittable formats involves a high degree of abstraction and further fragmentation. Corresponding to Stiegler's idea of decontextualization and the short-circuiting of transindividuation, this affects the interconnections between art and the public audience.[684]

As has been discussed, the documentation of the installation by Cage and Hiller exhibits an awareness of the fact that abstraction and fragmentation are inevitable in the progress of reproduction. Such awareness proved to be crucial for the composers' artistic choices in relation to *KNOBS*.

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[683] See Husarik, "John Cage and LeJaren Hiller: HPSCHD, 1969," 28.

Attempts at fusing acoustic and visual impressions of works involving sound and traditional visual arts have been made by means of similarly traditional catalogues and accompanying CDs. With these formats, however, the reader-listener-recipient still misses the spatial impression, which is created during the specific live interaction between image and sound. See Saxer, "Lücken, Brüche, Transformationen," 28.

[684] Stiegler, and Rogoff, "Bernard Stiegler and Irit Rogoff – Transindividuation,"

http://www.e- flux.com/journal/transindividuation/ (accessed May 25th, 2014).

In agreement with Stiegler's advice to exercise "[t]he ability to critique and the capacity to discern,"[685] Saxer ends her article with the proposition that an informed audience is just as important as are critical artists. A reproduction of music at the current stage of technological possibilities comes with responsibilities for the audience, which entail a reciprocal creative commitment to the perception of a piece of music or sound art. Eventually, according to Saxer's prognosis, this commitment will be rewarded with a unique perception of reproduced art, which in turn can no longer be perceived outside the context of reproduced sound. "Viewed in this light, those new art forms which are tied to the aspect of live-experience create new spaces of imagination [*Vorstellungsräume*], exactly because they are impossible to be projected medially."[686]

The importance of contextualization is also discussed by composer Jonathan Harvey. In his essay "The Metaphysics of Live Electronics" from 1999, he wonders about historical contextualization of reproduced sound, asking how music might be perceived in the future when recorded music makes audible the stylistic difference between a recorded performance from the past and the given contemporary performance practice.

> I have found that one hears the fixed sounds in a new way in different performances because they are re-articulated by their shifting context, they seem to change. (One can never put one's foot in the same fragment of river twice). If performing styles change in 70 years' time (and such works are still around) it would be interesting to see how the 'unchanging' recorded passages work with and influence the new slant of interpretation.[687]

In the case of *KNOBS*, however, one might dare to claim that – against all perils of a musical culture with a fetish-character as Adorno had imagined – current practices of musical interpretation are not simply substituted but rather extended by technologies: in *KNOBS*, the experience of the recorded music allows for a simultaneous contextualization through the performance of the listener.

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[685] Ibid.

[686] Saxer, "Lücken, Brüche, Transformationen," 28.

[687] Jonathan Harvey, "The metaphysics of live electronics" in *Contemporary Music Review* 18, 3 (1999): 80-81.

Realization

Music intended for perception via loudspeakers is referred to as *acousmatic music*[688] in which

> the listener perceives the music without seeing the sources or causes of the sounds. Acousmatic music thus ruptures traditional notions of music reception. […] The recorded format of acousmatic music allows the composer to combine sounds created at different times and on different systems, and offers the utmost flexibility for juxtaposing and superimposing sounds with attention to the finer details of sound quality. Two aesthetic tendencies have emerged. The more 'abstract' approach is concerned with developing discourses of sound types and timbres; the other favours recognizable 'real-world' sounds (including other music), a more radiophonic approach, which can border on the documentary, and is sometimes referred to as 'anecdotal' music. However, the two tendencies can merge and should not necessarily be regarded as polarized.[689]

Importantly, acousmatic music on tape, may employ abstract musical materials which are "created synthetically" where

> [t]he composers [aim] to use electronic resources to construct timbres, thereby extending control to the structure of sound itself, and they envisaged that a musical structure would be planned before realizing it electronically. These aims only became truly viable with the arrival of the computer.[690]

On the contrary, acousmatic music may employ musical materials such as in musique concrète[691] in which "sound materials could be taken from pre-existing

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[688] Simon Emmerson, and Denis Smalley, "Electro-acoustic music." *Grove Music Online. Oxford Music Online*, http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/08695 (accessed January 30th, 2015).

[689] Ibid.

[690] Ibid.

[691] An important figure in the field of musique concrète is French composer Pierre Schaeffer, who coined the term "Musique Concrète". Another under-represented but notable composer is Danish composer Else Marie Pade, who – after having been active in the resistance during World War II and having been imprisoned in a war camp from 1944 until 1945 – was the first Danish composer of electronic and musique concrète. Examples of her work are *Symphonie Magnétophnique* (1958/1959) and *Glasperlespil II* (1960).

The term "Musique Concrète" describes music which is "prepared from recorded sounds, either natural (e.g. birdsong) or manmade (traffic, instr. Etc.)." The term serves to "differentiate between mus. assembled from concrete sound objects and mus. based on the abstract medium of notation. Strictly, musique concrète should not be modified electronically but the distinction between it and electronically synthesized sound has been increasingly blurred until the term elec. mus. covers the whole process."

recordings (including instrumental and vocal music) and recordings made specially, whether of the environment or with instruments and objects in front of a studio microphone."[692]

Alvin Lucier's tape piece *I am sitting in a room* (1969) may be regarded an example for acousmatic music in which the musical material is both abstract and concrete. This piece consists of a recorded reading of a text[693] by Lucier and a series of looped playbacks of this recording. Importantly, each time the recorded narration is played back, the microphones in use pick up the interference of two sounds: the playback of Lucier's recorded voice as well as the resonant frequencies of the room in which this sound is played and re-recorded. As a result, certain frequencies are continuously emphasized (constructive interference) while others are continuously subtracted (destructive interference). Eventually, the listener hears "the natural resonant frequencies of the room articulated by speech." While Lucier's piece uses a *concrete* musical material, the musical process reveals a transformation of this material in which it seems to gain an *abstract* quality while remaining *concrete* in that the transitory process is documented on tape. One might say that the mechanized realization of *I am sitting in a room* presents an ultimate performative process, the "carnal" activity being an interaction between sound, space and technology. In his discussion about noise in relation to the concept of music, Martin Iddon correspondingly points out:

> The piece proceeds, then, in just the way that Lucier describes. Across the 32 repetitions of the text, it is evident that each (re-)recording presents a loss from the previous version: the technology which is used necessitates that various frequencies of the original 'message' – the message which describes the form of the piece – are lost. Simultaneously, that process is an additive one,

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OxfordMusicOnline.com, s.v., "Musique Concrète." http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/opr/t237/e7104 (accessed January 30th, 2015).

[692] Emmerson, and Smalley, "Electro-acoustic music." "http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/08695 (accessed January 30th, 2015).

[693] The full text of the piece is: "I am sitting in a room different from the one you are in now. I am recording the sound of my speaking voice and I am going to play it back into the room again and again until the resonant frequencies of the room reinforce themselves so that any semblance of my speech, with perhaps the exception of rhythm, is destroyed. What you will hear, then, are the natural resonant frequencies of the room articulated by speech. I regard this activity not so much as a demonstration of a physical fact, but more as a way to smooth out any irregularities my speech might have."

> though. Over the course of the piece, while the 'message' is being, as Lucier says, 'destroyed', it is continuously accreting frequencies which are not part of the message, the resonant frequencies of the room in which the process is taking place. This accreted 'noise', though, is thus meaningful. It is meaningful not least because of the channel along which the receiver has been led: the receiver is aware, by the close of the piece, that they are listening to a noise which is truly a part of their normative auditory experience but which is, ordinarily, closed off from them. In the process of obscuring the meaningfulness of the text, then, a particular meaningfulness of listening itself becomes revealed. The piece, to be sure, as a process piece cannot be other than a channel, a passage […]. What is different here – and what makes *I am sitting in a room* a piece fundamentally concerned with noise and meaningfulness – is just that channel which makes noise become itself associationally meaningful.[694]

While the timbral transformations of sound in Lucier's piece occur without an actual *synthesis* of sounds and timbres, other tape pieces consist of concrete sounds that are edited and processed via analogue or digital technologies by the composer.[695] By way of sound synthesis, sounds can be generated. This process allows for the integration of entirely abstract sound either live in performance or in tape pieces.[696]

"Such compositions [tape pieces] are quite transparently represented in a recording, [...] ready for repeated listening,"[697] however, this does not mean that the performance factor is entirely lost. As Gerhard Eckel points out, the compositional work in the studio "allows the composer to actually *perform* certain aspects of the music in the process of being composed. This 'performance' is an experimental, improvisational, explorative kind of performance, typically carried out alone in the studio."[698]

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[694] Iddon, "Siren Songs: Channels, Bodies, Noise," 65.

[695] Examples for such pieces are Karlheinz Stockhausen's *Gesang der Jünglinge* (1955-1956), or Jonathan Harvey's *Mortuos Plango*, and *Vivos Voco* (1980).

[696] Examples of synthesized music compositions are Milton Babbitt's *Composition for Synthesizer* (1961) who worked on an RCA synthesizer at the Columbia-Princeton Electronic Music Center. Morton Subotnick's electronic tape compositions *Silver Apples of the Moon* (1967) and *Wild Bull* (1968) were created on a Buchla synthesizer.

Other notable implementations of synthesized sounds are presented in American composer Wendy Carlos' record *The Well-Tempered Synthesizer* (1969). Carlos recorded her interpretation of the works by Johann Sebastian Bach, Claudio Monteverdi, Domenico Scarlatti and others on a Moog modular synthesizer.

[697] Deniz Peters, "Touch: Real, Apparent, and Absent," in *Bodily Espression in Electronic Music – Perspectives on Reclaiming Performativity*. (New York, London: Routledge, 2012), 25-26.

[698] Gerhard Eckel, "Embodied Generative Music," in *Bodily Espression in Electronic Music*, 144-145.

This relates to Hindrichs' notion of compositional labour, which determines both the pre-formation of musical material and the musical form of a given composition (see Chapter 3, *Musical Material*). Since the composer becomes performer him-/herself in the process of creating acousmatic music, the compositional labour as the initial moment of musical creation coincides with the performative labour in the studio. This confirms Stiegler's theory of the short-circuited connections between primary, secondary and tertiary memory. Only in this short-circuited setting is it possible that the "composer […] arranges actual sounds, unlike the imagined sounds that usually are concomitant with the score,"[699] as musicologist Deniz Peters contends. As a result, the *literal synthesis* of music – the score – is rendered redundant and substituted by *analogical and numerical syntheses*.[700]

The main body of the music of composer Steven Kazuo Takasugi is based on the use of sampled sound. Many of his pieces entail meticulous arrangements of numerous samples pre-recorded, edited and classified by the composer.[701] In his essay "Material: Towards a Music Without Qualities" Takasugi explains his understanding of sample-based musical materials: "The pre-recorded, pre-composed soundfile […] is not a spontaneous manifestation: its realization is out of time and is entirely revisable with limitless passes."[702]

It becomes evident that the use of technology to mediate musical sound not only changes the relationship between musical material and the labour behind it but also how musical material individuates within time – as stated by Takasugi. Such altered relationships between musical material with time and questions of labour shed a new light on the question of the "*making* of music […] as a bodily act"[703] within a cultural

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[699] Peters, "Touch: Real, Apparent, and Absent," 26.

[700] This leads back to Dahlhaus' question about the distinction between "a repeatable musical work" or "a non-repeatable individual performance" of the same piece, as has been discussed in chapter three. Ingarden, *Untersuchungen zur Ontologie der Kunst*, 101.

[701] For example: *The Flypaper* (2005) for samples of various vocalizations, *Diary of a Lung* (2006/07) for samples of kotos, shamisen, makeshift instruments, and vocalizations, *Jargon of Nothingness* (2007) for samples of various plucked, bowed, double-reed, and makeshift acoustic instrument.

[702] Steven Kazuo Takasugi, "Material: Towards a Music Without Qualities," in *New Music and Aesthetics in the 21st Century*, vol. 8 *Musical Material Today*, eds. Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig (Hofheim: Wolke Verlag, 2012), 188.

[703] Peters, "Touch: Real, Apparent, and Absent," 25.

context of music performance. Deniz Peters confirms that the "recording media and sound synthesis have bracketed the performer in some practices (with the composer of course still 'making' the music)."[704] In the examples above it has been discovered that in electronic music the aspect of performativity is not omitted but displaced: away from live performance – where the performative labour is experienced by the audience – to the studio where acousmatic music is created, wherein performative labour is visibly concealed but audibly remembered. Here, the "limits of these [musical] activities are not those of physical skills; they are limits and characteristics of the technologies used, the performativity of the hard- and software – their figurative bodies."[705]

In this lies a possibility for a culturally relevant musical discourse, within which a piece of music serves as a critical exploration of technology's limitations. When technology is presented not as an omnipotent extension of the human but as a *technical supplement* which is correspondingly prone to flaws and defined by limitations, then "within these limits human bodies' expressions can *sometimes* and *to some degree* be discerned."[706]

Musical Material: Technological Processes *in* Music

Mixed Music

Beginning in the late 1940s, the development of electronic music was accelerated when the first experimental music studios were founded in Europe, beginning with important locations in Paris and Cologne.[707] As these studios were established, composers began to implement pre-recorded sound in various works of "mixed music":

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[704]Ibid., 25.

[705]Ibid., 26.

[706]Ibid.

[707] In 1942, Pierre Schaeffer founded the *Studio d'Essai*, which was renamed *Club d'Essai de la Radiodiffusion-Télévision Française* in 1946. After meeting with Pierre Henry in 1949, with whom he started to work in collaboration, Schaeffer founded the *Groupe de Recherche de Musique Concrète* (GRMC) in the French Radio Institution in 1951. In the same year, the Nordwestdeutscher Rundfunk founded the *Studio für elektronische Musik des Westdeutschen Rundfunks* (Studio for Electronic Music of the West German Radio) in Cologne. Stockhausen joined the Studio in 1953 and began work on his *Elektronische Studien* (1953-1954) and the important composition *Gesang der Jünglinge* (1955-1956). Interestingly enough, the two studios were dedicated to the exploration of two "complementary areas of sound generation. The French studios were pioneering the art of sampling – taking sounds from the real world and processing them to make new sonic collages. At the same time the German studio was developing synthesis techniques – making sound from electronic components." Ross Kirk, and Andy Hunt, *Digital Sound Processing for Music and Multimedia* (Focal Press, 2013), 14-16.

here, pre-recorded musical material is incorporated in combination with live instrumental or vocal performances. In this way, the notion of reproduced sound was emancipated from the limited context of musical realization in which sound reproduction served to repeat a musical happening acoustically without an actual performance.

An example for such "mixed music" is *Musica su due dimensioni* [Music in Two Dimensions] (1952, revisions 1957/1963), written by Bruno Maderna and realized with sound technician Marino Zuccheri. The composition is for live flute, cymbal and magnetic tape, while the revised version omits the cymbal and may be regarded – as often stated – as a different composition altogether.[708]

> In its definitive final form, *Musica su due dimensioni* became a piece for magnetic tape, with the interpolation of a 'cadenza' for flute and a clash of cymbal in the final section. The electronic part was achieved by superimposing, with the help of two tape recorders, three different tonal ranges, scored in traditional notation and played on the Melochord, the keyboard instrument built by Harald Bode in 1949. […] Because the clash of cymbal does not in fact require the presence of a specific interpreter, it is now performed by the same flautist, so the reference to percussion instrument is omitted in the title.[709]

In pieces of "mixed music", *performed* instrumental or vocal sounds enter a particular interactive relationship with the implemented electronic sounds which, at this point, are static and don't allow change during their presentation: relevantly, Takasugi situates pre-recorded musical material in juxtaposition to live performed material in "mixed music" as follows:

> The pre-recorded, pre-composed soundfile, unlike other components related to the live performers, is not a spontaneous manifestation: its realization is out of time and is entirely revisable with limitless passes. By the time it is presented on stage, it has been revisited and modified more than a thousand times. This is what I understand as the well-formulated, pre-composed soundfile. It gains an outside perspective on the live material as it is disengaged from the existential conditions of the human performers who are swept up by the reality of the present. The

[708] Maurizio Romito, "Music in Two Dimensions: Works for Flute ," *Music in Two Dimensions: Works for Flute*, Mode Records MO260. Liner notes.

[709] Ibid.

> latter are like the characters of a novel who are busy agents within the live narrative realism of moment, time, and action. The soundfile lives outside these concerns. It is the essayistic infiltration into narrative real-time and formulates its paradoxical and contradictory pseudo-reality as a grafted and aloof philosophical dimension on the staged work. If it successfully permeates the live present, it does so by exploiting the suspension of disbelief created by the fictive narrative assumptions inherent in the performance ritual.[710]

A similar situation is apparent in Stockhausen's pieces *Gesang der Jünglinge* (1956) and *Kontakte* (1958-1960), both of which reconcile the distinct projects of the French and German studios*:* sampling techniques and sound synthesis, respectively.

In North America, examples of "mixed music" had an even earlier emergence with John Cage's *Imaginary Landscape* compositions – a set of five pieces written between 1939 and 1952. *Imaginary Landscape* No. 2 makes use of live instruments and amplified wire and is the only composition of the series which does not incorporate any pre-recorded sound. To the contrary, No. 1, and 3 are written for live performers and turntables with frequency recordings and, in the case of No. 3, recordings of generator whines and other electronic or amplified instruments are employed. *Imaginary Landscape* No. 4 is for 24 performers on 12 radios, and No. 5 asks for "any forty-two recordings; score to be realized as a magnetic tape."

In the various compositions of "mixed music" discussed above, traditional musical performativity is fused with technological pre-performativity whereby the perception of live performance is entirely transformed, as suggested by Takasugi. As a result, the musical materials of live and pre-recorded sources are re-contextualized: within "mixed music", the suggested *non-performativity* of reproduced sound is integrated into a performative context, which implies a contraction of the past and the present. Hovering between performativity and pre-performativity, the traditional notion of performativity – as a matter of the present – is not opposed but rather blurred: the new performative context can be considered as a constitution of Deleuze's idea of difference which he based on differential geometry. Here, a subtle notion of *différance* is present as

[710] Takasugi, "Material: Towards a Music Without Qualities," 188.

"a differentiated virtual field of Ideas or 'multiplicities' that are themselves changed."[711] "Difference in itself" and "repetition for itself" reveal the short-circuitry of formerly sequential processes – the pre-performed performance of the past coincides with and constitutes a performed performance in the present.

As the realization of musical material occurs both *in*-time and *out*-of-time, *per*-formed and *pre*-formed, one may see that Hindrichs' theory of the pre-formation of musical material is no longer a matter of social function but instead an integral part of the technological realization. One may proceed to say that musical material in electronic music individuates through a kind of *meta*-performativity as a consequence, given that the pre-recorded sound "successfully permeates the live present."[712]

Live Electronic Music: At the Speed of Light-Time

The 1960s saw the emergence of "live electronic music"[713] in which technology is finally implemented in a context of active musical performativity and in a truly reciprocal relationship with other *traditional* instruments. One may say that a new performance character arose from this development.

Music with live electronics, or "live electronic music",[714] situates *processes* of technological sound-generation (and modification) within an interactive context of live performance. The implementation of technology in music is therefore no longer limited to the passive reproduction of pre-recorded musical material. Instead, technological devices are now regarded as instruments fully capable of generating and controlling further parameters of sound. For example, Stockhausen's *Mikrophonie I* (1964) is a composition for six performers of mixed instruments: two percussionists play a tam-tam

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[711]Daniel Smith, and John Protevi, "Gilles Deleuze," *Stanford Encyclopedia of Philosophy*. http://plato.stanford.edu/entries/deleuze/#DifRep (accessed July 20th, 2014)

[712]Takasugi, "Material: Towards a Music Without Qualities," 188. Takasugi's statement echoes Adorno's demands to material thinking:

"Infatuation with the material along with blindness toward what is made out of it resulting from the fiction that the material speaks for itself, from an effectively primitive symbolism. To be sure, the material does speak but only in those constellations in which the artwork positions it." Adorno, "The Aging of the New Music (1955)," in *Essays on music*, 189.

[713] Emmerson, and Smalley, "Electro-acoustic music." "http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/08695 (accessed January 30th, 2015).

[714]Ibid.

while two performers are required to move hand-held microphones which are "used actively as a musical instrument, in contrast to its former passive function of reproducing sounds as faithfully as possible."[715] Another pair of performers is seated in the audience and regulates bandpass filters and the spatialization (via panning) between four speakers. Microphones, mixing board and speakers are treated as the percussion instruments.

Towards the end of the 1960s, technological devices such as analogue ring modulators, audio filters, phasers etc. had become widely available. With these devices, composers could modify and control frequency-based or timbral characteristics of sound, not before or after a concert but during the performance. With the emergence of other stand-alone devices, composers now had the capability to directly modify and enhance temporal aspects of sound.

For example, envelope generators allow for the modification of a sound's amplitudinal characteristics (volume) through time; i.e. the *attack* time, *decay* time, *sustain* level and *release* time (the so-called ADSR curve) of any sound can be modulated.[716] This presents an important development as, in reference to Gunnar Hindrichs, it has been discussed that sound representing musical time may appear in one of three primary forms: "the measure of time as process, the measure of time as a reflection of eternity, the measure of time as moment form."[717] With the help of envelope filters, musical time can therefore be controlled within one single sound.

Another important technological development is the implementation of tape machines as analogue delay systems. Sound can now be *sampled live* – a practice, which entirely transforms the previous notion of pre-recorded materials: within a musical environment of live sampling, a performed musical material becomes a *pre*-performed material at the time of the performance and is accessible and repeatable on demand.[718] In this situation, the realization of musical material is both *in* and *out* of time while the

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[715] Karlheinz Stockhausen, "Mikrophonie I (1965), für Tamtam, 2 Mikrophone, 2 Filter und Regler," in *Texte zur Musik* , vol. 3 (Cologne: Verlag M. DuMont Schauberg), 57-65.

[716] See Peter Manning, *Electronic and Computer Music*, fourth edition (New York: Oxford University Press, 2013), 114-115.

[717] Hindrichs, *Die Autonomie des Klangs*, 123.

[718] See Emmerson, and Smalley, "Electro-acoustic music." "http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/08695 (accessed January 30th, 2015).

perception of this realization is *in* time: a short-circuitry of meta-performativity. The notion of short-circuiting is additionally augmented when taking into account that live performed sound shares the same immediate temporality as sampled (memorized) and played-back (recalled) sound, which ultimately results in a collision between short-term and long-term memory: memory input and output are separated only by a minimal delay.

Further important technological innovations marked the beginnings of digitized, computer-based music. In 1957, Max Mathews wrote the computer program *MUSIC I*,[719] which triggered the development of various digital applications for musical sound synthesis, recording, archiving and playback.[720] Subsequent computer programs based on *MUSIC I* enabled composers to have absolute control over numerous parameters of the sounds in their compositions, even if the acquisition of the required programming skills to do so proved to be rather demanding.

The introduction of "real time" algorithms has produced formats which operate faster than analogue circuits. This notion is important as it affects the relationship of perceived time with musical time. Wolfgang Ernst describes the difference between analogue and digital media:

> With the age of so-called analog media such as the phonograph and the cinematograph, signs of or in time themselves can be registered. Not only do they maintain a symbolical relationship to macro and micro time (such as historiography), but they inscribe and reproduce functions of time themselves. It is only with the digital computer that the symbolic regime dialectically returns, this time in a genuinely dynamic mode (which differentiates implementation of software from the traditional Gutenberg galaxy): algorithmic time and operative diagrams.[721]

The implementation of digital technologies within "live electronic music" therefore entails an implementation of chaotic time which is intrinsic to the "dynamic

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[719] *MUSIC I* was the first computer program which could digitally synthesize sound. While the first version of *MUSIC* was only capable of producing one single triangular wave form, the following updates – the series is refered to as *MUSIC-N* – allowed for the simultaneous generation of several sounds (polyphonic voices) and a variety of waveforms. In 1986, the latest version *MUSIC 11* was translated and ultimately became Csound. For more, refer to Manning, *Electronic and Computer Music*. (New York: Oxford University Press, 2013, 4th edition), 181-1996.

[720] See Kirk, and Hunt, *Digital Sound Processing for Music and Multimedia*, 21-23.

[721] Wolfgang Ernst, "Media Archaeology as a Transatlantic Bridge," 30.

mode" of digital algorithms. The implementation of digital technologies creates an intensified meta-performance wherein chaotic time and linear time amalgamate within the cyclical time implicit in "the performance ritual."[722]

Digital technologies find application in the realm of contemporary "live electronic music" in the following three formats:

1) samplers and sequencers, 2) synthesizers, and 3) effect units.

One may differentiate between these three formats in how they distinctly individuate – generate and modify – musical material within time:

1) Digital samplers and sequencers are similar to analogue tape machines in that they allow for *event processing*: sound is recorded (sampled) and stored in digital memory (for example, on a computer hard drive). It can be quickly accessed and recalled on demand. Digital audio samples may be "looped": played back in continuous repetition, loops make possible a theoretically endless chain of musical memories, which are recalled verbatim.

While sound may be sampled for looping, instrumental sounds are often sampled for emulation; an emulated instrument can then be "played" from a control device, i.e. an instrument which only serves as a *performance interface* (for example, a MIDI piano which can trigger any sampled sound) and possesses no fixed sound identity. This will be discussed further below.

In contrast to analogue machines, digital samplers and sequencers facilitate event processing in real time: they allow higher amounts of audio data to be stored and retrieved at faster speeds.[723]

The following illustration shows the assignment of individual sounds to a range of keys on a MIDI keyboard: four recorded violin sounds are assigned to 12 keys which means that, in this case, one single sample (pitch) serves to represent three pitches and thus necessarily entails transposition in order to produce these pitches.[724]

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[722] Takasugi, "Material: Towards a Music Without Qualities," 188.

[723] Furthermore, digital samplers became successful successors to analogue devices due to economical reasons. The required hardware peripheries are cheaper in production and more practical in operation than analogue circuits. In addition, many contemporary software samplers, or sampler instruments, offer the option to intermodulate sampled sounds with algorithms of sound synthesis so as to generate more complex sound textures and timbres. See Kirk, and Hunt, *Digital Sound Processing for Music and Multimedia*, 127-128.

[724] Image from Wikipedia: http://upload.wikimedia.org/wikipedia/en/f/ff/KeyboardZone.gif (accessed February 4th, 2015).

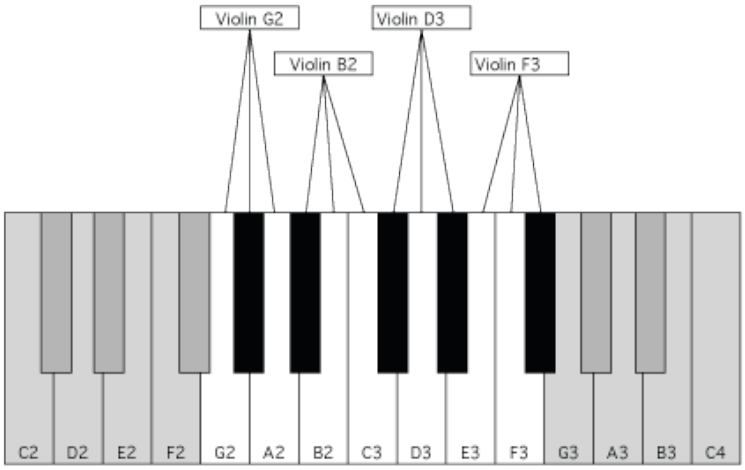

Figure 29 - Example for a Sampler Instrument (Violin) Sounds assigned to Specific Key Regions on a MIDI Keyboard

Within a software sequencer, often in so-called *arrangement windows*, audio samples can be arranged directly or indirectly (in the form of MIDI messages[725] which *trigger* the samples) in any vertical and horizontal order.

It can be observed that digital samplers and sequencers short-circuit performative and temporal aspects of musical material in a similar way to analogue tape machines: musical material is performed and simultaneously memorized (input) and recalled (output) in real time.[726] The use of *recalled* sound noticeably entails an omission of a human performer. This transforms Roland Posner's biological media concept as "bodily organs which are used for the production and reception of signs"[727] become expendable in the performative environment of samplers.

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[725] The development of MIDI and the use of *interfaces* will be explained in the next section. At this point, however, it is noteworthy to mention that MIDI is a serial protocol, i.e. seemingly simultaneous sounds are in fact deferred by 31.25 kbit/s while the transmission requires "all data information to be directed down a single data line." See Manning, *Electronic and Computer Music*, 272.

[726] Basic sampler instruments access so-called sound banks with pre-sampled sounds. When such sampler instruments are used in performance, the moment of memorization (input) is thus entirely removed from the moment of remembering (output). In this way, digital sampler instruments function similarly to analogue tape machines. Importantly though, these marketed sound banks contain "fetishized" sound which means that such sampler instruments trigger industrialized musical memory which is never forgotten.

[727] Posner, "Basic Tasks of Cultural Semiotics,"
http://faculty.georgetown.edu/irvinem/theory/Posnerbasictasksofculturalsemiotics.
pdf (accessed November 28th, 2014).

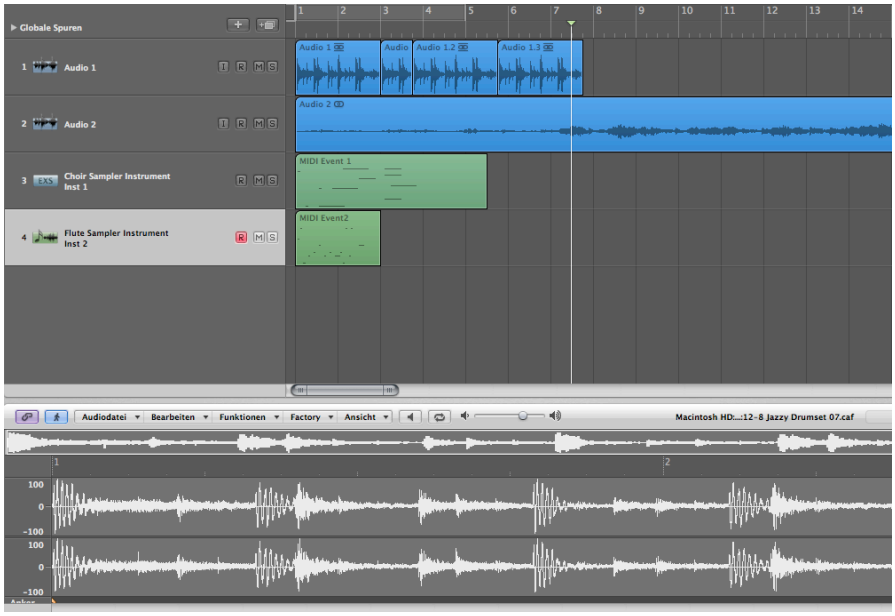

Figure 30 - Software Sequencer (Apple's Logic 8)

Figure 30 (above) shows an example for a software sequencer: the blue "events" show an arrangement of audio samples, the green "events" show MIDI events which trigger sounds within the virtual sampler instrument which is assigned to the given channel. The lower third of the image shows the wave-form of the audio sample "Audio 1" from the channel one.

2) Digital sound synthesis generates sound in "real time" via one of the following three methods: a) synthesis by oscillators (additive synthesis, subtractive synthesis, frequency modulation, amplitude modulation), b) synthesis by complex modelling, or c) sampling[728] – as described above.

3) Digital sound processing involves methods of *artificial reverberation*, *delay*, *chorus*, phasing and flanging, and highly complex operations such as convolution, FFT analysis, time-stretching, complex digital filters etc.[729]

As opposed to samplers and sequencers, which enable *event processing*, digital sound synthesis and processing are formats of *signal processing*. Implementations of

[728] For a detailed description of these methods, please refer to Kirk, and Hunt, *Digital Sound Processing for Music and Multimedia*, 124-128.

[729] Again, for a detailed description of these methods, please see Kirk, and Hunt, *Digital Sound Processing for Music and Multimedia*, 129-130, or Steven W. Smith, "The Scientist and Engineer's Guide to Digital Signal Processing," http://www.dspguide.com/pdfbook.htm (accessed February 3rd, 2015).

signal processing require high computational capacities.[730] For this reason, such processes used to be limited to studio use and were not suitable for implementation during live performances. Only

> the increasing speed of personal computers has allowed the implementation of many such processes in real time, making possible the integration of event and signal processing within a single control environment – a development that [has influenced] both studio composition and performance practice.[731]

In contemporary electronic music, digital technologies are frequently employed in combination. Many compositions use samplers, synthesizers and digital effects simultaneously. Within such pieces of "mixed media", distinct characteristics of performativity and memory operations coexist. Takasugi differentiates between the use of samples (as a fixed type of recallable memory) and real time processes:

> The pre-recorded, pre-composed soundfile in a live mixed-media work is fundamentally different from a pre-composed real-time patch with live, variable input. The former is a closed, controlled and revisable system. It stands outside of time. The latter is an open system. While the live input of the real-time patch can be made more or less fixed, the advantage and perhaps even the purpose of such an apparatus is to have variable inputs: in other words, to invite unpredictable, uncontrolled sounding results. It is a real-time application analogous to the open form piece.[732]

Despite their appearance as simultaneous, incongruous systems, Takasugi makes the important observation that it is the interaction between accurate memory (pre-recording) and dynamic processes of memory manipulation (sound processing) that creates can elicit the "drastic" in electronic music – the essence of "real music",[733] as

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[730] See Smith, "The Scientist and Engineer's Guide to Digital Signal Processing," http://www.dspguide.com/pdfbook.htm (accessed February 3rd, 2015).

[731] Ibid.

[732] Takasugi, "Material: Towards a Music Without Qualities," 188.

[733] "[...] the relationship between real music and its action upon performers and listeners—at a nonrepeatable moment and place, in a context that will exist only once and not again – becomes so fundamental, so viscerally powerful and ephemeral, so personal, contingent, fugitive to understanding, that it elicits the unfashionable.[...]It is real music, music-as-performed, that engenders physical and spiritual conditions wherein sound might suggest multiple concrete meanings and associations, conflicting and interchangeable ones, or also none at all, doing something else entirely. Real music, the event itself, in encouraging or demanding the drastic, is what damps down the gnostic." Abbate, "Music – Drastic or Gnostic?," 529, 532.

suggested by Carolyn Abbate (see Chapter 1, *Social Forms of Memory: Communication = Community = Shared Culture*). Takasugi determines:

> Though algorithmic composition may be understood as a compositional set of procedures and less so as musical material, […] [a]n algorithmic program may combine a number of samples to produce an aggregate soundfile that is then used in the same manner as other basic source materials. [...] [M]ixing presents an opportunity for momentary but powerful sonic collisions, sabotaging the precision associated with single samples and their transparency.
>
> In addition, the entire gamut of sound processing is integral to this other indispensable laboratory for material investigation. Aside from all the familiar techniques of sound processing, a few stand out as extensions in the digital realm of the protracted acoustic work in the studio. They invariably concern the investigation of hybridizing instruments as a metaphor for transgenic organisms, an ever advancing reality in today's biotech laboratories. Cross-synthesis of sampled instruments and hybrid instruments by mixing samples of acoustic instruments with those realized via physical modeling techniques are of particular interest here. Perhaps the most important point to made [sic] concerns the idea of continuous and endless redefinition. Let us take the example of piano samples at the keyboard. Despite their iconic, identifiable sound, these source samples still have the possibility to become something else, even after the sounding event has taken place. Nothing is too late to alter, and so its qualities are ever exchangeable.[734]

The interaction between various formats of technology in music is therefore where sound is *individuated* – not only within the perception as musical material but also as technological material, externalized by the *inorganic*. This is relevant for the following proposition: synthesized and pre-recorded sounds are *inorganic* sound, generated independently from the presence of a physical action on an instrument. One may thus regard sound synthesis and sampling as a kind of sound production, which is detached from the body. This is corroborated by the following statement by Deniz Peters, which refers to electronic instruments but can, in the present context, be understood as applicable to the employment of sampled sound:

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[734] Takasugi, "Material: Towards a Music Without Qualities," 186-187.

> Unless specifically designed, an electronic instrument is no longer a bodily extension that prolongs the touch, but something that supplants its functionality. As a visible physical detachment, this is perhaps most tellingly apparent in the theremin, one of the first electronic instruments. More subtly, in a given mapping (that is, the freely determined projection of a set of movement data onto a set of sound data), the sound projected by the loudspeaker for example *may* be completely arbitrary to any meaningful human motion, resulting in a profound form of detachment. Human motions, in their particular qualities, might cease to be heard as causing the sound. The *making* of music then virtually fades as a bodily act, or as an anticipated bodily act.[735]

Dissociated from human motion, one may say, the *presence* of the sound is *withered*, referring to Benjamin's concept of art's *aura.*[736] Frank Cox proposes a reconsideration of the *aura* and echoes Takasugi's above-mentioned concepts regarding electronic music:

> Aura is a given in live performance […], but is almost by definition non-existent in electronic music (excepting with live electronics, where the issue of the significance of the aura becomes paramount). It is precisely confronting this deficit that must become one of the main projects of electronic music. Not, however by mimicking the aura of live instruments, which would inevitably produce a 'cheap imitation,' but firstly in the sense of composing-out a sort of virtual aura, unique to the piece.
>
> A second possibility would be that of creating such a meaningful complexity of interrelationships between components of live electronics and/or between live performer and electronics such that every performance will necessarily differ in detail, although the overall identity of the work and of the significant forms within it be maintained across performances.[737]

The production of *aura* of electronic music, according to Cox, cannot be achieved by the same means as found in purely acoustic music, where *presence* and *aura* are guaranteed by the act of performance. Electronic music depends not on different but on *extended* relationships as its mediality (i.e. performativity) is extended itself. Such

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[735] Peters, "Touch: Real, Apparent, and Absent," 25.

[736] "[T]hat which withers in the age of mechanical reproduction is the aura of the work of art. […] [f]or aura is tied to [its] presence". Benjamin, "The Work of Art in the Age of Mechanical Reproduction," 229.

[737] Cox, "Aura and Electronic Music," 56.

interrelationships, as Cox contends, must allow for transformation and not remain static. As the three aforementioned formats of digital technology (sampling, synthesis, processing) provide technological musical material as well as processes of *individuation* of that material, Takasugi's and Cox' statements directly pertain to the question of material pre-formation and its inherent tendency: there exist ways in which digital technologies constitute musical material in its present, past and *becoming*-future simultaneously. As has been discussed, the pre-formation of *pre-performed* sound transforms the perception of *performed* sound, embodying Deleuze's concept of "difference in itself" and performing a simultaneity of a "repetition for itself."[738]

Takasugi's music demonstrates a direct implementation of this notion. In his writing, he proposes a "music without qualities" which is a music "that rejects assumed properties that would predefine it; rather, it defines what it is and which characteristics it retains or retires at any given moment for itself."[739] Such a music requires a musical material that has intentionally forgotten its presumed physicality by way of pre-performing its performed preformation. In his piece *The Destinies of Hallucinations* (2013), Takasugi achieves this via juxtaposing music generated from samples, live performed music, and aspects of theatrical performance,[740] by way of which pre-performed, reproduced musical material is re-contextualized.

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[738] See Deleuze, *Difference and Repetition*, and Daniel Smith, and John Protevi, "Gilles Deleuze," *Stanford Encyclopedia of Philosophy*.

http://plato.stanford.edu/entries/deleuze/#DifRep (accessed July 20th, 2014)

[739] Takasugi, "Material: Towards a Music Without Qualities," 179, note 1.

[740] In the performance notes, Takasugi instructs:

> "*The Destinies of Hallucinations* is first and foremost a work of music theater framed as a chamber music performance suggesting a circus side show (freak show). It is extreme in its theatrical depictions and demonstrations, and yet is ruthlessly contained. Comical, strange, or grotesque elicitations may result from various acts performed on stage, but these are never approached by a performer's attempt to be silly, cute, melodramatic, or histrionical. Quite the opposite, it is an extremely austere theater, more related to the Japanese Noh theater or the Japanese tea ceremony. (From the performer's view, there is nothing funny about this drama, on the contrary, something tragic.) Despite this containment, extreme acts should be performed without shame or embarrassment. One needs to "go all the way" and this is difficult to do in front of an audience (even if achieved in rehearsal). For instance, if certain breathing techniques require that the face become red from hyperventilation or extremely twisted from certain performance directions, the performer should not hold himself/herself back, but rather allow these bodily phenomena their unabashed exhibitionism on stage. Furthermore, in general, the music theater is contained and yet severe, petrified, and tense throughout. Tacet, silent, or empty measures are no grounds for relaxation, in fact the opposite: these frozen silences or non-activities must be performed with the utmost…even more…focus and concentration, as if holding up the emptiness of the universe simply with one's gaze."

Though referring to the context of artistic works of mixed-media, the following statement lends itself to an analysis of technological de-physicalization, or de-humanization, within a wider cultural context.

> One thing is clear: human presence is and will always be imbued with its past absence. One might ask then, are they really there at all? Yes and no. In the context of mixed media, there is a confusion between their live presence and their loudspeaker representation. Who or what is playing? Occasionally, they lip-sync. Or a voice is thrown like a ventriloquist – in other words, something is said, but no lips move. There is disfigured imitating, but who is what is hard to say. Persons and impersonators inhabit the stage at the same time. A maxim emerges: people are allowed to return if and only if they enter this house-of-mirrors, understanding the conditions for what will be called a *strange doubling* – a heterophony of left and right, of close and far, of live and recorded, of original and translation, of human and virtual manifestations. In short, a digitalized, engineered material world superimposed by attempts at replication by failing, albeit virtuosic performers.[741]

The concept of centring the piece on theatrical aspects entails a blurring of temporal and bodily boundaries: as an exaggeration of bodily presence, the theatrical staging of musical performers serves as a transitory presentation bridging the *who* and the *what*. Simultaneously, the pre-produced tape music microscopically enlarges this obscured presence which is even further augmented in the context of the theatrically performed musical material (see fig. 31).

In this way, the technical prosthesis extends the human so far that the prosthesis itself is extended; *différance* itself becomes dramatic, theatrical.[742]

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[741] Takasugi, "Material: Towards a Music Without Qualities," 187.

[742] A representation for this might be the use of a ventriloquist, which reveals a complex simultaneity of externalization: vocal sound is produced within 1) theatrical presentation (of the guitarist as ventriloquist), 2) magical presentation (of the "ventriloquist"), 3) semantic presentation (as fragments), 4) and musical presentation (as isolated word fragments).

Takasugi explains in his performance notes "[t]his is a 'marionette-ventriloquist act.' Vocalizations are assumed to come from the guitarist, but are thrown around the ensemble. The coordination of puppet and puppeteer requires perfect precision. Ideally, when performing these intermittent vocalizations, one looks up from one's music and stares straight at the audience."

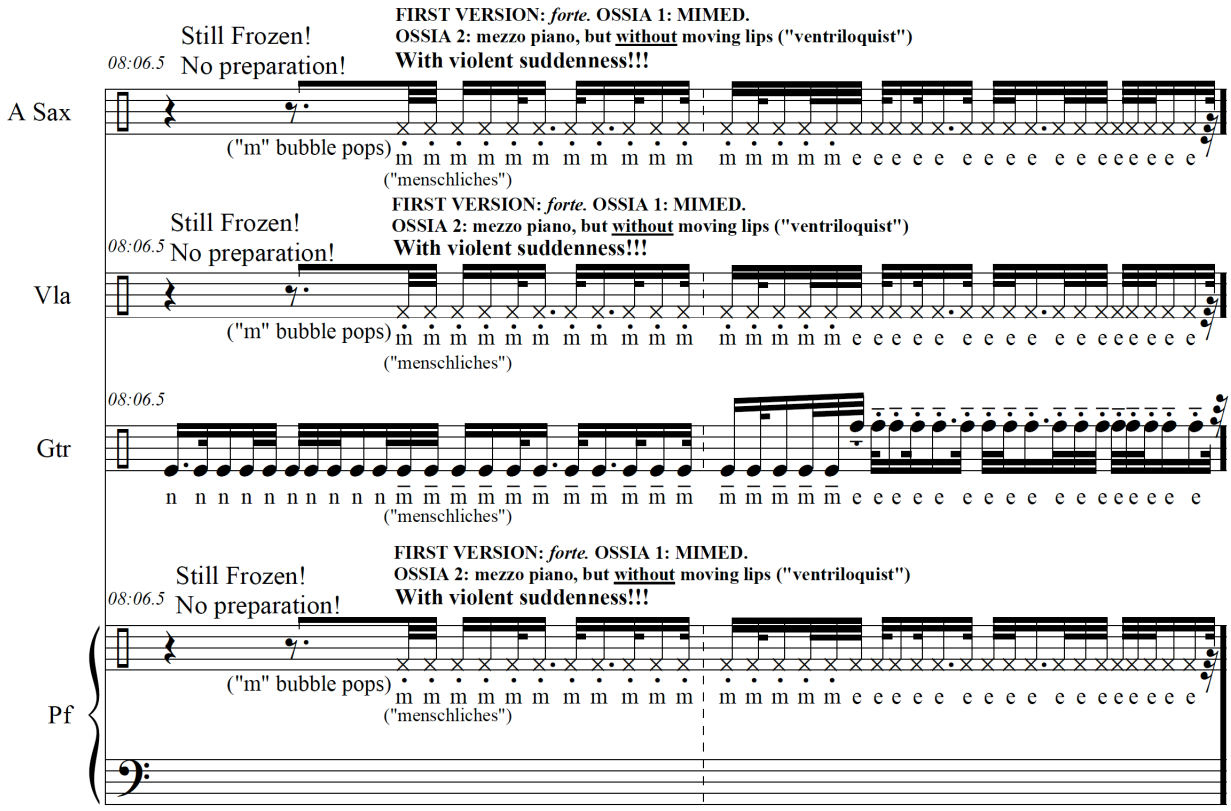

Figure 31 - Takasugi: The Destinies of Hallucinations (Score excerpt, mm. 121, p. 45)

The diverse technological formats discussed above present distinct technological musical processes. Importantly, event processing and signal processing may be controlled by the computer or via *performance interfaces.* These are physical devices (instruments) to control given technological musical processes and allow for increased performativity of the technological components.

Performance Interfaces

Max Mathews' series of MUSIC-N programs appealed to numerous composers who then fully committed to the programming of digital sound synthesis. However, the new processes of sound generation and manipulation remained bound to the hardware peripheries of the computer. As such, the possibilities of digital processes only allowed for limited musical interactions between *organic* musical sources (live musicians or even the presence of physical instruments) and *inorganic* technological extensions during musical performances. Recognizing the lack of mobile *performance interfaces*, Mathews

developed the first control system for real time music synthesis. In collaboration with Richard Moore, *GROOVE* (Generated Real time Output Operations on Voltage-controlled Equipment) was first built in 1970. A complex *hybrid* system, *GROOVE* consists of digital and analogue components and permits its user to *perform* processes of sound generation and control operations such as audio sampling and playback in real time. Keyboard manual, rotary knobs and a joystick are further implementations, which made *GROOVE* a highly versatile instrument for real time performances of live electronic music.[743]

In the 1970s and 1980s, other performance interfaces were developed which made possible the translation of formerly analogue circuits such as filters and delay systems into microprocessors. The same music-technological processes could now be achieved faster and more affordably, making the new digital control devices accessible to a wider audience of composers.

The standardization of MIDI (Musical Instrument Digital Interface) in 1983 paved the way for the emergence of a plethora of new performance interfaces:[744] keyboard manuals serve as various types of MIDI *control interfaces* or as *physical action controllers* to emulate commonly known musical instruments. Such *Physical action controllers* are available in a variety of forms. For example, guitar interfaces allow for a conversion of performance data on a guitar to MIDI data. A variety of wind instrument controllers incorporate so-called *breath controllers* and a series of MIDI wind controllers also detect lip pressure.[745] Other physical instrument emulators include percussion or

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[743] See Manning, *Electronic and Computer Music*, 207-208.

Notably, composer Laurie Spiegel made changes to the GROOVE system in the mid seventies and implemented the option for graphic input. The new system was called VAMPIRE (Video And Music Program for Interactive Realtime Exploration/Experimentation), which enabled the user to control both sonic and visual parameters.

See Spiegel, Laurie. *Graphical Groove: Memorium for a Visual Music System.* Published in *Organised Sound* 3:3 (1998) Cambridge University Press, 187-191. http://retiary.org/ls/writings/vampire.html (accessed February 10th, 2015).

[744] As the present dissertation discusses the impact of MIDI in terms of concepts of instrumentality and performativity, a brief introduction of MIDI shall suffice at this point. For more information on MIDI specificities, signal flow and functionality, please refer to Manning, *Electronic and Computer Music*, 263-364.

[745] For example, Yamaha developed a series of monophonic MIDI wind controllers: WX5, WX11, and WX7.

string controllers etc.[746] Importantly, these MIDI interfaces register specific data: events such as note-on and note-off are transmitted as *messages* containing values of pitch, velocity (*dynamic)*, MIDI channel,[747] while other channel-specific *messages*, for example "pitch-bend" and "program change", have corresponding values.[748] These *messages* are then transmitted to a MIDI sound module (often as part of computer software) where they are decoded and generate sound or a given change within the MIDI environment.

> These devices tracked and measured the physical action that causes sound production (finger position and pressure, breath pressure, strike velocity etc.), and usually had no acoustic sound output of their own. The designers often added the measurement of physical actions that were not significant in the original acoustic instrument – for example, finger pressure ('aftertouch') on the wind controller.[749]

As opposed to such physical action controllers, *performance action controllers* are MIDI-based interfaces, which analyse gestures: the use of sensors, gloves and/or wires allows the *reading* of drawing, conducting or other gestures. Other performance action controllers employ devices based on complex circuits of microprocessors and analyse sounds (sonic information) rather than performance (gestural information) via pitch-tracking, envelope-following, timbre-analysis etc.[750]

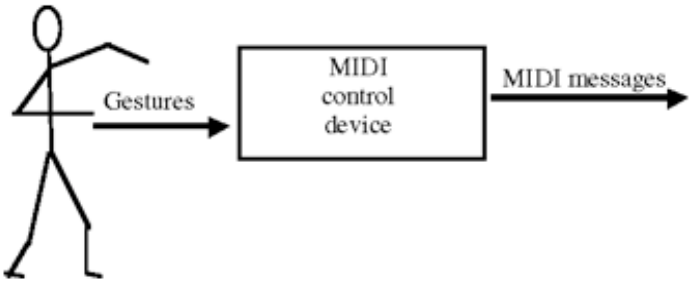

Figure 32 - Simplified Signal Flow of Gesture-Based Interfaces (Graph by Kirk and Hunt)

[746] Other MIDI controllers can be found on midi.org: MidiManufacturesAssociation, "MIDI Products," http://www.midi.org/aboutmidi/products.php#NonTrad (accessed February 3rd, 2015).

[747] Up to 16 channels can be addressed.

[748] These values range from 0-127. Mode messages ("CC Messages") are non-channel specific messages, which apply to the entire MIDI device rather than to individual channels.

[749] Simon, Smalley, Denis. "Electro-acoustic music". http://www.oxfordmusiconline.com.ezproxy.library.uvic.ca/subscriber/article/grove/music/08695 (accessed January 30th, 2015).

[750] Ibid., and Kirk, and Hunt, *Digital Sound Processing for Music and Multimedia*, 33-35.

The landscape of new instruments is constantly updated, particularly with so-called apps, which turn ubiquitous smart phones into interfaces.[751]
In practice, the aforementioned interfaces and musical processes are often controlled within "interactive music environments". Pieces of interactive performance software such as Max/MSP, Midas, the internet etc.[752] are *graphical interfaces* which allow composers to link a variety of processes and interfaces within complex networks. Data of MIDI data, audio, graphics, video and various types of control data can be controlled inside these mixed-media "environments".

The use of MIDI interfaces constitutes an altered *physical media concept* as it introduces an additional instant of mediation: that between physical performance and sound production. The former *immediacy* – wherein musical human performance acts as a *direct* "acoustic medium to serve as a physical connection between the sign and the recipient"[753] – is replaced by a new, technical *mediacy.* Correspondingly, Deniz Peter describes that

> in the case of electronic instruments – and this justifies talking of a new instrumental paradigm – there is a gap that needs to be filled between human touch and sound made, despite – or as part of – their instrumentality.[754]

In the following, this "new instrumental paradigm" will be scrutinized from the perspective of musical and cultural semiotics as has been done in the third chapter.

Renewed Interpretations

The *Whos* and the Digital *Whats*

> Memory is objectified when it is technically synthesized. The question, then, is: what is the passive synthetization characteristic

[751] For example, today's technology allows for the use of GPS to deliver data which can be translated into musical data.

[752] Kirk, and Hunt, *Digital Sound Processing for Music and Multimedia*, 35-37.

[753] Posner, "Basic Tasks of Cultural Semiotics,"

http://faculty.georgetown.edu/irvinem/theory/Posnerbasictasksofculturalsemiotics.pdf (accessed November 28th, 2014).

[754] Peters, "Touch: Real, Apparent, and Absent," 25.

> of the *what* of contemporary technics, as well as of the *who* that *we* are?[755]

A passive synthesis of memory, contemporary technologies – as discussed – are advanced primarily by economical motivations,[756] and the current relationship between the *who* and the *what* has been explained by Stiegler's analysis and located within a "hive" culture as proposed by Jaron Lanier. In summary, the situation of the *who* and the *what* is as follows:

> The contemporary issue of the *who*'s relation to the *what* is characterized by a decontextualization resulting from a new industrial synthesis, from retentional finitude, whose spatial dimension is deterritorialization, tearing the *who* away from its ethnic markers, and whose temporal dimension is real time. This leads to a simultaneous disappearance of 'deferred time' – literal, historical time – and of the value of knowledge; but more generally, the vectorization of land by speed is experienced as a disappearance of idiomatic difference in all its forms, including the uniqueness of local dialects, habitat as the end of art, and universities' 'bowing' to techno-economic imperatives. Industrial decontextualization occludes différance; the issue at hand, then, is to know if 'our' technological communities are, nonetheless, possible.[757]

The technological community, fostered by industrialized cultural memory, presents the "hive" culture which verifies "that the new digital hypomnesic milieus enable a collective individuation that does not take already individuated individuals as its starting point, but rather directly individuates the collective and sustains the ongoing individuation of this collective."[758] In chapter five, it was pointed out that this has similar implications for the individuation of musical material with regards to its pre-formation and innate material tendency.

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[755] See Stiegler, *Disorientation*, 97. "There is passive synthesis because there is retentional finitude. In the age of analogic, numeric, and biological syntheses, retentional finitude is implemented economically, becoming the privileged object of industrial investment: the economic imperative has the initiative of its reification."

[756] Ibid., 126.

[757] Ibid.,143.

[758] Stiegler, "Memory," 86, note 39.

No longer is the pre-formation of musical material informed by music's double social function alone.[759] Digital technology has become an integral constituent in the genesis and individuation of musical material. This is because of the ubiquitous presence of computers within culture on the one hand, and the frequent incorporation of technological devices and processes in today's musical creations on the other. It can therefore be said that numeric technics constitute both material pre-formation and material tendency in an extra- and intra-musical manner simultaneously.

Until this point, this dissertation has investigated traditional practices and historical developments of both musical culture and technological memory supplements. This approach concurs with Wolfgang Ernst's idea that a separate analysis of the two aspects – culture and technology – is imperative so as to develop a practice of "listening to the musicality not only emerging from, but taking place *within*, technomathematical media."[760]

> The challenge facing the study of interrelations between culture and technology is not to bring them closer together but to rethink their terms and practices, which must therefore remain separate.[761]

With regards to the conception of music compositions, Michael Beil's comment about the contemporary state of musical material becomes instructive once again:

> [...] the meanings of a composition's musical material are more important today than the material itself; I can no longer consider material primarily a reservoir of building elements within an organized structure of sounds.[762]

Beil argues for a renewed concept of musical material as extended by technologies. This concept, however, involves a continuous analysis of the interrelations between contemporary culture and music through technology. An understanding of the extensive cultural transformation can only be gained in a continuous assessment of the ever-changing network of culture, technology, and music.

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[759] As has been described earlier, the individuation of musical material is dependent on the interconnected presence of intra- and extratextual memory.

[760] Ernst, "Media Archaeology as a Transatlantic Bridge," 25.

[761] Ibid., 24.

[762] Beil, "Material Shift," 9.

This is corroborated by Stiegler as he incessantly advises consideration of the implications of memory's supplementation via numeric technics always within the larger context of the *who*:

> [b]y misunderstanding the concrete numeric machine, the computer, as a particular case of a knowing memory – knowing because essentially epiphylogenetic and always already installed in the prostheticity of a what coupled to the living (i.e., dying) memory of a *who* – , […] [would be to] mistake the part for the whole: the whole is the coupling of the organic and the inorganic, which makes the memory complex epiphylogenetic. The result is either organic or inorganic. To privilege one of these two, disconnecting it from the other, is to fall into a metaphysics of the *who* or of the *what* – which comes to the same thing.[763]

Contemporary memory operations may be understood when investigated within an analytical framework which looks not at any prioritisation of the organic or the *in*organic, expressed by questions such as "*Who* programs *what* or *what* programs *who?*"[764] Stiegler's initial proposition becomes instructive, as he maintains that all forms of technicity – technology – are originary to humanity. Therefore, computerized cultural memory must be considered as equally originary to the *becoming* future of humanity as the technics of literal synthesis or oral traditions.

Stiegler suggests that

> we see that programs themselves are *temporal objects* in the phenomenological sense, but impose the overcoming of the phenomenological analysis of time. In saying that the media narrate ordinary life by anticipating it, with such force that its story of life seems ineluctably to precede life itself, I meant that public life is significantly produced by these programs; many sorts of interfaces are introduced into each life's intimate consciousness of time, such that the distinction between public and private becomes

[763] Stiegler, *Disorientation*, 165.

[764] Stiegler proposes the following questions lead to no helpful answer: "And the *who*, in its indetermination, programs itself. *Who* programs *what*? *What* programs *who*? Does the *who* program the *what* through self-programming? Is the reader, the spectator, or the listener being auto-programmed prosthetically when reading a book, watching a film, or listening to a CD, a DVD, or an iPod? Or does the receiver process the data stored in the particular medium through a program or programs that is the human being? Or do these programs consisting of mnemo-technical data permit the 'processing' of data in the receiver's 'own' memory, which then program their execution? What is the organ (instrument) activated by a CD: the CD player? the listener's sense of hearing? both? something entirely different? Is a book a translation (and production) interface between reader and Literature, as a vast collective memory? Does 'software' function in the same way?" Ibid.,186.

> problematic, while an exorbitant privileging of the one(self), the impersonal, simultaneously seems to result. Analogic, numeric, and biological orthotheses transform every object into a becoming-temporal-object, mediatic sequences to the living being's sequencings, to the analysis of the reproductive processes, the mastery of the time of transplants and hybrids, not to mention acceleration and thus of management calling itself human evolution.[765]

Stiegler concludes his second volume of *Technics and Time* with a suggestion that the aspect of "default of origin" needs to be consolidated within the question of "if and how a re-constitution of communities (within the default of community qua community of default) was possible within decontextualization."[766] Only in recognizing such new cultural contexts can questions be asked about the emergence of various temporalities within musical material and performance. Such questions are relevant for a music-semiotical approach – particularly in regard to the cultural semiotics as introduced by Roland Posner, which was discussed in chapter four.

A Merging of Semiotics

In his essay "Media Archaeology as a Transatlantic Bridge", Wolfgang Ernst echoes Stiegler's observation that digital technologies have pervaded contemporary culture, and argues that traditional analytical approaches towards culture need to be reconsidered. The need for a methodical reconsideration suggests an altered music-analytical paradigm:

> Occidental culture is still dominated by semiotically iconic, musically semantic, literally hermeneutic ways of seeing, hearing, and reading; the twenty-first century, though, allows for a genuinely computer-generated information aesthetics that is closer to that of processual diagrams than to figurative phenomena within the audiovisual (or textual) regime. On the level of cultural analysis and description, diagrams might eventually replace traditional historiography and enable unprecedented types of generative archives (rather than representations).[767]

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[765] Ibid., 186.

[766] Ibid., 243.

[767] Ernst, "Media Archaeology as a Transatlantic Bridge," 27-28.

Ernst recognizes that the digitization of memory has caused long-term archival aspects of memory to leave behind the formerly passive realm of information storage and to enter an active space of generative forces. Specifically, this means that, within electronic music, these forces take on the form of event processing or sound processing and/or synthesis, as described above. Through these forms, previously passive archival technologies become generative forces and engender short-term, intratextual musical memory – accessible on demand and in real time. This has explicit consequences for the genesis of musical material: in electronic music, musical material is informed by the various computer-based processes, which have been discussed above. A composition of electronic music then employs digital technology as inner-musical processes with a given material tendency. At the same time, this technological material must be understood within a broader cultural and extra-musical context, which in turn is constituted by the fact that music today is experienced both live and through mechanical/digital reproduction. This situation causes a splitting of digital memory into archival and active memory, as inner-musical systems collide with (extra-musical) culture.

> This 'archive' is no longer simply a passive storage space but becomes generative itself in algorithmically ruled processuality. Sound and images at the borderline of digital addressability can be navigated through large amounts of data unfiltered by linguistic words. Images and sounds thus become calculable by pattern recognition algorithms. Such procedures not only media-archaeologically excavate but also generate unexpected statements and perspectives.[768]

These unexpected – and unprecedented – statements and perspectives are a consequence of the interplay between intra- and extratextual memory within electronic music. With regards to temporality, the active archive reveals an amalgamation of the various layers of time-related vectors. As has been described above, these layers entail linear, cyclical, and chaotic or dynamic time. Accordingly, the renewed semiotic approach suggested by Ernst incorporates an understanding of the required re-ordering of linear, cyclical and chaotic temporalities within contemporary computerized culture.

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[768] Ibid., 29.

> Contrary to traditional semantic research in the history of ideas, such an endogenic [audio] archive will no longer list sound [...] sequences exclusively according to their authors, subjects, and time and space metadata of recording. Instead, digital data banks will allow [audio] sequences to be systematized according to genuinely signal-parametric notions (mediatic rather than narrative topoi), revealing new insights into their informative qualities and aesthetics. […] There is a sound in electronic media, with the sonic taken not in its physical (acoustic, audible) sense but in its epistemological sense, as an expression of tempor(e)alities. The privileged relation between sound and technological media is grounded in their analogous time-basedness and chronopoietical time-basing. New media articulate themselves in well-ordered, even rhythmical times (whether electrotechnical or algorithmic), which is their music.[769]

Roland Posner's *media concepts* are helpful in explicating that semiotic content is directly influenced by the mode of its transmission.

> The *technological media concept* characterizes sign processes according to the technical means used to modify the contact matter involved. […] In auditory sign processes, the technical means include musical instruments, microphones and loudspeakers, radios and receivers, as well as vinyl records, reel-to-reel tapes, cassette tapes, and CDs, which is why one speaks of records, reel-to-reels, cassettes, CDs, and so forth as different media.[770]

As has been discussed, the *biological* and *physical media concepts* are changed in electronic music since the *technological media concept* substitutes (or complements) given musical processes: the technological devices used today allow for the digitization of some or all workflows of musical creation. Instrumental interactivity within music is therefore re-structured as it occurs between human and digital technologies. Thus, *biological* and *physical media concepts* are changed, which has ramifications in the realm of the sociological, functional, and code-related media concepts, as discussed in chapter five.[771]

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[769] Ibid., 29, 31.

[770] Posner, "Basic Tasks of Cultural Semiotics,"

http://faculty.georgetown.edu/irvinem/theory/Posnerbasictasksofculturalsemiotics.pdf (accessed November 28th, 2014).

[771] It has been established that digital technologies have affected the *sociological media concept*, as cultural institutions for musical culture – such as venues or music libraries – have become replaced by digital

An example for how sociological, functional, code-based media concepts are related to biological, physical, and technological concepts can be found in Carolyn Abbate's essay "Music – Drastic or Gnostic?" Abbate describes the employment of technology as an extension of the human by the example of Laurie Anderson's performance piece *Happiness* (2002). The piece makes use of a sound recording of the airplanes colliding with the towers of the World Trade Centre in New York, September 11th, 2001. Abbate points to the aspect that the recognition of the sound's origin is dependent on the audience's familiarity with the extensive media coverage of the September 11 attacks. The sound's substantial semiotic charge is implemented within the performance art piece as a recording and, if recognized, given a new context. By using similar sounding *live* sounds, one might say, Anderson creates a network of *différance* which has the potential to redirect the previous semiotic charge of the acoustic representation of the crashing planes.

> That performance raised questions about secret knowledge – the object of hermeneutics – and its loss. […] At one point in *Happiness*, Anderson put on eyeglasses with tiny built-in microphones, which amplified not her voice but the anatomical sounds made by her head. When she clicked her teeth together, there was a loud boom with no reverberation. It was an uncanny moment. Guided by earlier references to the World Trade Center's destruction, I marked that sound as a musical translation. The original of this translation was recorded in the Naudet brothers' documentary about the disaster, the sound of bodies hitting the ground from great heights. No one who has seen the documentary forgets the sound, which the filmmakers chose not to censor or cut. Anderson imitated it. My secret knowledge of the hidden signified (because I had seen the documentary) is what triggered real terror at that moment in her performance.[772]

By way of re-arranging aspects of today's complex of media coverage, technology, and physicality, Anderson offers an intriguing approach to personalizing the events of September 11: the target audience is not the public mass but instead a group of individual audience members who experience a highly individualized perception of

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archives. The same digital archives affect both the *functional* and *code-based media concept* in that musical archivization and accessibility discern neither musical function nor code-based characteristics.

[772] Abbate, "Music – Drastic or Gnostic?," 533-534.

Happiness. Additionally, Anderson manages to recreate an artistic kind of temporal depth by re-attaching the medial transmission of the event to the present, while it should remain clear that the sound's origin lies in the past. From this, one may deduce that in *Happiness*, tertiary memory is present in the form of digital technology and simultaneously retains a multi-dimensional rather than "conflagrated" temporality.[773] The piece is based on a direct juxtaposition of the digitally archived sound with the personalized experience of the present through primary and secondary memory. Thereby, Anderson re-establishes communicative memory within the social realms of an otherwise de-communicative medium of the "hive" culture through which the sound of the plane crashes is consumed otherwise. In *Happiness*, the numerical *what* and the *who* are meaningfully connected via *différance*.[774]

In terms of cultural semiotics, Anderson's installation piece is a demonstration of how its multi-faceted mediality encompasses Posner's various media concepts.[775] This becomes specifically relevant within the context of Jean-Jacques Nattiez's idea of the material *trace*[776]– which was discussed in chapter four: as semiotic *trace*, the various medial dimensions of *Happiness* reveal distinct levels of pre-formation and material tendency and are informed by the involved poietic and esthesic processes correspondingly. This particular relationship within the semiotic tripartition showcases

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[773] See Stiegler, *Disorientation*, 12.

[774] Notably, Abbate concludes:

> "We so often deal hermeneutically with the past and its artifacts, yet seldom do we reflect upon artifacts we have right now and what they will mean in the future. Here is a chance. Will some audience years hence see a pirate videotape of Happiness and hear the sound and, without the secret, find themselves perplexed? And, even if some spectator were told by a musicologist of the future what the historical reading of the sound should be, would he or she find that knowing no longer means what it did in 2002? That knowing means loss of the perhaps equally terrible aura the sound now engenders only as long as it remains undefined? The very fact of recording – as any future audience can experience this event that came into presence [...] only via its repeatable surrogate – does that not alter a basic alchemy, making the event an artifact, handheld and under control, encouraging distance and reflection? Gnostic satisfactions can become pale. What may be left in Laurie Anderson's recorded sound is a remnant whose force approaches the force once predicated on a rare amalgam – live presence and secret knowledge – but do so precisely because the secret knowledge has been lost, as has what was once alive. To believe that original signification can become quasi-permanent, or to value nondetermination for the freedom that allows alternatives to arise and to exist? That is the choice when confronting artifacts from the past as well, and perhaps that choice depends on which loss is regretted more deeply." Abbate, "Music – Drastic or Gnostic?," 534.

[775] This involves the biological, physical, technological, sociological, functional, and code-based media concepts.

[776] The *trace* presents the third component within Nattiez's semiotic tripartition. In its entirety, this tripartition consists of 1) poietic processes, 2) esthesic processes, 3) material *trace*. See Nattiez, *Music and Discourse*, 15.

that an analysis of the material reality of Anderson's performance piece necessitates a consideration of the medial reality of poietic and esthesic processes. A contextualization of the material *trace* within cultural semiotics is therefore veritably complex.

Noise: The Sound of the Medium

Above discussion leads to the question whether the employment of digital technologies within given works of artistic expression is perceived as *noise* or if technological implementation has become so standardized in contemporary culture that its intrinsic sound is no longer noticed within a piece of art. This question is tenuously related to another question – that of intention, with regards to Luciano Berio's idea of the "intention of listening to music".[777] One might ask: does the listener, in his/her intention to listen to music, intend to consciously perceive a synthesized sound as de-humanized sound? Does the listener intend to identify a sampled, played-back sound as reproduction of a primordial sound, whose spatio-temporal autonomy lies in the past?

With regards to early devices of "noisy" sound reproduction, Ernst explains:

> In contemporary music as well as photography, we find a tendency to return to the imperfect image, the imperfect tone. Early techno recordings are badly produced, on vinyl, with amplified crackle and pop, and this goes so far that it becomes a pink noise and the hiss of the record is the real thing: we hear only the noise and the interstices of the record grooves. [...] The technical impulse itself becomes the message. In the hissing we hear the medium itself – the basis for a transharmonic understanding of music […]; thus what Walter Benjamin wrote about language (*à propos* the self-referentiality of proper names) here becomes true for all media, namely, that they communicate primarily themselves.[778]

As the discussion in chapter four has revealed, various approaches to noise exist. In relationship to musical information, it can be perceived as a *reduction* or an *addition* to an original signal. Based on these distinctions between the different perceptions of noise, it has been explained how various compositional approaches have involved attempts to *accept* or to *master* noise: the Ulyssean and Orphic notion of noise as revealed in the

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[777]See Berio, *Remembering the Future*, 49.

[778] Wolfgang Ernst, "Between Real Time and Memory on Demand: Reflections on Television," *Digital memory and the archive*, 107.

works of John Cage and Helmut Lachenmann, respectively. A third approach has been demonstrated by the example of Pierluigi Billone in whose music "the body is immersed in noise".[779] Interestingly, Billone's approach in the context of today's digitized culture gains another meaning.

The current sound world of reproduced music is based on high fidelity and makes use of various algorithms for *noise-reduction*. In this sense, Billone's compositional choice to incorporate noise in an equal manner to other musical aspects presents a reclamation of music's – or, the world's – natural, originary noisiness. Noise in this case is then neither an addition nor reduction of a musical message, but rather the convalescence of a damaged, fragmented (musical) sound culture.

Ernst's above-cited example of the noisiness of record players then presents an analogous situation to the noisiness of sound production via human performer. Additionally, Ernst points out:

> In these early prototypes, a transmission could be considered successful as long as an image took shape against the choppy grey static. . . . But if these images rush to make a claim on reality, it rests on the fact of transmission – reproduction at a distance – not on the veracity of its representations.[780]

As has been discussed in chapter five, recent developments have eradicated the noisy quality of digital technologies in the most literal sense. What remains is a question about noise with regards to the perception of computer-based technologies as the opposite extrime of the organic, biological genesis of sound. Deniz Peters raises this question in his essay "Touch: Real, Apparent, and Absent" and emphasizes the relationship between sound and bodily presence. According to him, one mode of musical conception in electronic music may imply a perception of sound as being emancipated from any primordial physicality. In this case, one might see an analogy to the Ulyssean concept of noise, i.e. electronic sound as an autonomous musical sound, independent from human physicality. In Peters' writing, another mode of sound perception implies that bodily aspects are expressively (re-)inserted into the electronically generated sound world. Within the noise analogy, this lies closer to the Orphic concept of noise since electronic

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[779] Iddon, "Siren Songs: Channels, Bodies, Noise," 85.

[780] Ernst, "Discontinuities: Does the Archive Become Metaphorical in Multimedia Space?," 106.

sound is *mastered*: fully integrated into the traditional notion of musical expressivity, bodily presence is reconstructed.

Peters terms the two modes of perception "detachment" and "attachment". The former mode implies a Ulyssean abstraction of sound, the latter indicates an Orphic victory of bodily expressivity over electronic independence. Both modes are achieved by relevant compositional decisions.[781] It is evident that these decisions are directly tied to the question of musical material and the processes the material undergoes within a given piece of music. Takasugi concludes his essay on musical material with the following, relevant statement:

> In music's attempt to determine what it is at any given moment, on its own terms, it must do so from the perspective of material, from its qualities, as these are ever in flux and always exchanging themselves. Music observes its materials and follows after, and the composer in turn, observes the music, and attends to it. Life, in turn, observes the composer and follows after, and it will not always resemble that which claims a state of 'having qualities.' Thus, the composer's conditions are simply a consequence of his or her thinking. One cannot change one's conditions unless one changes one's materials, as these are like roots in the soil. Whereas if one cares nothing for material and rather attends only to concepts, the conditions can be anything or everything, as they are friction-free. The difference between the two is that the materialist will define himself [sic] – always a slow process – and the conceptualist will allow himself [sic] to be defined, something that can happen quickly.[782]

Once again, one is reminded of Hindrichs' concept of the essence of musical material, which is always informed by music's double functionality: the meaning of musical material is directly dependent on both music's social function as functional music and as a musical piece of art (please see Chapter 3, *Social Function of Musical Material* and

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[781] "Such displacement [of a sound's known source] requires both detachment and attachment: it is by way of detachment (involving abstraction) that we come to hear the sounds as sourcing from locations other than the loudspeakers – which may be hung at a distance or hidden from view, or be worn right on our ears as headphones. […] To bring the body to appear expressively in sound […] is a matter of artistic achievement in electronic music, where the making of sounds may disappear elusively into mappings. Whether to include or abandon bodily expression is an aesthetic decision. […] Some music will speak of an abandonment, as the absence of expression is the expression of absence. Bodily expression in electronic music, conversely, lets reciprocity, intimacy, and responsibility into the experience, celebrating presence despite the paradigmatic disruption." Peters, "Touch: Real, Apparent, and Absent," 29.

[782] Takasugi, "Material: Towards a Music Without Qualities," 189.

Chapter 2, *Music as Memory – Musical Function in Musical Material*). Even if the pre-formation of musical material is ultimately determined by the compositional labour of the composer, various outer-musical aspects are at play in the constitution of these material "qualities" that are "ever in flux and always exchanging themselves."[783] With regards to electronic music, Hindrichs' theory must then embrace the notion that digital technology – as one of these formerly purely outer-musical aspects – has gained an autonomous social function in mass media culture and simultaneously influences musical material in its double social function. Importantly, the omnipresence of digital technology forms the cultural basis even in acoustic music, which does not employ any analogue or digital technology. For example, it has been pointed out that Billone's musical implementation of noise gains additional meaning because of its cultural context within a technological environment that basically suppresses noise.

Such understanding is, for example, present in the musical philosophy of Pauline Oliveros,[784] who refers to the noisiness of technology as "the negative operant phenomena of systems,"[785] which she has consciously implemented throughout her musical work.

Her 1966 tape piece *I of IV* is an example of improvisational electronic work utilizing sine-tone oscillators and a tape delay system. As one of many tape pieces produced in that year, *I of IV* reflects Oliveros' preoccupation with combination tones on subsonic and supersonic fundamentals, which allows for a listening experience of combination tones as independent pitch collections with the human hearing range excluding these fundamentals. According to the composer, the employment of such extreme frequencies caused much antagonism towards her at the University

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[783] Ibid.

[784] Already in her childhood years, Oliveros developed a fondness of what is generally considered as colateral *noise*. "Sometimes during the mid 1930s I used to listen to my grandfather's crystal radio over earphones. I loved the crackling static. The same grandfather used to try to teach me the Morse Code with telegraph keys. I wasn't interested in the messages but I loved the dit da dit dit rhythms. I used to spend a lot of time tuning my father's radio, especially to the whistles peculiar acoustical phenomena which involved my parents' voices on long rides in the car. I would lie in the back seat listening intently to the modulation resultants produced by voices interacting with engine vibration. I didn't care what they were saying."

Elliott Schwarz, *Electronic Music.* (New York: Praeger, 1973), 246-247, as quoted in Heidi Von Gunden, *The Music of Pauline Oliveros*, (Metuchen, N.J.: Scarecrow Press, 1983), 52.

[785] Ibid.

of Toronto Electronic Music Studio.[786] Yet, Oliveros continued to pursue her studies, and "for recreation would ride [her] bicycle to the town power plant where [she] would listen for hours to the source of [her] newly-found powers."[787]

Interestingly enough, this recreational habit seems to have induced the compositional ideas for *I of IV*. In her book *The Music of Pauline Oliveros*, Heidi von Gunden explains that the piece could be understood from the perspective of tonality, as there are prominent drones characterizing each of the piece's four sections.[788] A

> curious perfect authentic cadence at the end of *I of IV* [the shift of a tonal centre on F# to B, articulated clearly by a movement from F#6 to B6] is a clue to the understanding of the piece. One may wonder about the validity of a tonal analysis, but I suggest that it is the key to the piece's structure and supports the position that *I of IV* is a statement about the very nature of electricity. […] It is the final cadence that reveals the source of sonic activity […].[789]

As von Gunden points out, the prominent drones of each section – C, F#, F# and A#, B – can be ascribed to the overtone series of the subsonic fundamental B-2 at 7.5Hz: a factor of North America's electrical cycle at 60 hertz. Below is an illustration based on von Gunden's figure of the "prominent drone tones in *I of IV*" and "show[s] how *I of IV* is tuned to the pitch of electricity used in the United States and Canada."[790]

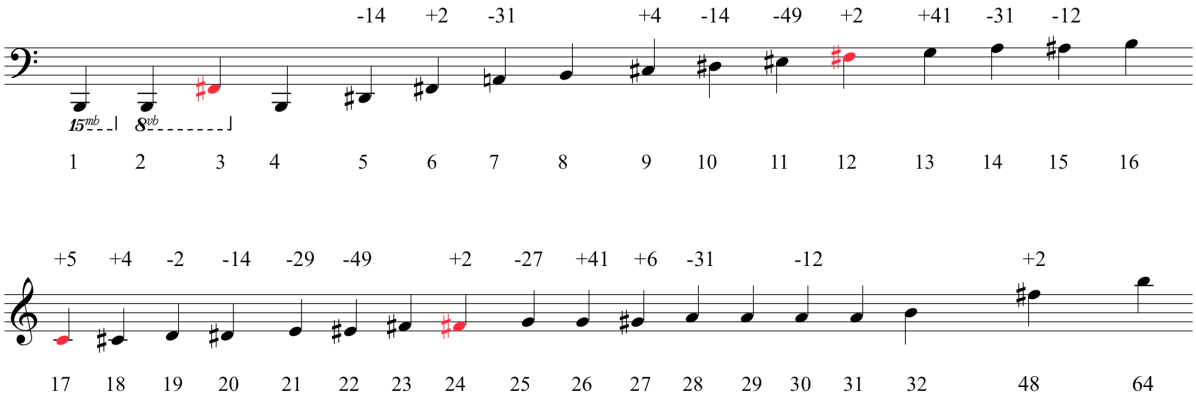

Figure 33 - Prominent drone tones in Oliveros' I of IV (Graph adapted from von Gunden)

[786] See Alfred Frankenstein, "Electronic Music – Masterpieces and Other Pieces," in *High Fidelity/Musical America* 18, no. 2 (1968), 45, as quoted in Von Gunden, *The Music of Pauline Oliveros*, 58.

[787] Ibid., 59.

[788] For a more detailed analysis, please refer to Von Gunden, *The Music of Pauline Oliveros*, 59-63.

[789] Ibid., 61-62.

[790] Ibid., 62.

Oliveros' *I of IV* is an early musical example in which *différance* occurrs between musical processes and the essence out of which modern technology arises: electricity. The piece integrates this idea via improvisation and the double tape delay, through which electricity *becomes* both generator of musical sound and musical material controlled by a human. Therefore, *I of IV* is "a statement about the nature of electricity, the very medium of electronic music."[791]

Conclusions

Concluding his book *Disorientation*, Stiegler asserts that the continued development of technological prostheses does not unavoidably lead to an eradication of the *who*. Even though the computerized synthesis of memory has been gaining more and more autonomy,[792] he restates that technological development is still merely advancing the ever-changing relationship between the organic and the inorganic as it always has.

> The complex of *who* and *what* endlessly modifies the conditions of temporalization, and if it is obvious that the machinic individuation Simondon explores continues on through the delegation of instrumental competencies of the *who* toward the *what*, this delegation is still only operant to the extent that it includes a transformation of the link between *who* and *what*.[793]

While the link between the *who* and the *what* represents two poles indicating either the presence or the absence of the human, Peters reminds us that "[b]etween these two extremes there is a vast area of aesthetic exploration, brimming with the full potential of our human perception and imagination, and inquiry through art."[794]

In conclusion it must be said that the relationship between the *who* and the *what* requires constant re-assessment in order to acquire an understanding of today's culture. This means that, as a culture, we need to be continuously aware of the fact that our humanity is perpetually under reconstruction, today even more radically than a century ago: humanity today is not in opposition to machinized supplementation but in a dynamic relationship. Only with this understanding can a meaningful practice of creating,

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[791] Ibid., 59.

[792] See Stiegler, *Disorientation*, 184.

[793] Ibid., 176.

[794] Peters, "Touch: Real, Apparent, and Absent," 29.

performing and perceiving music be cultivated within today's fragmentary "hive" culture. This is true for the relationship between this culture to music of the past as well as to contemporary music.

> One can react to performed music not just by imagining machines or mechanical processes as forms of explanation but by translating the relationship between sounds and performer or listener into safe forms, as connections between the musical notes and human facts: sexuality, subjectivity, the body, political faiths, cultural habits.[795]

Music may consist of purely acoustic and/or electronically generated sounds: it may be pre-recorded or performed live. Its performance may incorporate electronics, methods of sampling, robotics or no technological aspects at all. As long as the creators of music are critically aware of their culture, the ways in which their music is conceptualized, composed and deciphered along the process, naturally reflect and are reflected in those human facts that Abbate mentions above.

[795] Abbate, "Music – Drastic or Gnostic?," 530.

Chapter 7: Renewed Analytical Approaches: *Différance* and Rhizomatic Molecularity in Music's Numeric Technics

In chapter four, analytical approaches were suggested which embrace the notion of *différance* as it individuates between organic memory and its inorganic externalization. Based on the concept of music as an essential part of culture, the analytical paradigm involved perspectives which were considered to be relevant to the "connective structure" of contemporary culture. Within this framework, the musical analyses of chapter five focused on investigating cultural meaningfulness of the given compositions in which the conditions of *intertextuality*, *molecularity*, and *bodily différance* in the context of *noise* play a significant role in the semiotic process.

This final chapter will explore three examples of electronic music of the last forty years, not to provide a generalized, exhaustive music-analytical system but to attempt to characterize potential perspectives, which ideally unpack and decipher today's cultural frameworks of musical meaning. The compositions to be analyzed are 1) Brian Ferneyhough's *Time and Motion Study II* (1973-1976) for solo violoncello and live electronics, 2) Jonathan Harvey's *String Quartet No. 4* (2003) with live electronics, and 3) my thesis composition *#ffffff* (2012-2014) for flute, clarinet, percussion, piano, string quartet and live electronics.[796]

Within the analyses, the aspects of *intertextuality*, *molecularity*, and *bodily différance* will be taken into consideration, while the latter will receive heightened attention since relationships between sounds, performers, and listeners are fundamentally altered by digital technology, as has been explained in the previous chapters. Within each musical analysis, these new, reorganized relationships will inform the analysis of *intertextuality* and *différance*.

As in the fourth chapter, the following analyses will incorporate Gunnar Hindrichs' theory of music's double social function in combination with Roland Posner's various media concepts of cultural semiotics. However, these same aspects will also be

[796] The selection of these three pieces is based on the observation that each piece involves string instruments and liveelectronics in very different ways. The use of string instruments as a common denominator may be helpful in creating coherence in the overall analytical scheme.

investigated from an understanding of the multifaceted cultural impact of digital technicity.

As Michael Gallope proposes, musical ontology can only be redefined in the context of contemporary technics of extended retentional finitude.

> For me, the most powerful insight Derrida and Stiegler offer is the necessity of trusting or believing in a technical prosthesis – that sound recording, despite its total impossibility of being reproduced live, despite its ability to transcend the human, must be believed as human extension, as a prosthesis. Listening to recorded music does not involve understanding the complete origin of every specific edit, in other words, finding the traces of real performance behind the technical recording. It, conversely, involves merely hearing the end product as human, extending the definition of human music out through the prosthesis of recording, extending the definition of the music itself. It is precisely because of this necessary belief in recording that music's ontology can be re-formed as the pure ideality of any sound, that in turn live performance can appear mediatized, and that our musical performances are ceaselessly haunted as less than ideal, as less than repetition. We recoil at the thought, tremble, and plead yet again: 'the real.'[797]

This necessarily includes an acceptance of cultural circumstances which Benjamin and Adorno prominently criticized for their destructive potential with regards to artistic and expressive authenticity. However, as contemporary thinkers and composers have pointed out elsewhere,[798] accepting technology's omnipresence in society allows for renewed considerations of musical aura, of musical *différance*, and of alternative frames of reference, which ultimately render music meaningful in the context of today's culture.

Extended Bodies and Forgetting in Brian Ferneyhough's *Time and Motion Study II*

> The history of the piece is also the history of the conflict between immediate experience and the resonating chambers (distorting mirrors?) of memory. (Ferneyhough, 1995)

[797] Gallope, "Heidegger, Stiegler, and the Questions of Musical Technics," 10.

[798] See Cox, "Aura and Electronic Music," 54.

Time and Motion Study II is one of three pieces that constitute Brian Ferneyhough's *Time and Motion Studies* cycle.[799] For the purposes of investigating the effects of technology on both the musical material itself and the performative aspects within a concert setting, I will analyze the second part of the cycle:

Time and Motion Study II is scored for solo cello with live electronics, and, as the composer states, is directly concerned with memory – both individual and social. Nested within this topic, Ferneyhough explores questions about temporal perception and the boundaries and intersections between human and machine wherein the act of forgetting becomes equally important to the act of remembering.[800]

> In the first instance, this piece is concerned with memory – how memory sieves, colors and shuffles the avalanche of sense impressions which the brain registers. The electronic set-up is designed to demonstrate what I take to be the cumulative effect of some of these processes i.e. the supreme ambiguity of distillation and erasure in the individual's self-awareness of its own boundaries. My point of departure was a detailed examination of the linear nature of temporal perception and its effective abolition in the instantaneity of recall. Accordingly, the work is perhaps best regarded as the 'memory of a production process', and the performance environment as the point of confrontation between objectively measurable systems and their nemesis, subjective criteria of retention.[801]

The electronic setup, as will become clear, functions as an extension of both the instrument and the performer. This extension operates in various ways. First, the cellist is equipped with four microphones: two contact microphones are directly placed on the instrument, one is attached to the body of the cello and feeds a 14 second tape loop, and

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[799] *Time and Motion Study I* (1971-1977) for solo bass clarinet, *Time and Motion Study II* (1973-1976) for solo cello and live electronics, *Time and Motion Study III* (1974) for sixteen solo voices, percussion and live electronics. The cycle was conceived by the composer in the quest to explore "the problem of multi-movement structures". Ferneyhough conceptualized each component musical work to be able to stand on its own but also to gain extended meaning through the "perception of the mode of interlocking employed to fix the pieces in place [which] would enhance their singularities into a coherent design of a higher order." By means of expansion, the first piece of the cycle employs a solo bass clarinettist, the second piece asks for a solo cellist and makes use of additional live electronics, while the closing piece employs several 16 solo vocalists, percussion and electronic amplification with spatialization. See Brian Ferneyhough, "The Time and Motion Study Cycle," in *Collected Writings*, eds. James Boros, and Richard Toop (London: Routledge), 112-113.

[800] Brian Ferneyhough, "Epicycle, Missa Brevis, Time and Motion Study III," In *Collected Writings*, 93.

[801] Ferneyhough, "The Time and Motion Study Cycle," 113-114.

another microphone is positioned under the fingerboard, passing on signals to a 9 second delay tape. The signal from each contact microphone is split between tape machines and a direct output to separate speakers controlled by two foot pedals.[802]

Additionally, there is a throat-microphone for the cellist, which is connected to a direct output and to one of the inputs of a stereo tape machine, after passing through a ring modulator. The fourth microphone is a directional air-microphone, whose three outputs 1) are amplified live via loudspeakers ("two speakers preferable"), 2) feed through the ring modulator along with the throat-microphone, and 3) provide the second input of the stereo tape machine, respectively. With this setup, the amplified (or tape-reproduced) signal of the cellist's voice consists of a combination of the ring modulated throat-microphone and air-microphone as well as the unmodified signal of the latter (which is picking up both cello and vocal sounds).

This complex technical setup already suggests some of the musical methods of the 'sieving, coloring and shuffling' which is characteristic to *Time and Motion Study*. The choice of contact microphones along with their specific positioning result in a timbral modification of the amplified or reproduced cello sounds: while staying true to pitch content, the frequency or harmonic content picked up by the contact microphones will be distinctly different than what will be perceived from the direct instrumental sound. In addition, the employment of tape and loop machines heralds a variety of possible methods of shuffling recorded material revealing a type of *chaotic* remembering. At the same time, processes of memory distillation and erasure become a central point of the piece, as the two mono tape delay systems necessarily work with overwriting.[803] It will be

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[802] The tape delay machines are controlled by two technicians, as instructed in the score on three staves for tapes 1, 2 and 3, and are connected to two independent speakers. The cellist operates the two foot pedals for the live amplification as is indicated by two separate staves in the score with a similar "approximate (graphic) notation in the systems situated above and below the instrumental stave(s)".

[803] About the relationship between the electronics and musical material, Ferneyhough states: "The several recording mechanisms employed are required to sample, transform and reproduce very specifically indicated fragments of an already fractured discourse. This process continually interferes with the onward-flowing presentation and, at times, buries it under the accumulated weight of sonic detritus. At other junctures, the soloist has to react instantaneously to signals directed at him from various loudspeakers, whose task is to sort and analyze material according to quite other criteria than those applied to the live cello part itself. Towards the end of the work, the 'disturbance factor' increases with the insertion of still further prerecorded materials made up of ring modulated transformations of vocal actions picked up via a contact microphone attached to the cellist's throat." Ferneyhough, "The Time and Motion Study Cycle," 114.

shown how this exposes compositionally the inseparable connection between memory and forgetting.

Lastly, a distinction between the various sound sources is made by the utilization of several speakers, distinguishing live amplification through the different microphones, ring modulation, tape delay, stereo playback, and direct sound of the performer: a minimum of 7 speakers is necessary to fulfil the requirements laid out in Ferneyhough's circuit plan (see fig. 34), and each sound source is associated with one speaker.[804] In this way, sound localization creates spatial identity. One may say that the amplification of the live cello both unifies and distinguishes the musical *present* and the *past*; i.e. the cello sounds created by the human performer and the samples repeated by the machinery may share the same *level* of *mediation* but differ in localization via distinct speakers. *Organic* and *inorganic* sound production and perception thus differ and defer in a dynamicism of *différance.* This observation is further substantiated in passages where the operation of the foot pedals is included in the notation, indicating rhythmic independence between the feet and both hands.[805] Thus, the *inorganic* amplification of the performance itself is rendered independent from the *organic* cello performance.

[804]One exemption is the live cello sound amplified by the air-microphone, which should 'preferably have two speakers.' (score)

[805]Starting at *Sequences 4-8* on page 12, leading up to and culminating at the *Gran' Adagio,* the rhythmic specifications of the foot pedals become increasingly intricate.

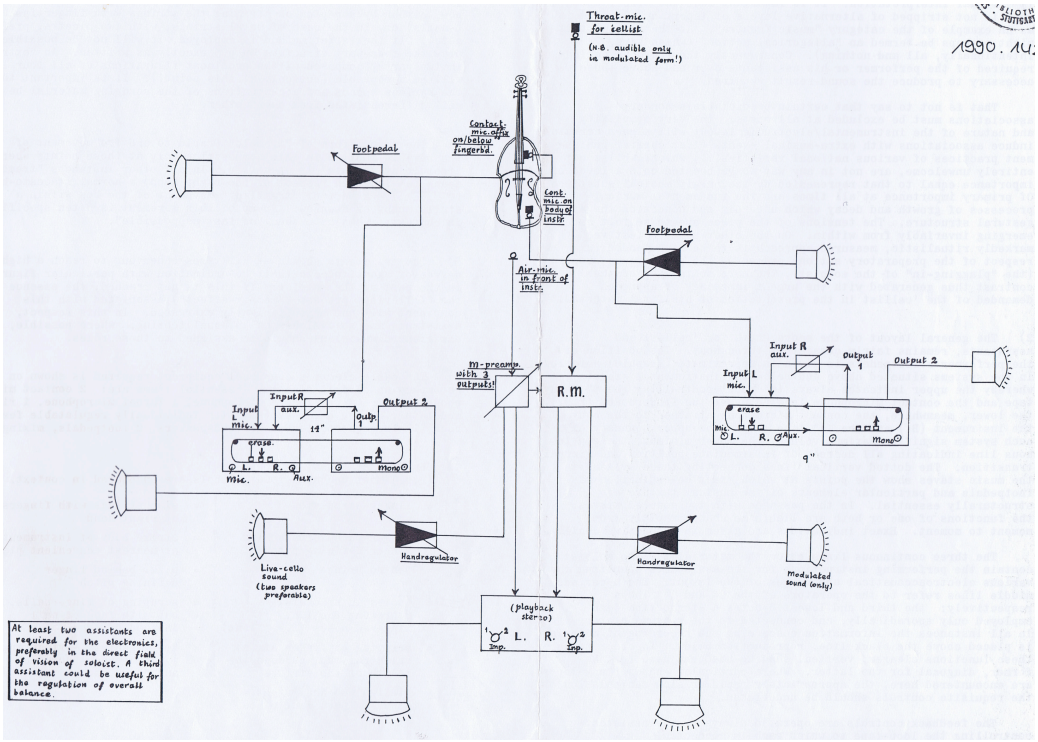

Figure 34 - Ferneyhough: Time and Motion Study II (Score: Electronic Circuit Plan)

An analysis of the three tapes reveals compelling consequences for how memory is affected in this piece. Generally, it can be said that tape machines 1 and 2, with their options for delay and looping, are employed in the manner of short-term memory, since they are only capable of recording fragments of 9 and 14 seconds duration respectively. The use of delay machines includes the aspect of forgetting, since all material older than 9 or 14 seconds is erased and overwritten on the tape machines. In his analysis, Martin Iddon points out the relationship between the piece's title and this peculiar conjuncture:

> The individual particles of Ferneyhough's title themselves have discrete meanings. He has spoken of *Time and Motion Study II* being 'the memory of a production process' (Ferneyhough, 1995c, p. 114). [It] is a distinct approach to the effects of memory across passing time. Though the cellist's memory of what he or she has produced is recorded onto the tape loops and replayed, the tape loops themselves are systematically wiped. Within the context of the piece, this becomes *temps perdu* in a very immediate sense and, with the tape loops continuing to record newer material over the

> old memory, there is neither the possibility nor the hope that this time could be in any way regained.[806]

In contrast to the ephemeral character of the tape loops' short-term memory, tape 3 can be seen as a type of long-term memory with access to longer passages of the past. Interestingly, throughout the beginning section, until *Sequence II*, the employment of tape 3 is separated from the employment of the tape loops: tape 3 is only active when tapes 1 and 2 are not in use (playback volume = 0) and only records track 1 – the unmodified input of the air-microphone.

The specific use of these technologies of short-term and long-term memory affect the piece's overall form: interesting observations can be made about the first entrances of the delay effect with tape machines 1 and 2, employing durations of 9 and 14 seconds respectively. During the percussive cello material at the beginning of the piece, the volume for the tape delay is turned up whenever clear pitch content comes through the stream of clicking, snapping and swishing of both hands on the instrument (see fig. 35 and 36).

One of the effects during the playback is that the recorded/memorized material shines through the more extended and noisy techniques, especially when espressivo playing starts to become prominent, the echo of that material gains heightened attention – i.e. *Sequence Ib* "Like a fanfare" (see fig. 37). *Sequence II exhibits a* much more apparent example of this, when the bow is finally (re)introduced (fig. 38).

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[806] Martin Iddon, "On the Entropy Circuit- Brian Ferneyhough's Time and Motion Study II," *Contemporary Music Review* 25, no. 1 (2006): 95-96.

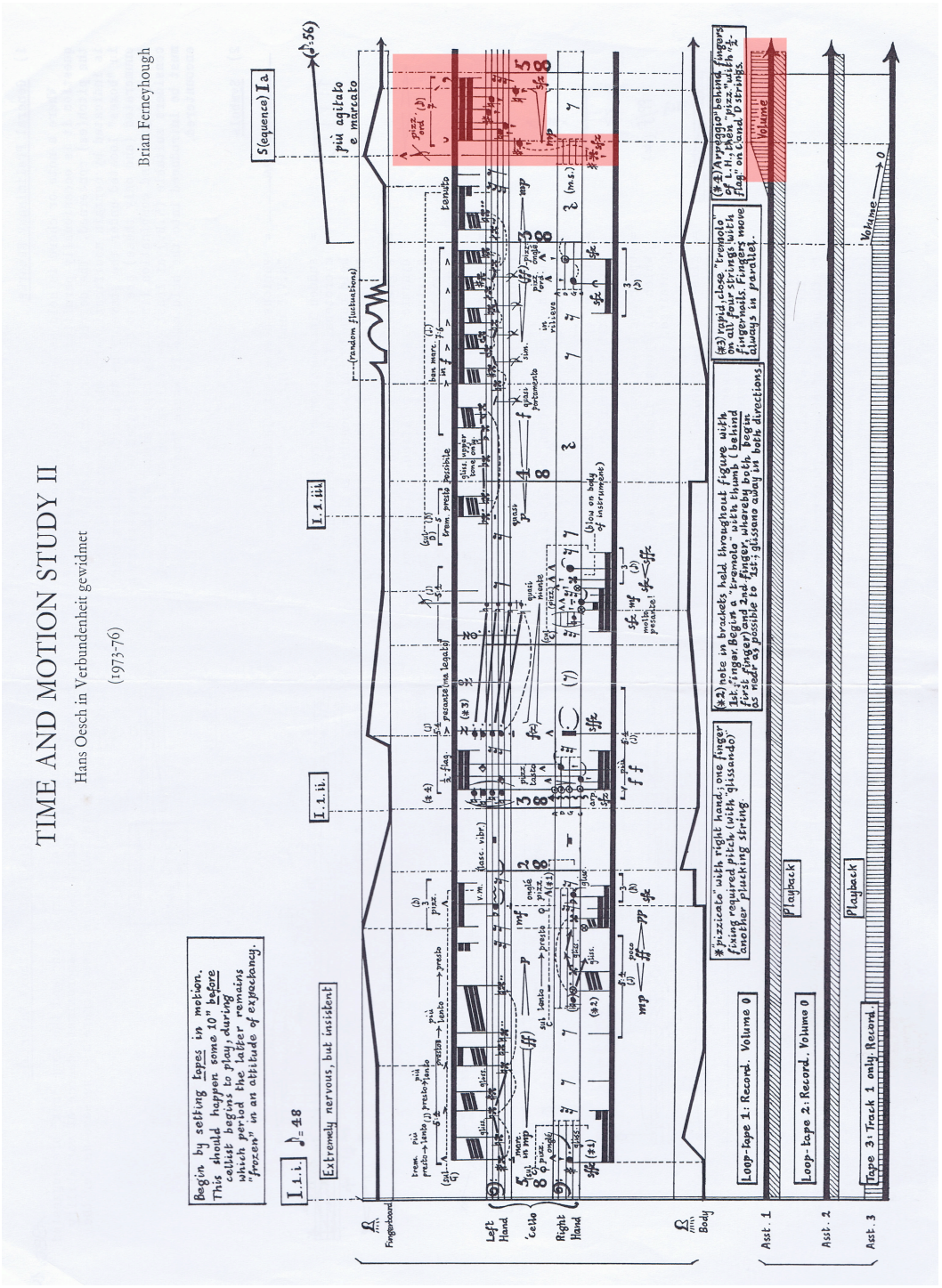

Figure 35 - Ferneyhough: Time and Motion Study II (Score, page 1)

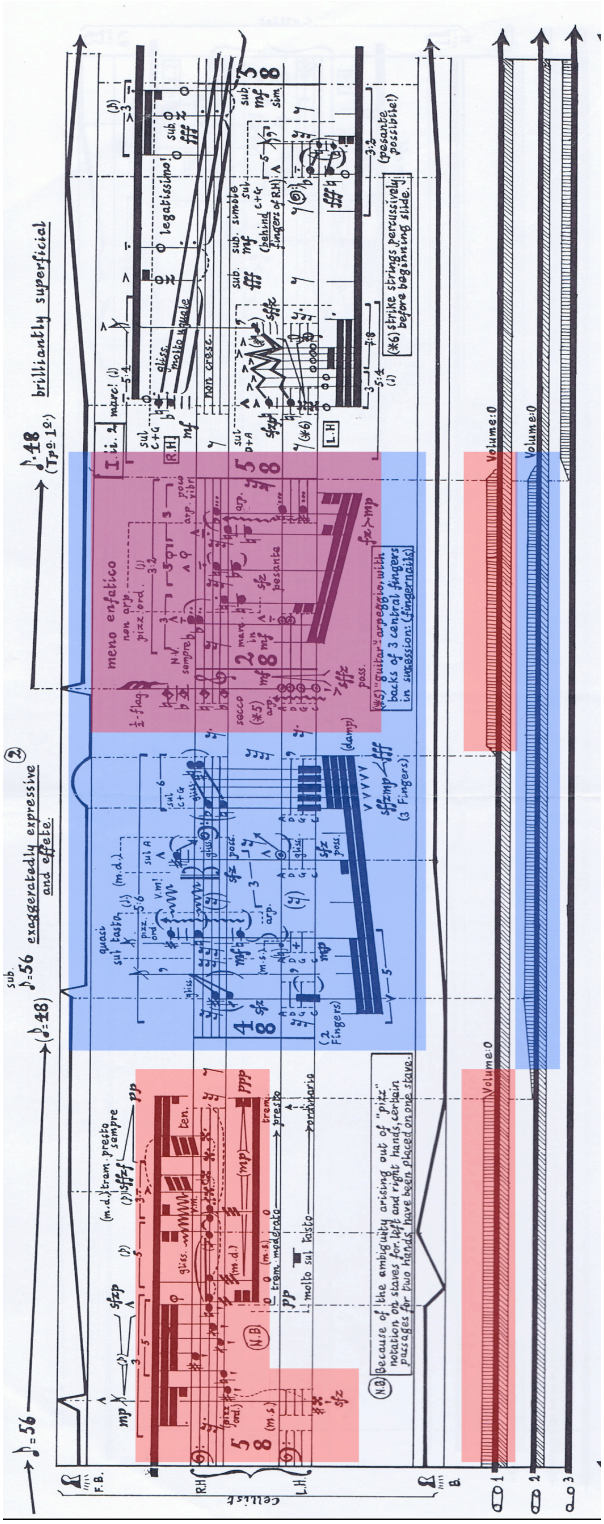

Figure 36 - Ferneyhough: Time and Motion Study II (Score, page 2)

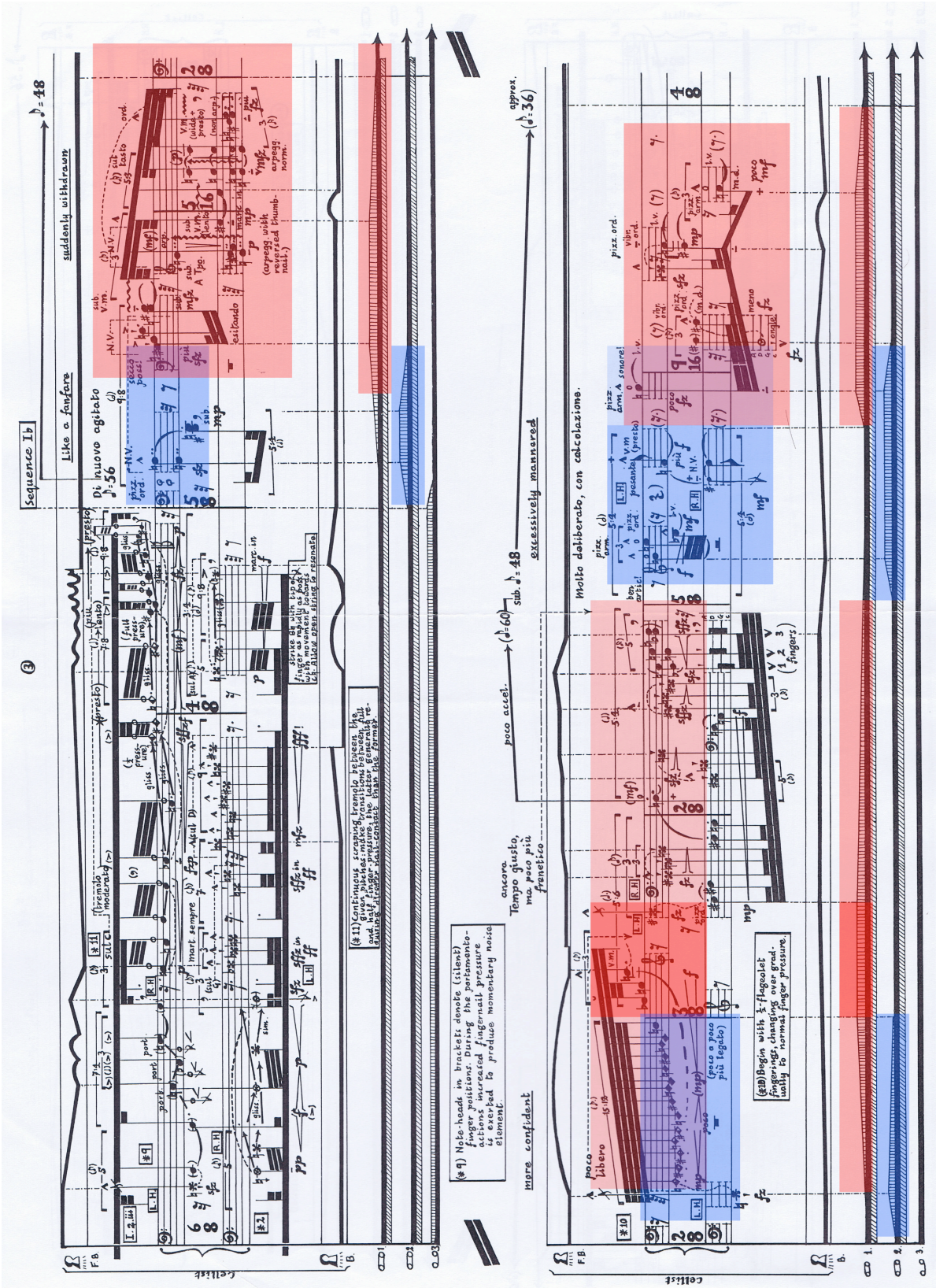

Figure 37 - Ferneyhough: Time and Motion Study II (Score, page 3)

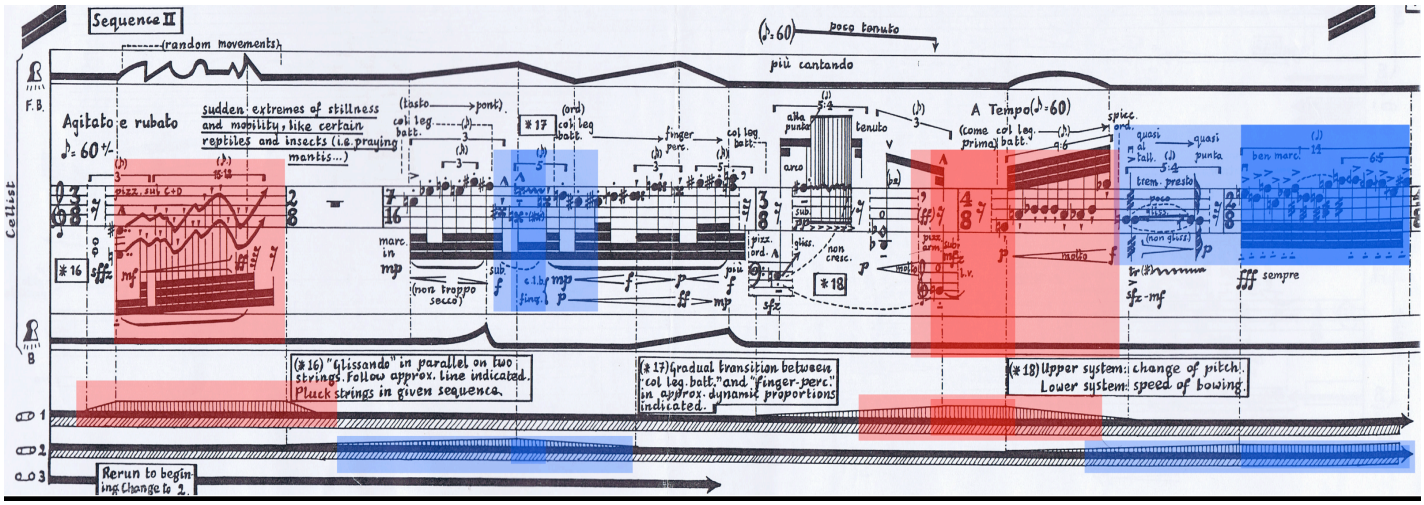

Figure 38 - Ferneyhough: Time and Motion Study II (Score, page 5)

From the beginning of the piece, the relationship between cellist, cello, and electronics brings up questions regarding both musical and technological ontologies and accordingly impacts the *becoming* of musical material of this piece. On might argue that these questions lead to a notion of an extended ontology based on a fusion of musical and technological performance. This is supported by Martin Iddon's theories, which he establishes in his essay "On the Entropy Circuit- Brian Ferneyhough's *Time and Motion Study II*." His analytical approach is based on the idea of cyborg identity,[807] in reference to Donna Haraway's description of cyborg entities expressed in her essay "A Cyborg Manifesto".[808] "[A] cyborg is a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction."[809]

Iddon aims to develop a distinctive analytical formula that goes beyond those theoretical approaches which usually tend to be applicable to "almost any piece or performance utilising live electronics" or, if taken further, "could even be applied to most

[807] "First, I will suggest that, rather than the opposition between cellist and electronics that Ferneyhough himself typically predicates, the relationship constructs an integrated composite musical entity. Rather than conceiving of this integration as a return to tired ideals of organic unity, I will instead view this through a model of cyborg identity (as an alternative to the usually 'pessimistic and self-flagellating approaches predominantly taken as the other half of the immanent face of the dualistic vision at work in the piece') as developed by Donna Haraway in her essay 'A Cyborg Manifesto' (Haraway, 1991)." Iddon, "On the Entropy Circuit- Brian Ferneyhough's Time and Motion Study II," 94.

[808] Donna Haraway, "A cyborg manifesto: Science, technology and socialist-feminism in the late twentieth century," in *Simians, cyborgs and women: The reinvention of nature* (New York: Routledge, 1991), 149 – 181, as cited in Iddon, "On the Entropy Circuit- Brian Ferneyhough's Time and Motion Study II," 97-98.

[809] Ibid., 149.

performances."[810] He goes on to say that Haraway's ideas claim that "'cyborg politics is the struggle for language and the struggle against perfect communication, against the one code that translates all meaning perfectly' (Haraway, 1991, p. 176)."[811] Iddon sees a clear parallel between this concept and Ferneyhough's work of the 1970s, more specifically to the last two parts of the *Time and Motion Study* cycle. The question of *the creator* and *the created*, the complex juxtaposition and intertwining of "man and machine", is at the centre of these pieces: a question, which prompted the composer to examine not simply the gap between two poles but the very space in between. He composed a hybrid of two extreme opposites.[812]

In this context, Ferneyhough's intentional employment of late twentieth-century machinery for the sake of exploring the ambiguity between the natural and artificial in *Time and Motion Study I* and *II* reads like a commitment to the matter of the *what* and the *who* as put forth by Bernard Stiegler.

> [The] primary opposition was always the one separating the human being from the machine, the creator from the created (whereby which is which remains intentionally an open question). I wanted to blur, destabilize the boundaries separating these polar extremities.[813]

The cyborg allegory, Iddon explains, is present particularly in *Time and Motion Study II*, when the cellist's performance is stored as memory onto the tapes, fragmented, and after a specific number of playbacks is written over again and again, with no possible way of the overwritten ever being retrieved from forgotten-ness again. These fragmentary pieces of memory are the materialization of "the cellist's electronic shadow […] stripped away from the physical reality of the performer's activity."[814]

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[810] Iddon, "On the Entropy Circuit- Brian Ferneyhough's Time and Motion Study II," 97.

[811] Ibid., 98.

[812] "Machines were not self-moving, self-designing, autonomous. They could not achieve man's dream, only mock it. . . . To think . . . otherwise was paranoid. Now we are not so sure. Late twentieth-century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines. Our machines are disturbingly lively, and we ourselves frighteningly inert. [...] the identity of the cyborg becomes a 'disassembled and reassembled, postmodern collective and personal self." Haraway, "A cyborg manifesto: Science, technology and socialist-feminism in the late twentieth century," 153, 163.

[813] Ferneyhough, "Epicycle, Missa Brevis, Time and Motion Study III," 93.

[814] Iddon, "On the Entropy Circuit- Brian Ferneyhough's Time and Motion Study II," 99.

For example, the *Gran' Adagio* section (fig. 39) until *Sequence 9* both complements and counteracts the performer's playing ("with passionate dedication and self-transcendence"): the played back percussive actions of the two rhythmically independent hands, picked up at a distance via air-microphone, are contrasted by the bowed double-stops which present a joint coordination of left-hand fingering and right-hand bowing. Simultaneously, the voice's utterances (disintegrated phonemes) from the previous section are played back while this already semiotically dismantled material is now stripped of its last resemblance to language through the modifications of the ring modulator. This has further repercussions:

> Ferneyhough engages here with many traditions of phonocentrism, and with the notion that the human voice (even where, as here, enmeshed within a separate electronic grid) occupies a central place in defining the human as such.[815]

With the elimination of the language aspect, the human character of the cellist is erased as well. The recording of "the electronic shadow" of the cellist takes on a specific shape and establishes a timbral shading which is no longer directly relatable to that of the performer. And, as a result of the deferred playback through the ring modulator, the cellist and the "shadow" are now temporally or spatially differed and defered – their relation is that of *différance*. In addition, the foot pedals are now operated in a rhythmically and gesturally complex fashion, which ultimately breaks the last physical connection between performer and electronic equipment.

[815] Ibid.,103.

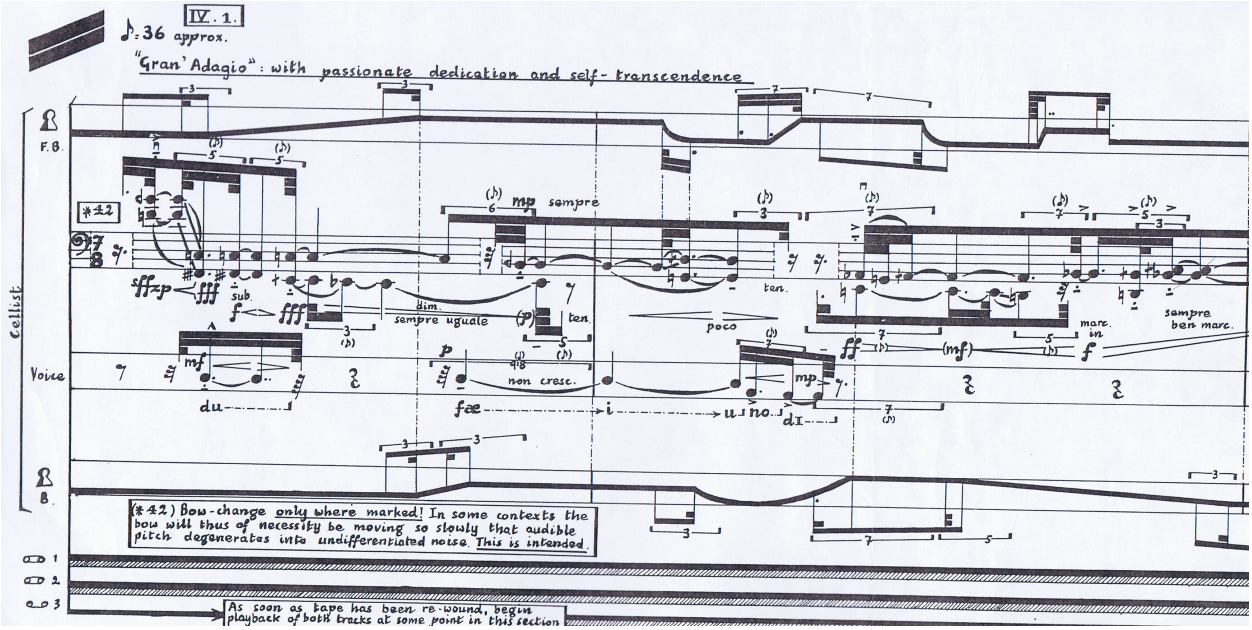

Figure 39 - Ferneyhough: Time and Motion Study II (Score, page 16)

Furthermore, the *Gran' Adagio* section reaches back into the piece's past in reference to an earlier *Adagio section.* As stated by Iddon, it is likely not a coincidence that the *Gran' Adagio*[816] section has the same tempo marking (eigth = 36) as the *Adagio maestoso* (page 5). A formal connection between the two *Adagios* is additionally confirmed as the end of the first *Adagio* also ends the process of long-term memorization.[817]

The *Gran' Adagio* passage presents its relation to preceding sections through temporal interlacement of the memorized longer fragments of the air-microphone of *Sequence I* and the whole ring-modulated voice section leading up to this point. Literal reproduction and filtered echo are juxtaposed.

Iddon suggests:

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[816] It may be worth noting that all starting points for tape 3 to record are marked with quarter notes at 48 bpm, or *Tempo 1°.* The one exception is the last passage at I.3.ii, however, the fairly long fade-in is followed by a decrescendo to quarter = 48.

[817] The recording via air-microphone on tape 3 stops before the next section *Sequence II.* The tape is then "[r]erun to beginning" and changed to track 2 for the input of the ring-modulated throat-microphone at *Sequences 4-5* (page 12), when the voice of the cellist comes into play for the first time. Tape 3 is stopped, rewound and changed to stereo playback at the end of this section, during the delayed echos of tapes 1 and 2 throughout a 12 second fermata.

> That it is somehow greater than the previous Adagio might be taken to suggest that there is some relationship between this moment and Mahlerian ideas of Abschied, or leave-taking. At the end of the Gran' Adagio, coinciding with the beginning of Sequence 9, therefore, the ring-modulated voice is itself effaced.[818]

Mahlerian *Abschied* here reminds us of the idea of rhizomatic molecularity as it is a farewell to a hierarchy made up of the shadow adhering to the human figure – the kind of relationship sustained by tapes 1 and 2.[819] Iddon determines a very similar dynamic in the cyborg trope. While Haraway sees in the cyborg the unification of two opposites there exists a fundamental difference in the grounding of the relationship between these opposites in *Time and Motion Study II*:

> The electronic face of Ferneyhough's cyborg has an origin, certainly, which is generated from the 'natural' unmodified sounds of the cello, but its identicalness with the original serves to distort the boundary lines between what has been made and the maker themselves. Furthermore, the notational language that Ferneyhough adopts – articulated beyond the ability of any player to reproduce identically with the score – can surely be seen as an example of a posture of absolute individuation. Clearly in this case, though, Ferneyhough's stance is one of slightly ironic detachment. This is to say that, within the context of the piece, Ferneyhough is already aware of what Haraway might have predicted. The individuation of his language, through its translation into the domain of electronic reproduction, is a substantive part of the downfall of the human cellist. The domination of abstraction is what causes the human performative aspect of the piece ultimately to fail. It would also be too simplistic to follow the common approach to the concluding theatre of *Time and Motion Study II* and argue that the electronic component itself kills off the 'natural' cello. Inevitably, without the production of fresh material from the performer, the tape elements are equally unable to continue. The respective demises of both cellist and electronic other are intimately interwoven. [820]

This idea of juxtaposing opposing poles – which simultaneously bear "identicalness" and thus reveal a molecularity of memory – finds equivalences most

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[818] Iddon, "On the Entropy Circuit- Brian Ferneyhough's Time and Motion Study II," 103.

[819] Martin Iddon identifies the voice's material from the section leading up to the *Gran' Adagio* as original text by Antonin Artaud: "This substance is the standard of the void which doesn't know itself". Ibid., 97-98.

[820] Ibid., 99-100.

evidently within the comparative framework of the performance-reproduction conflict,[821] but even more intriguingly in the interaction of that dichotomy with the musical material played by the cellist.

The loop function of the tape machines comes into play for the first time at *II.1.i.* (see fig. 40) and importantly coincides with a colourfully varied presentation of the pitch C#, which will have further consequences later.

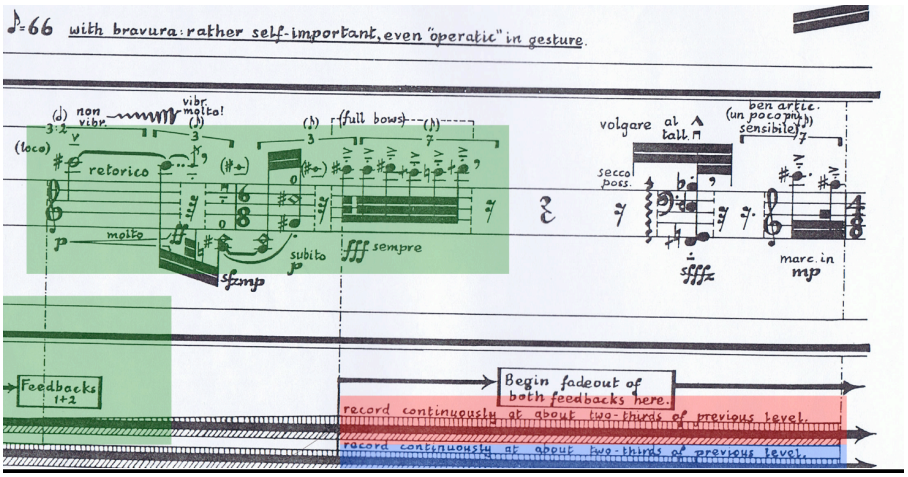

Figure 40 - Ferneyhough: Time and Motion Study II, II1.i (Score, page 6)

Along with the introduction of the plectrum, the feedback function of tapes 1 and 2 is finally employed at *Sequence 3* (page 8). As a result, the sounding outcome of this section is reminiscent of the percussive beginning with the rattle of the plectrum being augmented by the feedback through both tape machines.

Section *III.1.i.* (fig. 41), the first appearance of long sustained bowed pitches, occurs after a square fermata and the instruction "Soloist pauses until he hears the second (loop 2) repetition of previous 3 bars."

The past and the repetition of the past re-emerge: now it is the echo of the past influencing the present, as it governs the next entry points for the cellist. Hinting at some

[821] See Ferneyhough's own commentary in the program note:

"[...] [T]he individual is disorientated, oppressed and, finally, amokeilated by the complexities of the permanent (and deadly) battle between history as immediate experience and the prescriptive conventions imposed on this latter by public discourse ('history')." Brian Ferneyhough, Time and Motion Study II Programme Note, Edition Peters.

of Ferneyhough's ideas about social memory and personal identity, this has further consequences for the relationship between the performer and his/her memorized actions:

> I want the performer not to be some isolated supreme being, as it were, but far more being himself [sic] – one of the objects which the environment is conditioning.
>
> […] We mobilize many, many, many different forms of memory in our perception of time passing. I've always been very, very concerned with the issue of personal identity. What is it that both socially and in terms of individual awareness makes, constitutes, the subject – that which is the object of subjectivity, if you like. And it seems to me very clear, that a large part of that, at least, has to do with the structuring and content of memory.[822]

The sound of a long, low droning G at the beginning of *III.1.i.* also constitutes the end of a flurry of activity, where the flow of time is pushed forward by ever-changing registers, pitches, playing techniques and articulations. The employment of a sustained double-stop marks the new section, while the specific placement of the cellist's entry sets the present apart from the past, ironically "within the final moments of the tape climax": the past is reverberating only just at its peak and is not quite past yet.[823]

The section from *III.1.i.* until *III.5.i.* (see fig. 41 and 42) reveals an elaborated compositional investigation of the idea of the "non-identical", of *différance*. This investigation is individuated in the musical material and becomes apparent in the dynamic relationship between pitches and time: the repeated appearance of double-stop unisons, starting on the low G, frequently employs glissandi which literally pull apart the identical originating unison pitches. The entries of these long sustained notes are interrupted by insertions of varying lengths, usually involving a sequence of disjointed

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www.editionpeters.com/resources/0001/stock/pdf/time_and_motion_study__ii.pdf (accessed April 20th, 2014).

[822]Brian Ferneyhough in "Time and Motion Study II - Brian Ferneyhough,"

https://www.youtube.com/watch?v=ghyN-kJpcbI (accessed April 14th, 2014).

In this short film put together by David Van Noortwijk (for Bliss Studios), Brian Ferneyhough and cellist Reynard Rott talk about Time and Motion Study II, followed by a performance of the piece in concert presented by Yayasan Musik Indonesia at Erasmas Haus in Jakarta.

[823] It is interesting to note that for this section the recording volume is turned up without any changes while feedback 1 and 2 are running as well. This means that the cello material is now echoed back without any alterations, which resembles an unaltered mirroring effect – a different kind of memory than the manipulated playback from before.

material produced by quickly changing playing techniques (trills, tremoli, 1/2 col legno, col legno tratto, vibrato, staccato, triple stops, balzato etc.) and dynamic levels (*fff* to *ppp*, and several *mfz, sfz, sffz poss.*). Within this section, Ferneyhough juxtaposes different registers of the various sustained pitches, helping to separate previously neighbouring pitches such as G, G# and F#.

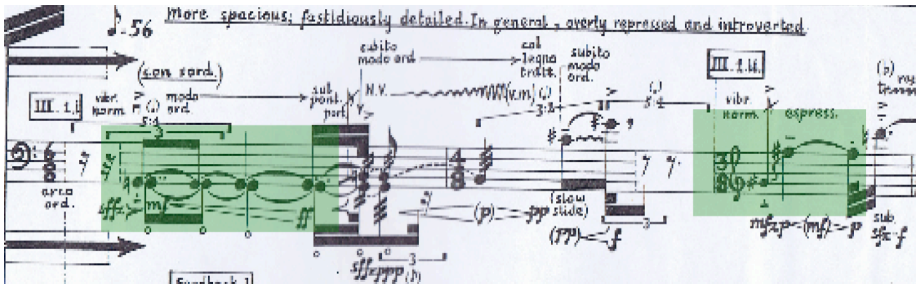

Figure 41 - Ferneyhough: Time and Motion Study II, III.1.i (Score, page 9)

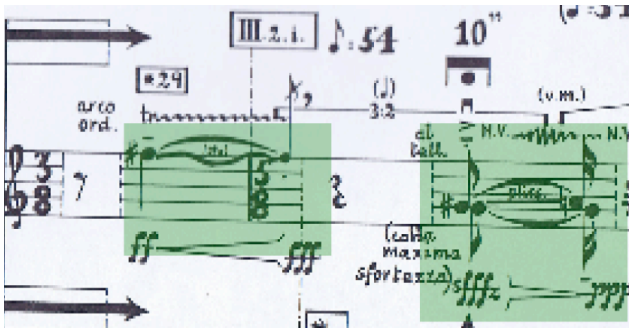

Figure 42 - Ferneyhough: Time and Motion Study II, III.2.i (Score, page 9)

Interestingly, Ferneyhough makes use of "boxed" materials of "Variational Possibilities" that are to be applied to the long sustained notes, chosen ad libitum by the cellist. Gradually, the performer becomes more human in that he or she is increasingly reliant on their own choices. These choices become highlighted by the repetitions in the feedback and the performer's playing becomes influenced by the mechanical repetition in that the cellist is asked to wait for given tape entries: it is unclear now who governs whom – the boundaries between the *what* and the *who*, between the *creator* and the *created* are blurred. Figures 43, 44, 45 illustrate the use of boxed materials.

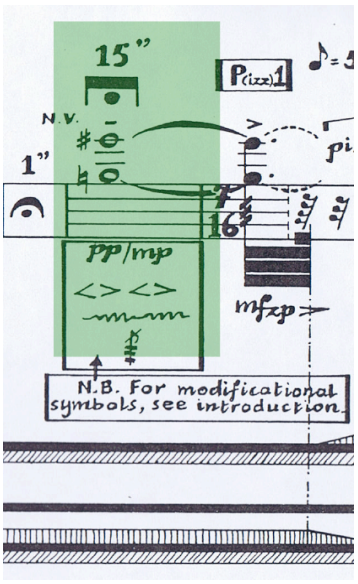

Figure 43 – Ferneyhough: Time and Motion Study II (Score, page 11)

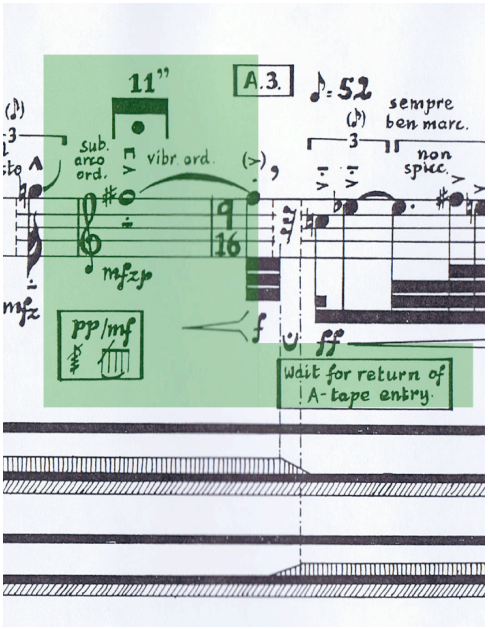

Figure 44 - Ferneyhough: Time and Motion Study II (Score, page 11)

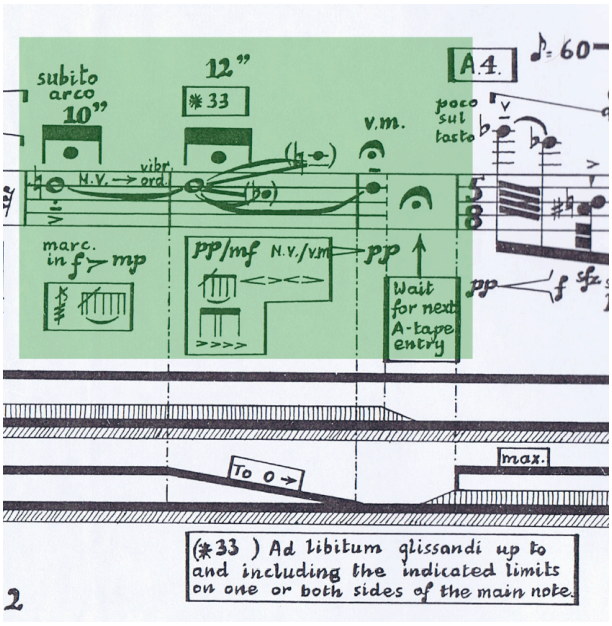

Figure 45 – Ferneyhough: Time and Motion Study II (Score, page 11)

While this section is dominated by minor seconds, it is interesting to see that the section is circumscribed by G at the beginning (page 9, figure 41) and C# at the end (page12, figure 46) – a tritone, which is the widest interval within an equally-tempered chromatic scale. Intervallic relationships here can be seen to determine the large-scale structural level, by designating the beginning and supposed end points of a section as well as connecting temporally distant sections. For example, in *II.1.i.* (fig. 40) there is an emphasis on C# while Section *III.5.i.* (page 12, figure 46) may be heard as "stuck" in a temporal realm dominated by C and C#. With regards to the presentation of these two pitches (C and C#), it is noteworthy that in their first appearance – played by the human cellist – occur in succession, melodically "interrupted" due to a four to five second long rest in between them, in disparate registers (five octaves) and with timbral differences (see fig. 46). With the beginning of *III.5.i*, however, the two pitches are reiterated by two *mechanized* cellists sounding on the tape (also fig. 46). As a result, C and C# begin to overlap as the use of continuous feedback leads to the formation of moments in which this previously horizontal interval occasionally *verticalizes*.

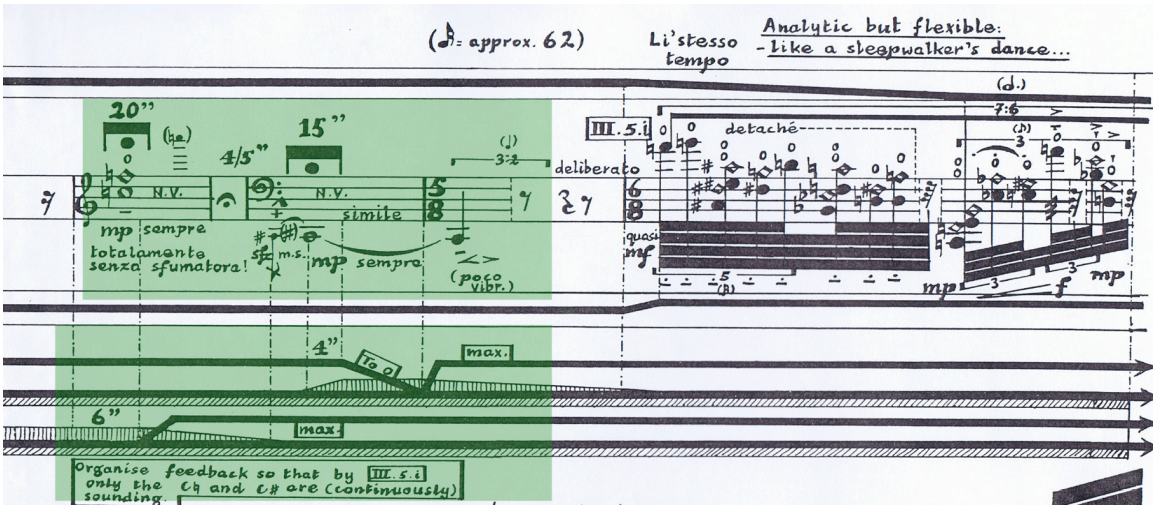

Figure 46 - Ferneyhough: Time and Motion Study II (Score, Page12)

Until *Sequences 4*-8, this section features an emphasis on the cellist's live performance as, for the first time, nothing is memorized on tape. Merely encapsulated by the diminishing "shadow" of C and C#'s past, the present only *individuates* for its own sake – this moment can be understood as the emancipation of the *who* from the *what.* With the fade-out of tape 3 (page 17), the highly complex *Gran' Adagio* comes to an end as the long-term memory of tape 3 winds down and the short-term memories of tapes 1 and 2 fade out their last repetitions of the previous bar, ending in "total silence."

Beginning with *Sequence 9* (page 18), *Time and Motion Study II* approaches its end and employs feedback of tapes 1 and 2. Simultaneously, short samples are taken from the cellist's "spluttering, brilliant – like a high voltage jumping between terminals" material, which itself presents disjointed[824] yet very dense material. The looping effect increases the significance of minuscule gestures as they engrave themselves into our memory through the numerous repetitions.[825]

The section ends on a sustained high E, with a *crescendo* leading to triple *forte* for the duration of a 11 second fermata. Tapes 1 and 2 stop recording just before the high

[824] In the last system on page 18 it reads "increasingly disjointed".

[825] Ferneyhough's statement might apply here:

> "[...] the sort of sensual aspect of compressing and distilling momentary perceptions and insights into a larger chain of speculative articulation on the intellectual plane, is extremely exciting for me." Brian Ferneyhough in "Time and Motion Study II - Brian Ferneyhough,"
>
> https://www.youtube.com/watch?v=ghyN-kJpcbI (accessed April 14th, 2014).

note is played.[826] From this point, the tapes' feedbacks play back the last fragments they were able to capture, before fading out. And while "[b]oth (empty) delay systems continue running until end of work", the performer is left to his/her sole unaccompanied performance in the piece – "off the record", so to speak.

Before the cellist resumes his/her playing for the final section, however, the player is instructed to retune the instrument during an 18 second pause. [827] A last, highly expressive cadenza around the pitch A# follows. The scordatura allows the cellist to produce the pitches on a comparably loose C string, resulting in an unusually rough tone colour – detuning and timbral transformation reveal a last fight with the artificial inside the natural.

"[W]ith the utmost imaginable degree of violence", and crescendo-ing to a mere "!", the cellist ends on a slightly raised A and finally A#, before "suddenly ceasing his frenetic playing activity" (fig. 47). The cellist ends, "freeze[s] – completely motionless – in his final playing position."

The melodic minor second between the final pitches A and A#, enlarged through the use of microtones (see fig. 47), recalls section *III.5.i.*, where the minor second between C and C# was contracted and repeatedly played back on the tapes. The choice to end on an A# constitutes yet another tritone relationship in the context of the earlier sustained E.

(*Dis*-)*similarities* are exhibited one last time: ambiguous differences between pitches, intervals, timbre.

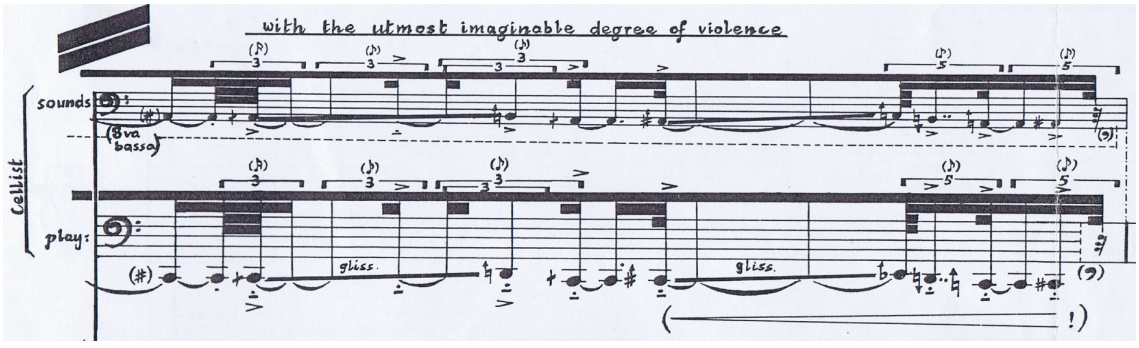

Figure 47 - Ferneyhough: Time and Motion Study II, end (Score, page 19

[826] It may be interesting to note that this pitch marks the centre between the tritone of G and C#, which reveals a critical reference to the earlier section starting at *III.1.i.*: the gap between the successive interval of a tritone gets halved – minutes later, attracting all attention.

[827] The two lowest strings C and G are to be tuned down to A and Eb.

As demonstrated in this analysis, the highly differentiated implementation of mechanical memorization and the structured placement of artificial reproduction allow memory to become utterly malleable in *Time and Motion Study II*.

With regards to individual memory, *Time and Motion Study II* exhibits how individual recollection individuates musically through the performance of the cellist[828] and, moreover, how the listener's perception of continuous, *linear* time may be influenced by the simultaneous perception of remembered time, *dynamic* and *chaotic*:

> [...] the place of performance as the point of confrontation of objective (measurable) systems and subjective obscuration and elimination (these latter by no means invariably predictable in terms of their ensemble effect). The function of these subjective processes is to (re-)present and [sic] idealized projection of experiential fragments which, at some point in the future, will, by means of individual recollective mechanisms, withdraw themselves effectively from the sphere of objectively measurable temporality.[829]

Through intentional implementations of specific musical material and the different tape machines, Ferneyhough was able to create a composition which emphasizes that technology must involve the aspect of forgetting in order to allow the memorized musical data to individuate meaningfully.[830] Technology in *Time and Motion Study II* is

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[828] Ferneyhough describes his ideas about recollection:

"Of course the positive aspects are that the supreme fiction of our re-constituted memory, what it is we remember, how those acts are then tailored or brought together in a new significant constellation, what we'll remember of our past, how we're continually re-writing our past for the purpose of optimizing the present and future of our awareness – all these things can be brought into music. [...] On the other hand, there is a negative aspect to it, which is that in trying to mobilize past memory for our own present purposes, in their continual re-constitution of our subjective awareness, we are inevitably being bombarded by those things we don't particularly want to remember: fragments of embarrassing experiences, painful things, unwanted childhood associations, all these things which also can be argued as form a part of the subject. And so, very often, particularly in this cello piece, I was concerned with both, the positive and the negative aspects of memory. Positive aspects in the sense that, things which repeat on the tapes for a long period of time, you hear them several times, or become distorted form, but also negative things where the grossly filtered and distorted, irrational irrationally re-inserted fragments of the past interfere with the process of musical creation which the performer is trying to mobilize at that particular moment." Ferneyhough, Brian. "Time and Motion Study II - Brian Ferneyhough" https://www.youtube.com/watch?v=ghyN-kJpcbI (accessed April 14th, 2014).

[829] Ferneyhough, Time and Motion Study II Programme Note, Edition Peters.

www.editionpeters.com/resources/0001/stock/pdf/time_and_motion_study__ii.pdf (accessed April 20th, 2014).

[830] This was discussed in the second and fifth chapter. See *Forgetting* (chapter two) and *Never Forgetting: Recording-Reproduction – Repetition ad infinitum* (chapter five).

released from archival passivity and gains musical cultural significance musically due to its active engagement with forgetfulness. The live electronics therefore become relateable to the retentional finitude of the organically produced musical material as this type of mechanical memory appears to behave "non-identically" *différante* to the *who*.

The "non-identity" is demonstrated via musical processes and successfully redefines the ontology of musical performance – musical ontology is extended via technical prostheses. As described above, this extension materializes in Ferneyhough's musical material – in a way, this reminds us of the kind of *différance* between instrumental and bodily tendencies which define the musical material in Helmut Lachenmann's music (see chapter four): with regards to Posner's technological media concept, the music presents a modification of the biological and physical media, in that the instrumental identity is expanded through a conjugal bond between human and mechanical performativity, thereby supplementing "the physical connection between the sign and the recipient."[831] As described before, musical compositions in which physicality and bodily aspects are re-contextualized ultimately invoke questions regarding the functional and code-related media concepts within a musical dimension. In the context of live electronics, however, these questions entail a double reference of the two media concepts: references to musical mediality as well as analogue or numeric archival mediality. At this point, the two types of tertiary, cultural memory converge – at times, music transindividuates as an archive, and archival memory always transindividuates through music. In this unification, it becomes apparent once more that technology is fully *mastered* by music's own technicity as the bodily aspect of the live music is projected into the electronic sound space. In Ferneyhough's *Time and Motion Study II*, one may suggest that the aforementioned occurrences of molecularity always transpire in the musical context: only as music does technology *become* body; only then does it work as a mnemonic device. Deniz Peters' writing is instructive[832] as his concepts reveal that the sound of Ferneyhough's live electronics "attaches" to suggested bodily

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[831] Posner, "Basic Tasks of Cultural Semiotics,"

http://faculty.georgetown.edu/irvinem/theory/Posnerbasictasksofculturalsemiotics.pdf (accessed November 28th, 2014).

[832] See Peters, "Touch: Real, Apparent, and Absent," 29.

and mnemonic expressions, which are inserted into the electronic part of the music. This, one might say, constitutes a relatively static as well as arborescent perception of technology in relationship to music: a molar entity, technology is perceived analogously to Orphic noise perception[833] and transforms the Orphic notion of *Body becoming Music* into *Technology becoming Music.*

To conclude this analysis, I would like to note that between the composition of *Time and Motion Study II* and the present, digital technology has allowed for a "simplification" of the necessary electronic setup of the piece: the two tape machines including the two (or three) assistants can now be replaced by a computer which runs a signal processing software (Max/MSP or PD, for example), and one technical assistant to operate it. Iddon mentions in a footnote, referring to John Hails' observations on the added performance issues,[834] that the theatrical aspect of having all this machinery and "personnel" on stage is lost as a result. With this, the staging of the piece's complexity is gone. After my analysis of the relationship between performer and electronic prostheses in this piece, I would like to suggest that a renewed assessment of the piece in the context of a (partially) digital realization would be valuable.

The Simultaneity of Time in Jonathan Harvey's *String Quartet no. 4*

> [...] for me, live electronics is the most powerful tool in the dialectical process [...].[835]

The fourth string quartet of British composer Jonathan Harvey is an extraordinary example of how the implementation of live electronics in music may generate *différance* by treating the electronic component as an autonomous musical instrument, thereby reconciling various layers of temporality.

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[833] In chapter four, various concepts of noise were described in relation to a specific notion of (musical) sound: relationships of *opposition* (the Ulyssean model), of *interchangeability/correspondence* (the Orphic model) were presented as well as an inextricable relationship within a reconstituted organicism as exemplified by the music of Pierlugi Billone.

[834] "In more recent performances by Neil Heyde (cello) and Paul Archbold (electronics), the analogue tape loops have been replaced digitally by MSP tools (tapin*, tapout*, record* and play*), which obviates difficulties such as the use of variable playing speeds on different machines and simplifies the reliability of the electronic element. Simultaneously, though, the physical theatrical presence of two large tape machines and the cellist's multiple assistants is lost. I am grateful to John Hails for his observations regarding these issues in performance." Iddon, "On the Entropy Circuit- Brian Ferneyhough's Time and Motion Study II," 104, note 1.

[835] Harvey, "The metaphysics of live electronics," 80.

Commissioned by the Arditti quartet,[836] the piece's conceptualization was begun in 1996. For the electronic component of the piece, Harvey conducted research at IRCAM in 2002 and was able to complete work on the quartet in 2003.

Before delving into the specifics of the composition, it should be noted that Harvey's general understanding of music is deeply connected with his spiritual practice. He writes about this at length in his book *In Quest of Spirit: Thoughts on Music* (1999):[837] rooted in his personal views on Buddhism, Harvey's conception of music embraces the notion of life's cyclicity, the belief in life's impermanency and the 'evanescence of everything'.[838] Importantly, this philosophy is also the foundation for Harvey's approach to the utilization of technology in music – particularly in performed music. To him, technology has a potential to present either something *alien* or an *extension* of the organic in music.[839]

This potential also becomes evident in Harvey's fourth string quartet. The composer remarks that, in this piece, the aim was to harmonize oppositional notions of sound:

> I've always been fascinated by wind noises - white noise or coloured noise. It's something of really loving wind, feeling the

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[836]This quartet is, in fact, the second commission by the Arditti Quartet. Previously, Irvin Arditti had commissioned from Harvey what then became his *Quartet No. 1* (1977).

[837]Harvey offers insight into his ideas about various religious and spiritual traditions and practices and their relationship to music. The book is based on his Ernest Bloch Lecture series at the University of California at Berkely in 1995. In the book, it is explained that, while Tibetan Mahayana Buddhism has played a central role in his life, he embraced other forms of religion and spirituality in his personal spiritual practices – including Zen Buddhism, Christianity, Hinduism, mysticism.

See Jonathan Harvey, *In Quest of Spirit: Thoughts on Music*. (Berkely: University of California Press, 1999), 1-6.

[838]See Jonathan Harvey, "The Genesis of Quartet no. 4," in *Identity and Difference: Essays on Music, Language and Time* (Leuven University Press, 2004), particularly 43, 49.

[839]In his essay on *The Metaphysics of Live Electronics*, Harvey contends:

"With electronics it is common to make sounds that have no, or only vestigial, traces of human instrumental performance. No person can be envisaged blowing, hitting or scraping anything. They are often sounds of mysterious provenance. With live electronics, when electronics are performed in realtime like instruments and combined with instruments (or, of course voices), two worlds are brought together in a theatre of transformations. No-one listening knows exactly what is instrumental and what is electronic any more. Legerdemain deceives the audience as in a magic show. When they lack their connection to the familiar instrumental world electronics can be inadmissably alien, other, inhuman, dismissable (like the notion of flying in a rational world). When electronics are seamlessly connected to the physical, solid instrumental world an expansion of the admissable takes place, and the 'mad' world is made to belong." Harvey, "The metaphysics of live electronics," 80.

> joy of the presence of nature in cultured classical music. I enjoy that extension into the great wide world outside. But essentially it was to be a a neutral, disembodied sound.[840]

This brings to mind again the various concepts of noise:

Harvey's above-cited intention to overcome the dichotomy between nature's sound of noise and the sound of cultured music appears to be in line with Billone's holistic approach to noise. Interestingly, Deniz Peter's ideas about the perception of electronic sound as "attachment" to or as "detachment" from a suggested bodily expressivity do not apply, since Harvey envisions "a neutral, disembodied sound."[841] As will be shown, over the course of the fourth string quartet both electronic sound and quartet sound amalgamate and *become* a "disembodied sound".

This idea is compositionally realized by the performance of live instrumentalists and a similar *performance* of the various technological implementations, which generate a number of computerized processes and trigger recorded sounds – both modified and unmodified. As will be shown, the musical material of the piece is used by the live electronics as much as by the string quartet. In this way, a juxtaposition of different degrees of performativity exists throughout the piece. Harvey understands that – only in juxtaposition with a dynamic sound that is performed live – fixed, pre-recorded sounds may be perceived as equally meaningful to acoustic, performed sounds. This is due to the occurrence of *différance* between the various levels of performativity – a type of meta-performativity:

> In between these two extremes there is every imaginable degree of liveness, every level of fixity. Because of all these sounds' presentation through the same loudspeakers, their proliferation and often simultaneity, the listener has little chance of knowing where instrumentality stops and where fixed object-like 'tape' music starts. […] the duality too is fascinating: I have found that one hears the fixed sounds in a new way in different performances because they are re-articulated by their shifting context, they seem to change.[842]

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[840]Jonathan Harvey, "Jonathan Harvey 'String Quartet No. 4'" https://www.youtube.com/watch?v=w-JAL-Vh7Xk (accessed February 19th, 2015).

[841]Ibid.

[842] Harvey, "The metaphysics of live electronics," 80.

Importantly, the "several degrees of liveness"[843] result in what may be understood as a simultaneity of organic and *in*organic time, i.e. chaotic, linear and cyclical time, as has been discussed above. This relationship between meta-performativity and the simultaneity of various temporal layers will be central to various arguments presented the following analysis.

The requirements of the electronic part of the piece define the various relationships between the technological and instrumental performances. Clip-on microphones are employed to amplify the instruments, while a series of computerized processes is controlled by one or two operators via MIDI-fader-controller and digital mixer. Amplified and processed sounds are played back from the same arrangement of speakers, therefore sharing the same acoustical space.

The digital operations involve the following aspects: one of the main processes is the use of *multiphonic spatialization* ("6-8 (or minimum of 4) loudspeakers distributed around the hall for sound diffusion"). Throughout the piece, two spatializers are frequently active, while temporal and spatial aspects of the movements between the loudspeakers are precisely controlled by a sound engineer. The spatial movements themselves evoke an extended spatial perception of the performance space as the audience witnesses various movements of sound at different directions and speed.[844] In contrast to Ferneyhough's *Time and Motion Study II*, the spatialization in Harvey's piece does not remain static but instead becomes an integral part of the dynamic musical material.

The following scheme, taken from Michael Clarke's lecture on Harvey's composition given at the University of Huddersfield, illustrates the spatial movements:[845]

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[843]Ibid.

[844]It should be furthermore noted that the use of spatialization helps to make transparent the otherwise opaque texture of oftentimes extremely dense musical activity. "What would seem polyphony that is a little confused was immediately clarified by the separation of spatialization – different types of movement across the hall characterising each layer." Harvey, "The Genesis of Quartet no. 4," in *Identity and Difference: Essays on Music, Language and Time* (Leuven University Press, 2004), 44.

[845] Michael Clarke, "Jonathan Harvey String Quartet no. 4. Notes towards an analysis." (lecture, University of Huddersfield – UK, 2013), available online: https://www.youtube.com/watch?v=XMbX_d-8mcQ (accessed February 19th, 2015).

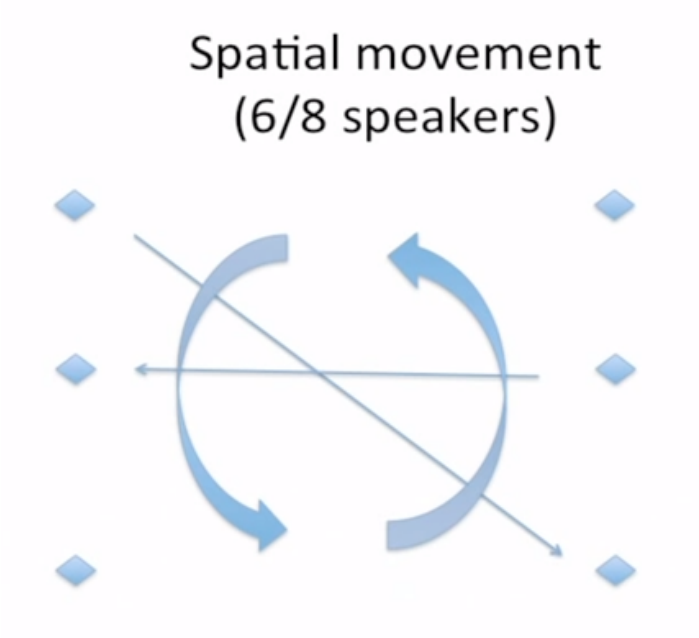

Figure 48 - Clarke: Spatial Movement between Speakers in Harvey's 4th String Quartet

In addition to the spatializers, multiple *harmonizers* are used, "each capable of delivering five or six additional notes to the inputted note."[846] The settings of the harmonizers are based on a variety of intervallic constellations, such as clusters of semitones or quarter-tones, or chords based on the harmonic series etc. The distinction between equal temperament and just intonation reflects Harvey's idea of a harmonic sound world representing "cultured classical music"[847] in contrast to a harmonic character, which is "'less musical' […] more like nature".[848]

The use of buffers is another central element throughout the piece: the buffers allow for temporal storage of the numerous samples of quartet sound. The stored data is used in various ways:

> Either this recording loops unchanged, or new recordings are placed over it. If these new recordings are very short, perhaps only one per cent of the length of the original recording, then it would take at least a hundred new triggerings to obliterate completely the

[846] Harvey, "The Genesis of Quartet no. 4," 46.

[847] Harvey, "Jonathan Harvey 'String Quartet No. 4'" https://www.youtube.com/watch?v=w-JAL-Vh7Xk (accessed February 19th, 2015).

[848] Harvey, "The Genesis of Quartet no. 4,": 46.

> original recording, or probably many more. More normally short new recordings would gradually be added interspersed almost at random into the old recordings, so bits of archaeological history, as it were, would gradually appear in the looped playback, which would continually change, updating itself partially, bit by bit, with new juxtapositions. One bit of time would be completely distant from another bit of time with which it would be rubbing shoulders.[849]

It becomes apparent that the dynamic archive of the buffer presents what Wolfgang Ernst calls the "chaotic storage method".[850] This causes "chaotic time" to be inserted into the linear process of the live performance of the quartet: a polyphony of temporality. A very specific use of the buffers occurs in combination with *granular synthesis*,[851] which

> entails recording what the quartet play and either storing it as a buffer of a few seconds' duration or continuously rerecording the buffer so that after a little delay the treatment of what the quartet has just played will come out, like a following distorted echo.[852]

It is eveident that granulation is another "chaotic storage method" while the execution of the same recording and storage processes entail much smaller durations – particles – of sound. The aspect of fragmentation is thereby augmented and the aspect of chaos is no longer just a matter of form but a matter of material. Clarke's illustrations help to describe this:[853]

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[849] Ibid., 47.

[850] See Ernst, "Discontinuities: Does the Archive Become Metaphorical in Multimedia Space?,"139.

[851] Based on similar processes as sampling, sound granulation requires the recording of a sound while its duration is played back in grains – split into "granular" fragments. As in other sampling methods, such grains can be played back reverse, at different speeds, phased, etc.

[852] Harvey, "The Genesis of Quartet no. 4.," 46.

[853] According to Clarke's lecture, individual grains have a duration of 80ms to 0.5 seconds; an order change of grains is possible as is a gradual reduction of grains. Fragmentation of a sample can therefore be realized continuously. Clarke, "Jonathan Harvey String Quartet no. 4. Notes towards an analysis." (lecture, University of Huddersfield – UK, 2013), https://www.youtube.com/watch?v=XMbX_d-8mcQ (accessed February 19th, 2015).

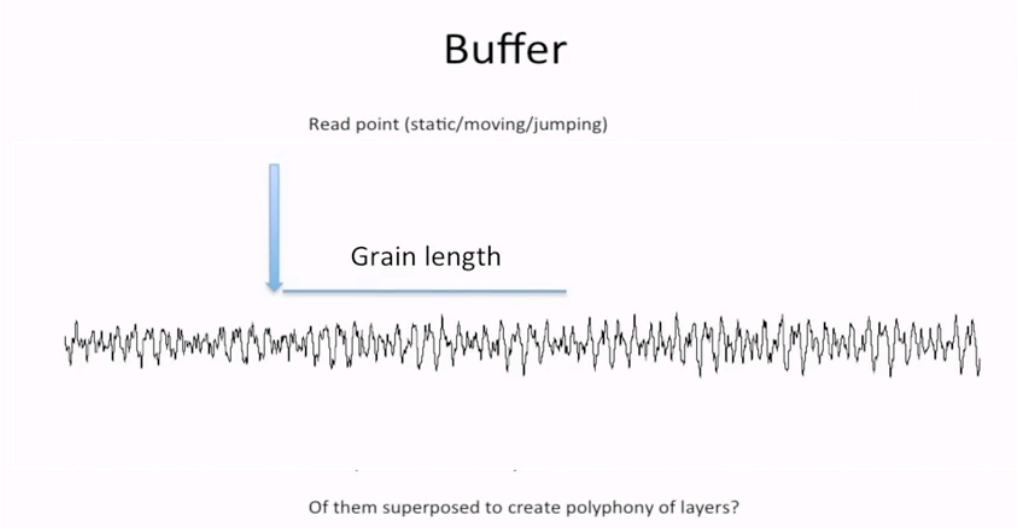

Figure 49 - Clarke: Granulation of Buffers in Harvey's 4th String Quartet

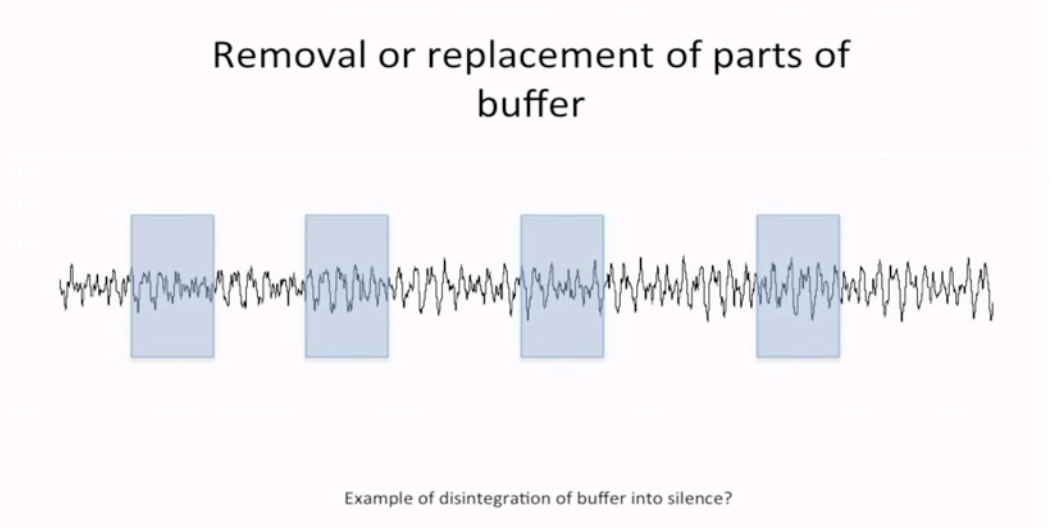

Figure 50 – Clarke: Disintegration of Buffers in Harvey's 4th String Quartet

The figures elucidate how granular synthesis directly modifies a sound's inner construction rather than serving the mere purpose of playing back recorded passages of sound. This has further implications in terms of the measure of musical time within individual sounds, as explained in chapter three in reference to Gunnar Hindrichs' theories.[854] From this perspective, the "measure of time" through granulation is neither

[854] Hindrichs, *Die Autonomie des Klangs*, 116-117, 123.

process, nor reflecting eternity or moment form. Instead, the measure of time through granulation is that of chaos – the measure of "real time".

Finally, processes of *time-stretching*, *spectral inversion* and *frequency shift* are employed in the third cycle of the piece. Much like the harmonizers, these processes result in a transformation of primarily timbral aspects of the inputted sound.
At this point, it should be noted that granulation, as a specific implementation of buffers, must be recognized in its primary function as a mnemonic supplement: buffers and granulators entail a playback of sampled (memorized) sound which is then perceived as a temporally and spatially deferred actualization of a previously performed sound. Buffered and granulated sounds are detached from the moments of their *physical* genesis. As a result, musical time is split into organic (performance) time and *in*organic (technological) time. Sound engineer Gilbert Nouno, who was significantly involved in conceptualizing and realizing the quartet, substantiates this observation in an interview during Clarke's lecture:

> I can say about the time stretching which is quite an interesting but also a paradoxical thing to stretch the musical time of a player in real time which is a bit paradoxical because when you have the sound coming in the computer you can't really make it playing faster or shorter without having holes or silences in the sound. And for this, the idea was to record some sound analysis and to work directly on this analysis and to do the time stretching on this analysis.[855]

One may say that the processes of granular synthesis, buffers and, in a somewhat peculiar way, time-stretching are technological implementations which impact the composition's architecture – on the two levels of form and material: buffered sound is played back in its entirety or in fragments. During the piece, samples are often played back as loops, cycling and repeating as ostinati alongside the quartet's progress through the piece. In this way, the sound's temporality is affected in large-scale and small-scale dimensions, while temporal linearity is joined by chaotic, dynamic time.[856] This reveals a

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[855] Clarke, "Jonathan Harvey String Quartet no. 4. Notes towards an analysis." (lecture, University of Huddersfield – UK, 2013), https://www.youtube.com/watch?v=XMbX_d-8mcQ (accessed February 19th, 2015).

[856] According to Nouno, looping and granular synthesis are "both quite the same processes but at different time scaling." In the context with the material in the string quartet, this represents "a macro-synthesis." Ibid.

simultaneity of linear, cyclical, and chaotic time – a kind of "macro-synthesis"[857] of time via memory.

An example for this can be found at the end of cycle 1, mm. 44-55 (see fig. 51), as the continuous output of granulator 2 is periodically *updated* by short instants of new buffer "inputs". At mm. 46-47, the looping in granulator 2 is matched by a composed "loop" of the two bars in the string quartet while the granulator "feeds" again on samples taken from the quartet's material. In this moment, the granulator produces constantly re-structured and fragmented ostinati as the quartet continues through the piece.

At measure 48 (fig. 52) a type of "feedback-loop" occurs as the quartet is instructed to "imitate the electronic sound" which itself reiterates – in fragments – what was played by the quartet before.

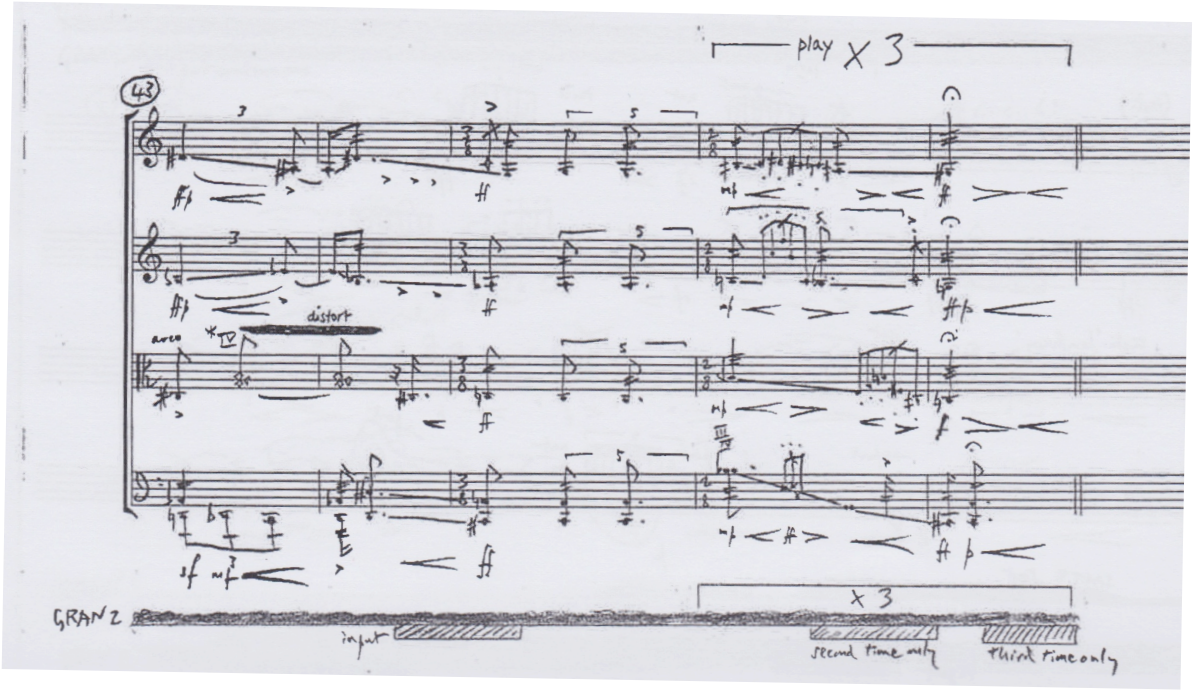

Figure 51 - Harvey: 4th String Quartet (Score, mm. 43-47)

[857] Gilbert Nouno in Ibid.

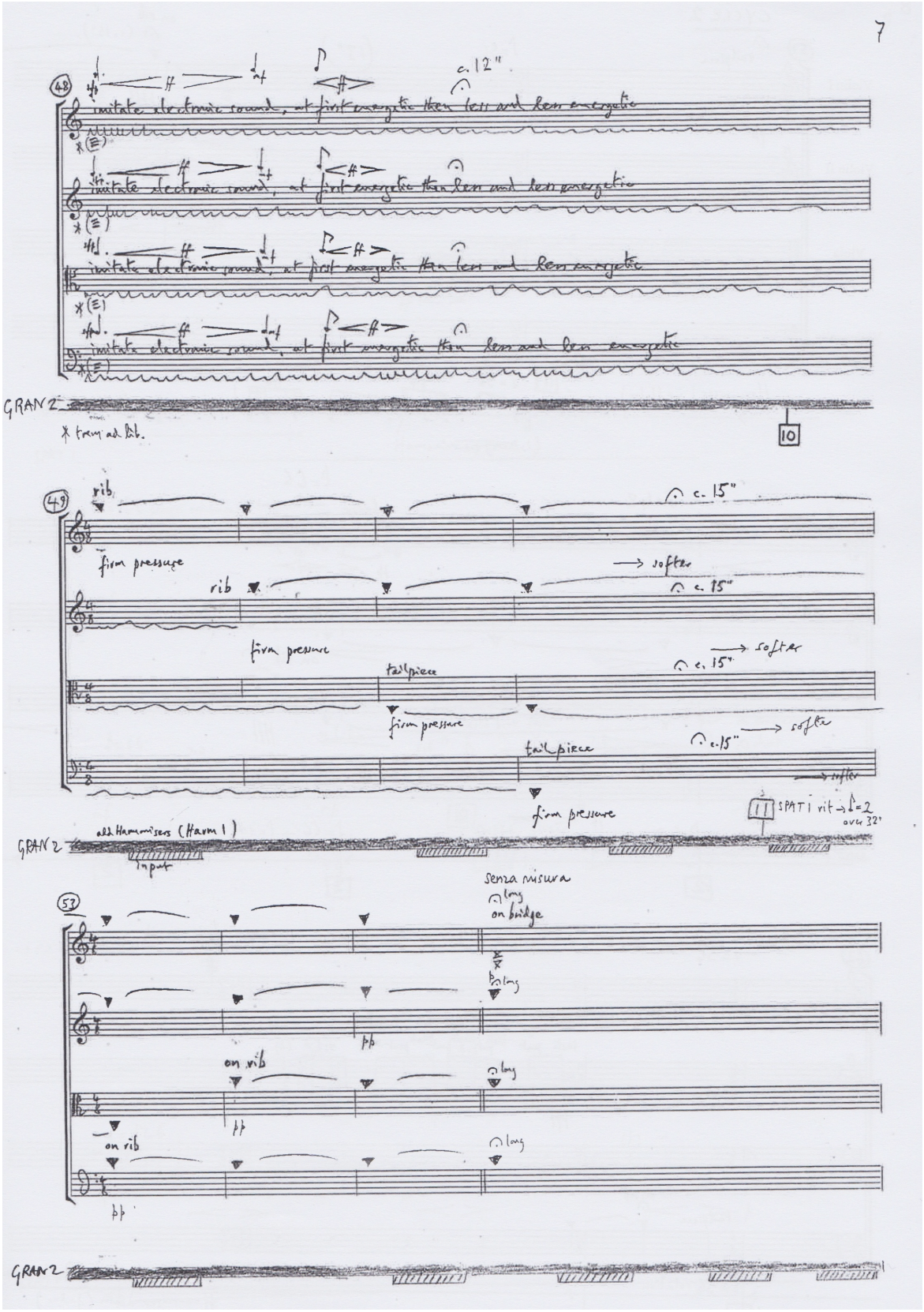

Figure 52 - Harvey: 4th String Quartet (Score, mm 48-55)

In contrast to such *temporal* transformations, the employment of spatializers, harmonizers, spectral inversion and frequency shift serves the instantaneous modification of sound and does not create temporal *différance.*[858]

By now, it may have become clear that, in his fourth quartet, Harvey employs live electronics as just another instrumental part in addition to the four string players. Much like in Ferneyhough's *Time and Motion Study II*, the digital live electronics in *String Quartet No. 4* reveal extensions of the notions of musical and performative ontology. As described above, this technological extension of musical transindividuation operates on large-scale formal ideas but is also reflected in various musical materials and the small-scale processes within which these materials emerge. In the following, specific examples will substantiate these observations and demonstrate how Harvey's musical material transpires in the string quartet performance and how the rather "mobile"[859] part of the live electronics is "rhythmically integrated" into this performance.

The composition is divided into five "cycles". As opposed to the term "movements", Harvey's use of "cycles" and – though not used in the score - "bardo" sections emphasizes Buddhist notions of reincarnation cycles.[860] Correspondingly, the formal structure of Harvey's fourth string quartet reveals reincarnations of musical

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[858]While"real-time" algorithms always involve a certain latency, the temporal delays in Harvey's fourth String Quartet are unnoticeable enough to argue that the implementation of spatialization, harmonizers, spectral inversion, frequency shift occurs at the same temporal level.

[859] See Harvey, "The Genesis of Quartet no. 4," 46-47.

Furthermore, it should be noted that the *mobililty* of the live electronics is possible at this level only because of techologies such as touch-sensitive pads etc.

[860] Harvey uses the term "bardo" section to describe the third cycle in his essay "The Genesis of Quartet No. 4." Michael Clarke, however, reveals a description of the word "Bardo", taken from an entry in the composer's sketch book. Accordingly, Harvey's understanding of the term is as follows:

"A Tibetan word: Intermediate state, an in between liminal state. Between two incarnations." As Clarke points out, each of the five cycles in the final piece are "preceded by one of these Bardo passages. […] They are not marked as such in the score, they're really the introduction, if you like, to each of the cycles. They're that inbetween state, very much to do with sound almost coming from nothing and sounds that […] have a strong element of noise in them and the thematic ideas and the harmonic ideas and the rhythmic ideas gradually emerge from these."

Clarke, "Jonathan Harvey String Quartet no. 4. Notes towards an analysis." (lecture, University of Huddersfield – UK, 2013), https://www.youtube.com/watch?v=XMbX_d-8mcQ (accessed February 19th, 2015)

processes, exhibiting the composer's idea of a *becoming* "purer, moving towards a 'pure land' or 'pure mind'."[861]

For the purpose of the present analysis, it shall suffice to point out that cycles 1-3 have almost identical opening sections ("bardo") in terms of quartet material, while the technological implementations change.[862] The beginnings of cycles 4 and 5 present the original "bardo" idea in a similar static form, while the prevalent "wispy material" creates a "fleeting airiness" out of which cycle 5 eventually rises "as a kind of melodic invention."[863]

The concept of cyclicity is the basis for the macro-formal outline of the piece, but which intriguingly already transpires on the material and micro-formal level: in cycle 2, Harvey "invented a melodic chain consisting of six melodies (see fig. 53) which are interspersed by six combination melodies. The combination melodies add together the two melodies on either side to make a more complex structure: where one melody has a sustained note or a rest the other melody will insert some activity, and vice versa."[864] In this way, cyclicity is the foundation of melodic construction as it reveals continuous interrelations between the distinct melodies.

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[861] Ibid. Also, Harvey, "The Genesis of Quartet no. 4," 52-53.

[862] The beginning of cycle 1 makes use of spatializers, cycle 2 additionally involves harmonizer 1. The active processes at the beginning of cycle 3 are spatializer, time-stretch, spectral inversion and – during the last two bars of this "bardo" section – frequency shift.

[863] Harvey, "The Genesis of Quartet no. 4," 52.

[864] Ibid., 51. As Harvey explains, the six basic melodies (A-F) are "interlocked" via combinatory melodies. For example, melody A is interlocked with melody B via compound melodies AAB (mostly melody A, partly melody B), AB (equally melody A as melody B), and ABB (partly melody A, mostly melody B). Characteristically, melody F is interlocked with melody A, therefore completing a full cycle.

This is taken from Michael Clarke's lecture in which Clarke provides a chart with the transitional stages of melodic "interlocking". Clarke, "Jonathan Harvey String Quartet no. 4. Notes towards an analysis." (lecture, University of Huddersfield – UK, 2013), https://www.youtube.com/watch?v=XMbX_d-8mcQ (accessed February 19th, 2015)

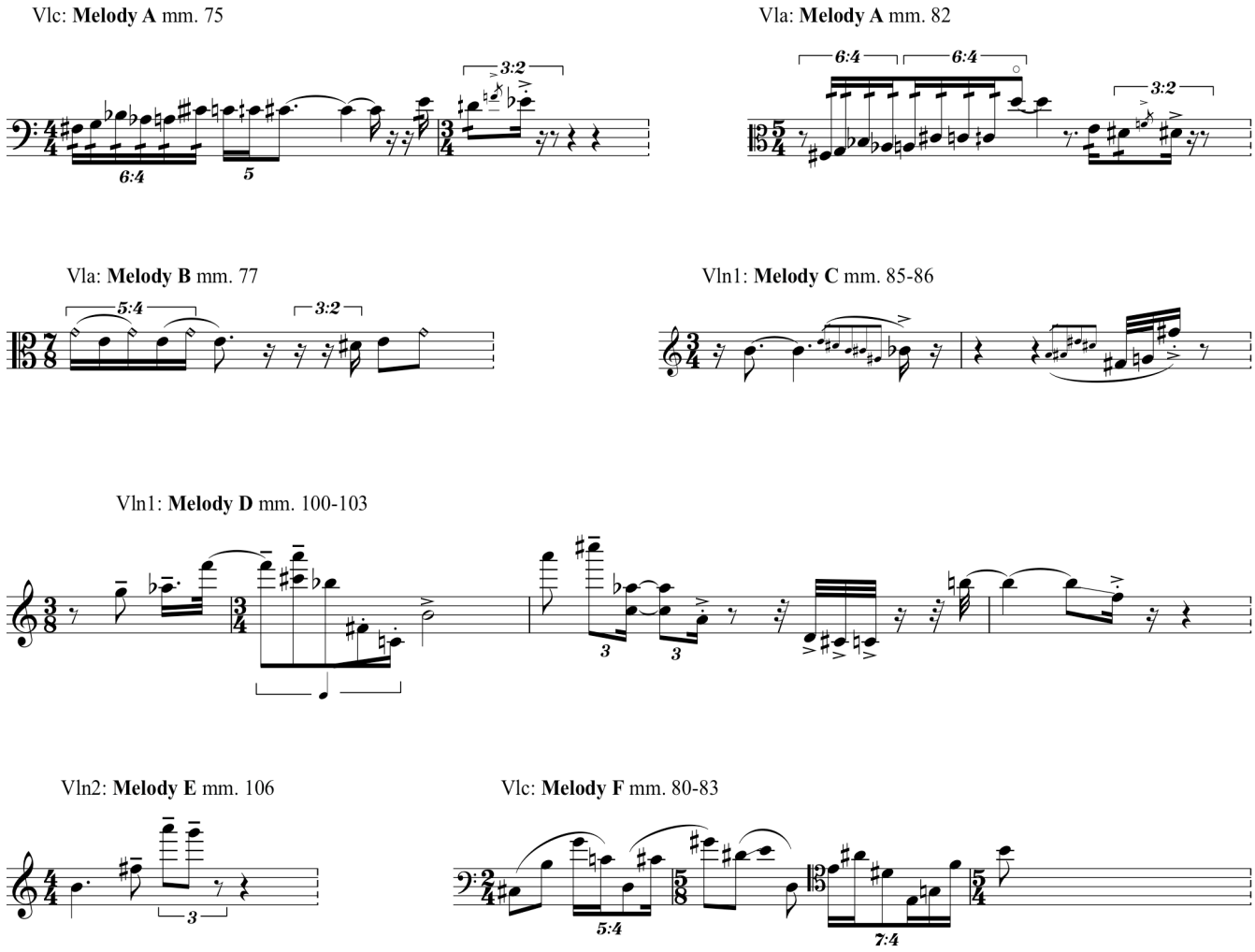

Figure 53 - Six Basic Melodies of Harvey's 4th String Quartet

Although the six melodies appear as melodic chain only in cycle 2, the melodies continuously reappear throughout the rest of the piece. In fact, they are derived from the first cycle.

For example, at measure 11 (see figure 54 below) a *viola theme* is played, resembling what is later established as melody A. The viola theme itself is somewhat memorable as it is the first occurrence of melodic material in the piece and is reiterated several times. A variation of the theme occurs only four measures later (also in the viola) and two measures afterwards another variation sounds in the violoncello. Both variations reveal the same intervallic structure as the beginning hexachord of melody A.

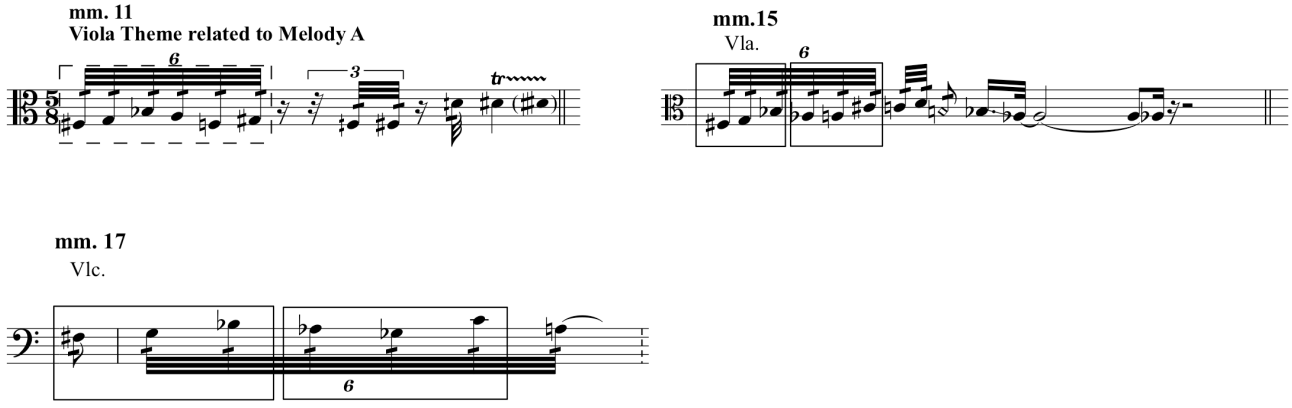

Figure 54 - Viola Theme in Harvey's 4th String Quartet

While the second cycle exhibits the six melodies in various forms of interlocking, there are two particularly clear implementations of this idea. First, in mm. 100-117, a canon based on melody D occurs between the two violins, with melodies C and E entering and interlocking with the subject of the canon (melody D) from mm.104 on. The interjections eventually detach from melody D (mm. 109-117) and are presented in static repetition. Simultaneously, an ever-renewing buffer 2 (and later buffer 1) is active and heightens the sense of stasis.

Harvey refers to such moments of repetitiveness when he describes the second cycle in general as

> more rhythmically assured than the first and at the same time more thematically obsessive. Here advantage is taken of the electronic recording of live quartet sound and its ability to be looped; this is in itself an image of obsession – of repeating without much variation, without thought. All lives are characterised to some extent by obsession, by hobbyhorses, by mistakes which we go on making or illusions we go on clinging to, without ceasing.[865]

The next illustrations show the canon between violin 1 and 2.

[865] Harvey, "The Genesis of Quartet no. 4," 50.

mm. 100-117:
Canon between Violin 1 and 2, Example for Interlocking Melodies

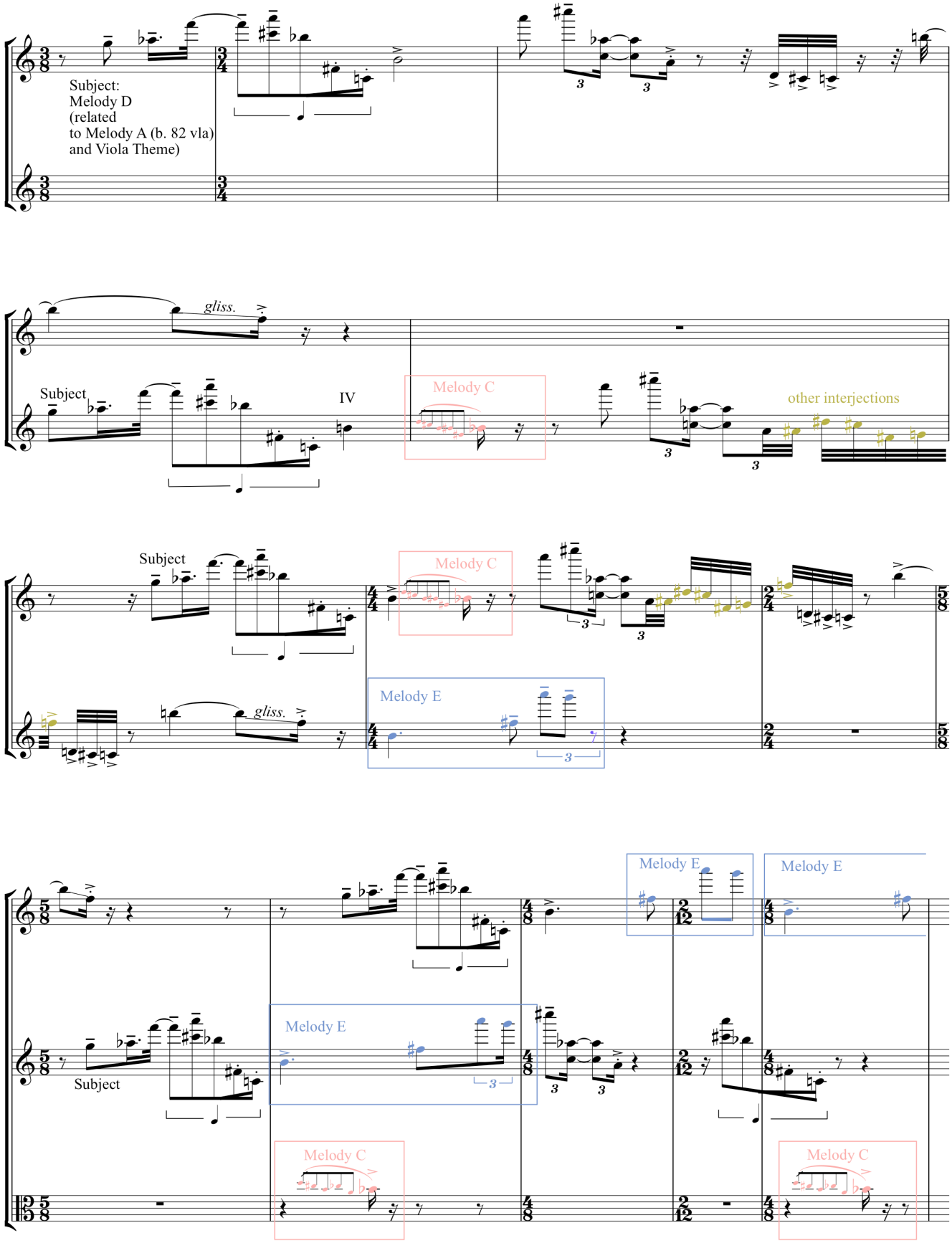

Figure 55 - Canon in Harvey's 4th String Quartet (mm. 100-117)

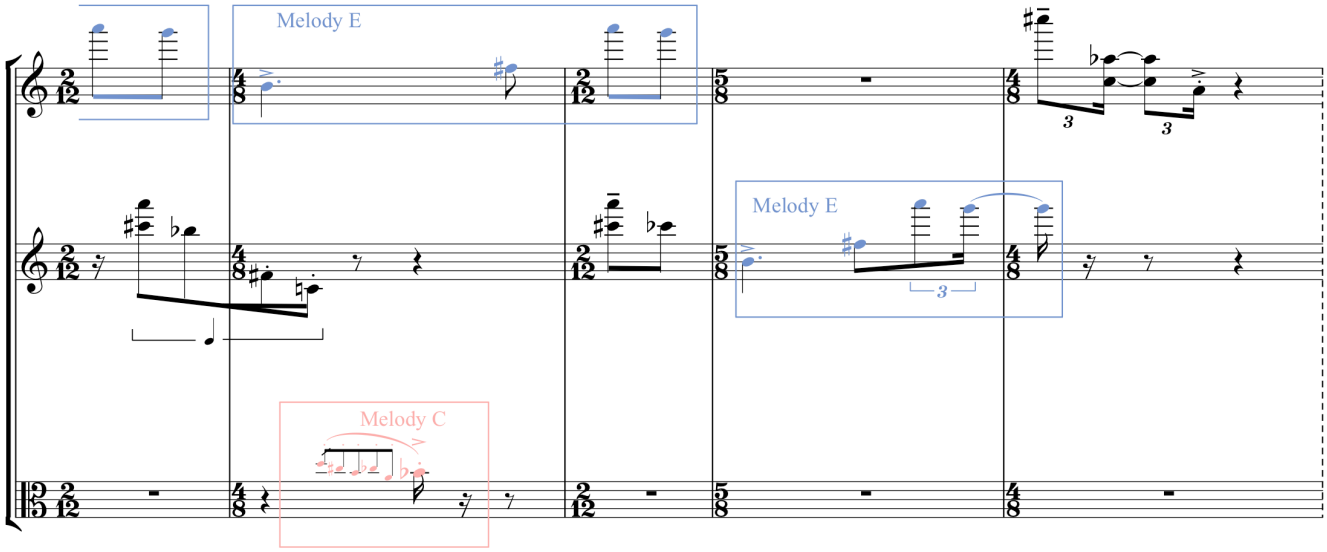

Figure 56 – Canon in Harvey's 4th String Quartet (mm. 100-117) (continuation)

A second noteworthy example of the implementation of the characteristic melodic material can be detected in the last cycle. From measure 316 on, the viola theme – or melody A – is presented in a quasi-fugato framework.

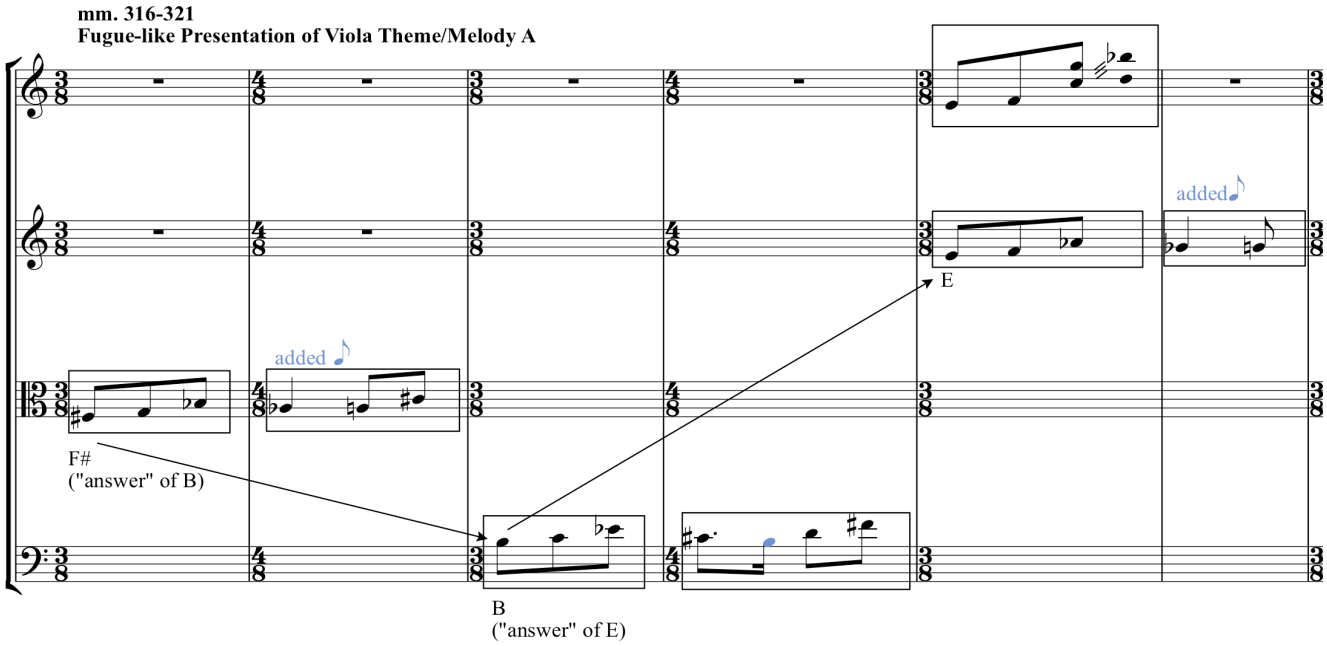

Figure 57 - Quasi-Fugue in Harvey's 4th String Quartet (mm. 316-321)

It should be noted that the three entries of the subject occur on pitches related by fifths, thereby implying a reference to the historical practice of fugue-writing. Tonality

appears to reveal a valid context for this section because, from a tonal perspective, entries of *subjects* (dux) are only suggested by entries of *answers* (comes). This would imply a temporal trajectory gravitating away from the present, in which it is unclear whether a primordial subject entry exists or not. In this section, one might conclude, the material tendency expresses a temporal rhizome and molecularity.

In addition, the use of the historical technique of fugue-writing presents a simultaneous implementation of extratextual and intratextual memory as the fugue subject is composed of previously established material: the viola theme/melody A.

At measure 340 (see fig. 58), the fugue idea returns, leading the quartet to the end of the piece. This time, the same subject material remains and gravitates around F# while the succession of entry points is gradually stretched out, imitating the concept of electronic time-stretch that is implemented in cycle 3. Furthermore, each subject entry occurs at a different internal tempo (eights, quadruplets, and quintuplets), which reveals another imitation of time-stretch. The final entry of the melodic theme in the cello ("*cantabile al fine*") is the slowest presentation of the theme, solemnly proceeding in quarter notes.[866]

A notable inversion of the major second (see fig. 58) can be observed at mm. 335-338: the original melody A hexachord consists of two intervallically identical trichords, connected by a descending major second. This time, however, the major second ascends to a last occurrence of the characteristic trichord on Bb. This appears to be of significance in regard to the cello's previous *cantabile al fine* entry on Bb (mm. 346) instead of C#, as implied by the previous entries of the other instruments.

The Bb is vindicated at the very end of the piece, as a long-held unison on Eb suggests a tonal relationship between the mysterious Bb and the final Eb (fig. 59). This furthers the extratexual association in terms of Harvey's decision to employ the technique of fugal counterpoint.

[866]Interestingly enough, the spatializer in the electronic part presents another "entry" after the cello.

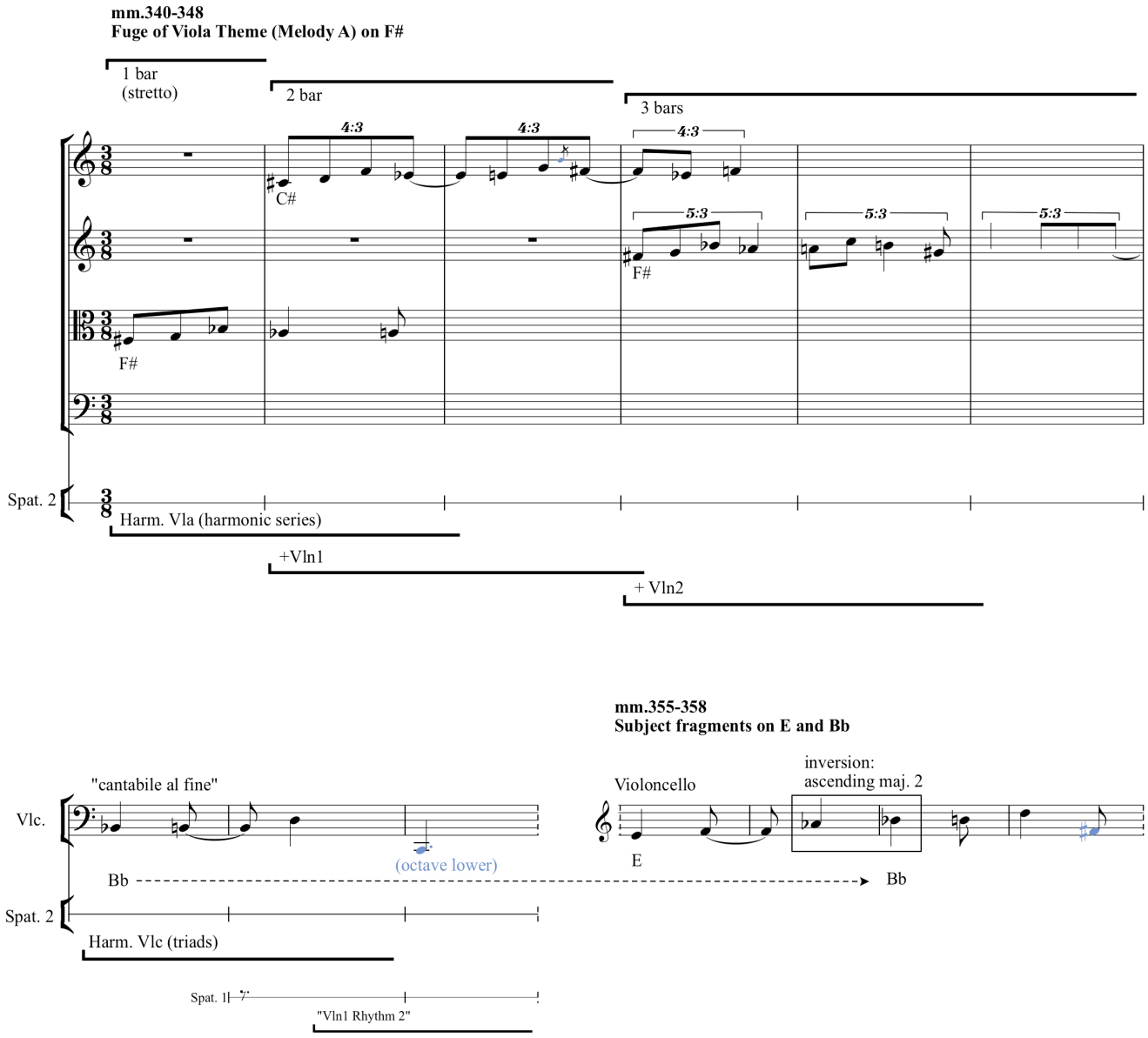

Figure 58 - Temporal Transformation in the Fugue Theme in Harvey's 4th String Quartet (mm. 340-348, mm. 355-358)

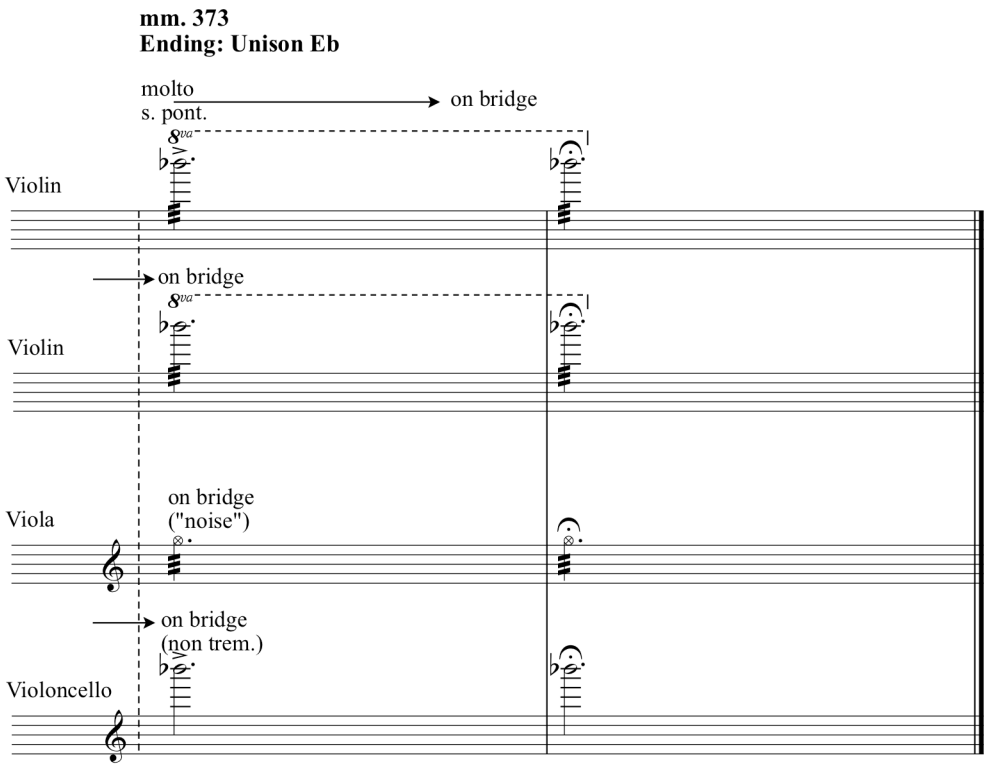

Figure 59 - Unison Ending on Eb in Harvey's 4th String Quartet (mm. 373-374)

As demonstrated, Harvey's compositional methods embed formal cyclic qualities within the quartet's macro-structure, its material, and the smaller-scale processes. Extratextual references generate a notion of historical cyclicity with regards to the implementation of a past musical tradition.

Further layers of intricate cyclic interconnections exist on the level of the live electronics. As the next figure illustrates, Harvey derives four rhythms from the six melodies and employs them in the spatialization.[867]

[867] The four rhythms control the movement of the spatialization as follows: "2" appears in the opening bars of the "bardo" sections 1-3; mm. 1, mm. 58, mm. 168, mm. 152, mm. 275; "3" mm. 15, mm. 76, mm.183, mm. 284; "1" mm. 68, mm. 182 "linear", mm. 276, mm. 286; "4" mm. 166 (bridging into cycle 3, then taken over by "2"), mm. 180 in "rotation"; mm. 262 particularly in cycle 4 (mm. 259-270 then "sim." in accel.)

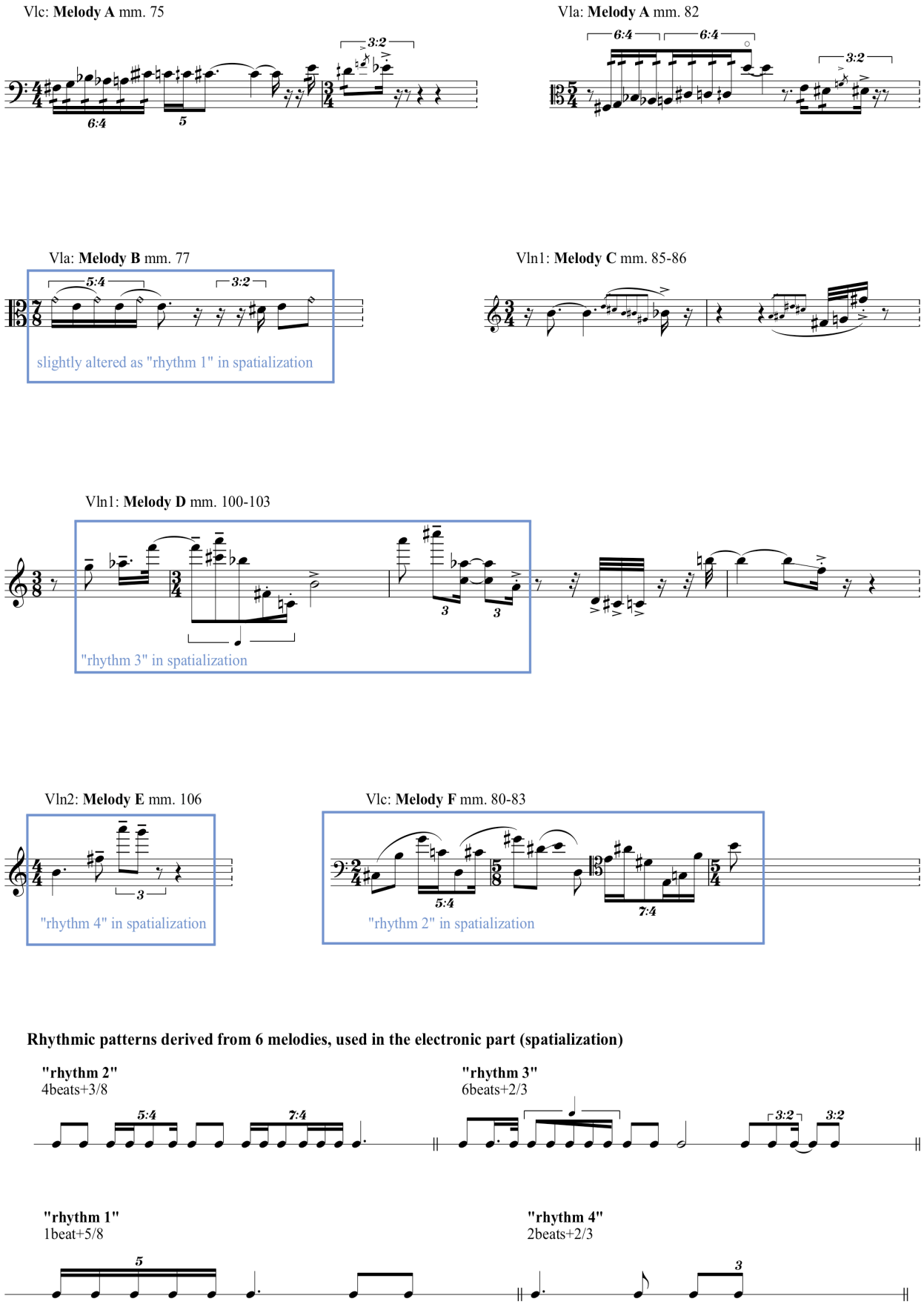

Figure 60 - Rhythmic patterns used in the Electronic Part of Harvey's 4th String Quartet

An example of the imaginative ways in which Harvey employs the rhythmic patterns can be found at the beginning of the piece. In the first spatializer, rhythm "2" defines the spatial representation of the first violin's noisy tailpiece sound and "continues looping" until the end of this "bardo" section (mm. 14). At measure 8, the second violin presents the same rhythmic cell in a circular bowing motion, producing quickly fluctuating overtones with a high content of noise. Five bars later, the cello plays rhythm "2" twice: first on the tailpiece, then starting on the bridge and moving to sul ponticello, repeating the second violin's circular bowing motion. All the while, spatializer 1 continuously loops rhythm "2", thereby doubling the presentation of the rhythm which is here heard – quite literally – through time and space.

Within the first 13 measures (fig. 61-63), Harvey creates a complex relationship between the quartet and the electronics by way of rhythmic integration[868] of the spatialization into the quartet performance: a merging of physical and technological media concepts.

[868]It is interesting to learn from Clarke's lecture that Harvey's notes reveal a multitude of ways in which thequartet's rhythmic patterns determine the live electronic processes.

The notes read:

"1) rhythm of quartet

2) rhythm of looped buffers ('minimalism')

3) rhythm (almost static) of frozen segments

4) rhythm of spatialization loops (in buffers)"

Clarke, "Jonathan Harvey String Quartet no. 4. Notes towards an analysis." (lecture, University of Huddersfield – UK, 2013), https://www.youtube.com/watch?v=XMbX_d-8mcQ (accessed February 19th, 2015).

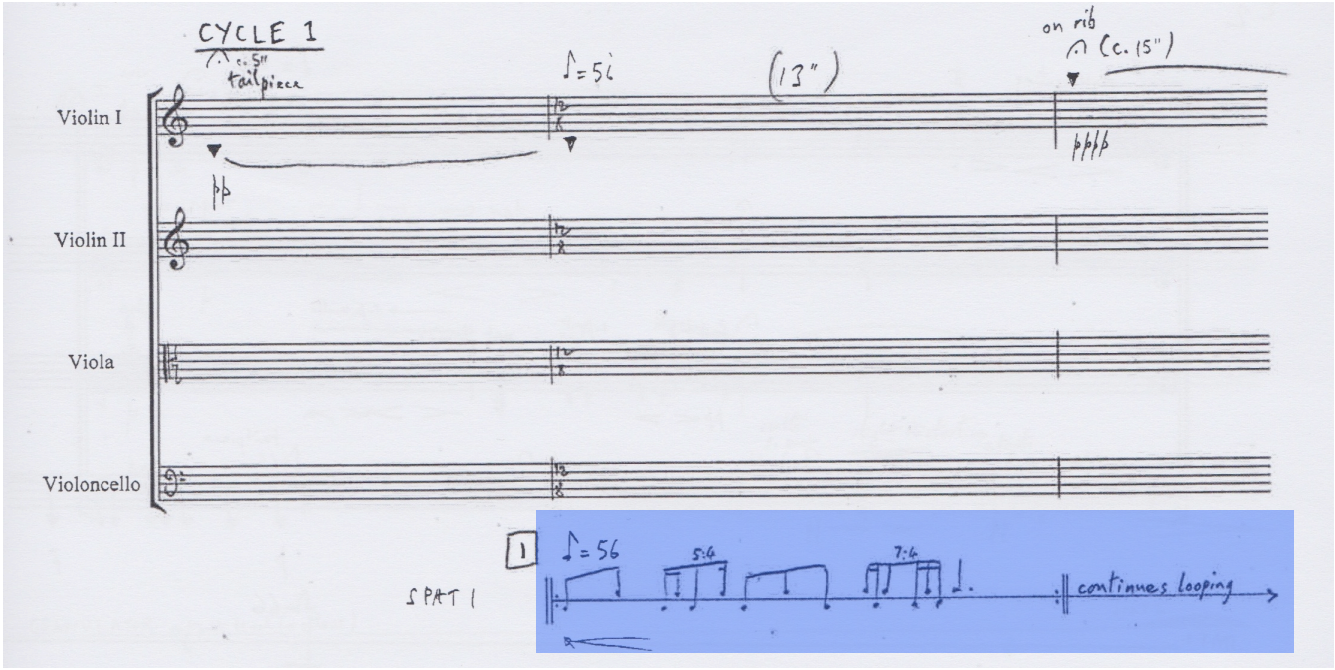

Figure 61 - Harvey: 4th String Quartet (Score, mm. 1-3)

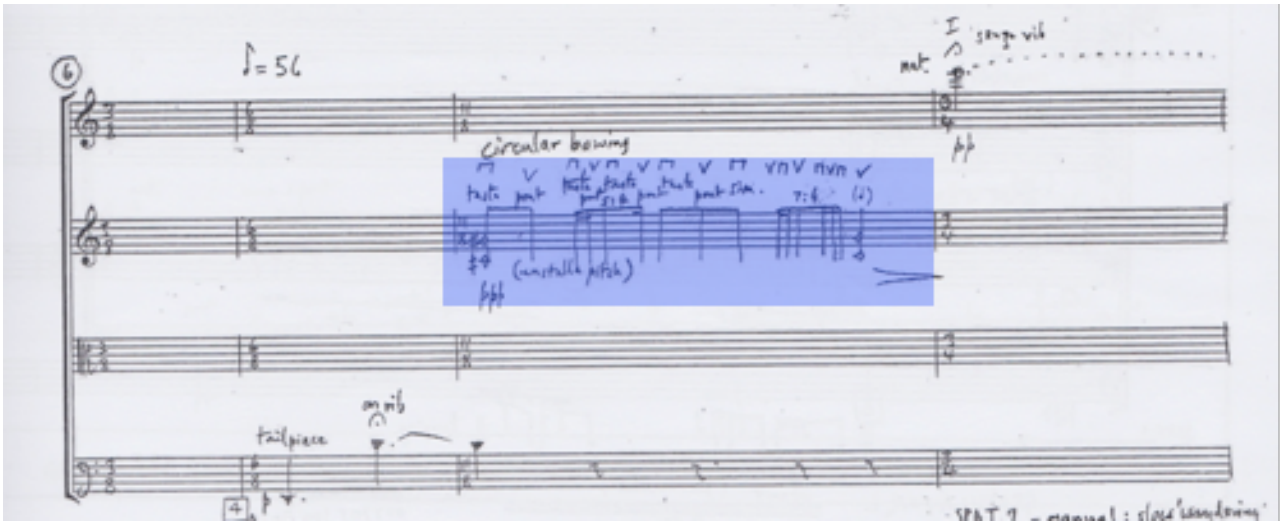

Figure 62 - Harvey: 4th String Quartet (Score, mm. 6-9)

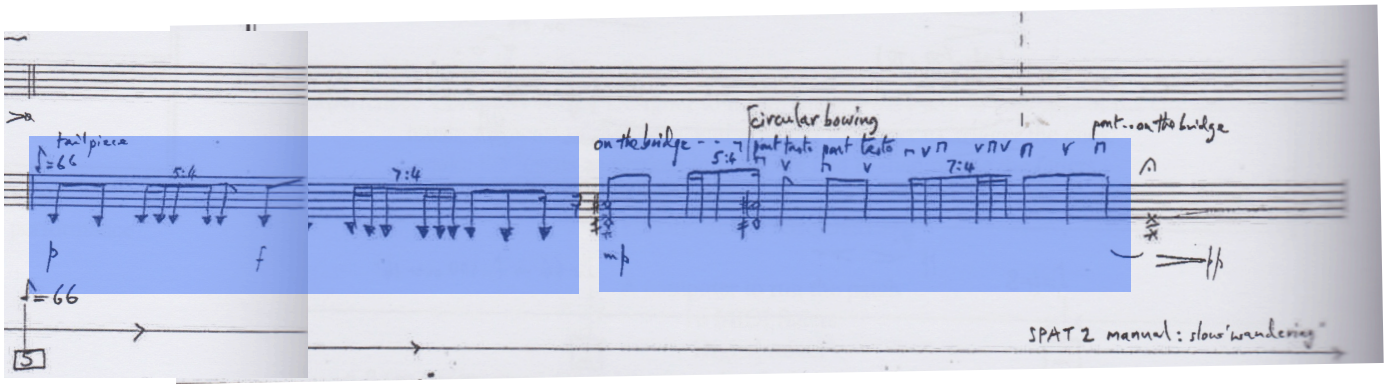

Figure 63 - Harvey: 4th String Quartet (Score, mm. 13)

Another example of a similar effect is the fifth cycle in which spatialization is used at "rapid speed – stroboscopic": at 23 cycles per second, the sound of each string player's direct input circles through the space, articulating Harvey's idea of "volatility, an ethereal quality"[869] and projecting it into time and space.

It has been discovered that Harvey's ways of integrating live electronics into the quartet music creates intimate connections not only between the quartet and the technology, but also between space and time. A polyphonic relationship between the electronics and the string quartet therefore exists in a newly defined spatio-temporal dimension. This underlines Harvey's "view of electronics as evocation or representation of another world"[870] rather than as a technical supplementation of musical sound from a Ulyssean or Orphic perspective. The live electronics *re*define the quartet sound-space.

In a unique way, Harvey's *String Quartet No. 4* successfully transindividuates a music which is composed of a "neutral, disembodied sound."[871] This sound, while *becoming* organic as well as *becoming* inorganic, generates a new organicism within the piece with an idiosyncratic temporality uniting cyclical, linear, and chaotic time. Importantly, references to musical mediality as well as analogue or numeric archival mediality are reciprocal: archival memory transindividuates through music, and music transindividuates through an adaptation of archival tendencies of numeric technics. Technology is not *mastered* but generates an equally instructive expressivity within an

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[869] Harvey, "The Genesis of Quartet no. 4," 44.

[870] Harvey, "The metaphysics of live electronics," 81.

[871] Harvey, "Jonathan Harvey 'String Quartet No. 4'," https://www.youtube.com/watch?v=w-JAL-Vh7Xk (accessed February 19th, 2015).

extended musical context: the nullification of any hierarchical notions about the organic (humanity) and the inorganic (technology) ultimately creates a molecularity within the no-longer-dichotomic *différance* of organic *who* and inorganic *what*.

Compositional Approaches to Memory in the Dissertation Composition *#ffffff*

> Musical revenants form the soundtrack of that lifeworld, and their sound is surprisingly uncoercive. When you play or hear them, you will not find your subjectivity shattered or scattered, nor summoned by the fiction of originality to break with a past from which you have neither the ability nor the desire to break. Everything that postmodernity has emptied of substance is still there, only with a difference, a *différance*, the trace of the impossible but improbably successful effort to reanimate the sense of substance without its essence […]. The musical revenant, as both event and concept, is one small means by which the lifeless past can revive within the 'life' half of my deliberately loaded term 'lifeworld.' Unoriginal music is one resource by which even the living may discover their capacity to live on in the present – only differently.[872]

From the beginnings of my compositional work, I have been very skeptical of the inclusion of live electronics within my own compositions. As a trained sound engineer it seemed as though the implementation of live electronics in my compositions should come with confidence based on the practical and technical skills acquired through my previous studies. However, due to my skepticism, I refrained from utilizing technology in my music. The doubts stemmed from a lack of understanding of the broader implications of digital processes within the context of live performed music. I had not yet developed a language to even ask relevant questions that could lead to specific answers. Particularly dubious-seeming were the computerized processes which involve memory operations, such as live sampling or the playback of pre-recorded sound materials, for reasons which I was not even able to grasp logically or to contextualize in any meaningful way.

[872] Kramer, *Musical Meaning*, 286-287.

With the beginnings of my studies at the University of Victoria, a slow process of understanding was set into motion, an understanding of the existence of questions regarding cultural identity and memory – as I have described in the introduction of the present dissertation. It became obvious to me that my doubts about electronic music stemmed from a general skepticism regarding modern technology in the context of identity, memory, and culture. The ideas behind *#ffffff* emanated from a desire to explore these fundamental questions regarding cultural implications of digital media within the performative settings of composed music. As such, the piece was conceptualized to involve various types of memory: the compositional framework should facilitate various engagements between digital memory, musical memory, cultural memory etc. Those distinct relationships should then engender questions not only about digital technology in music but also about the essence of this extension of human as well as musical memory within a larger context of contemporary culture of computerization.

When I finally began the research for the present dissertation, I came across an interesting problem surrounding the often-discussed *Tristan Chord* from Richard Wagner's opera *Tristan und Isolde* (1857-1859).

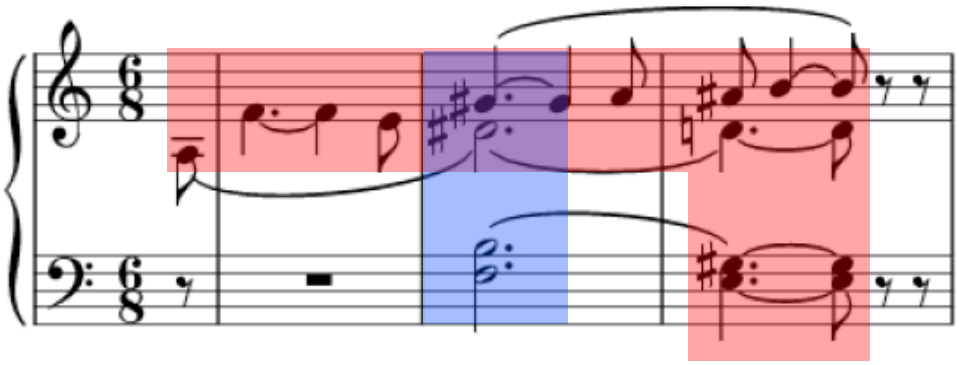

Figure 64 - Wagner: Reduction of Tristan Chord (Chord=Blue, Melody=Red)

First of all, it fascinated me that the comprehensive list of scholarly research regarding the chord essentially addressed two main aspects:

1) the apparent impossibility of finding consensus on a useful taxonomy of the chord
2) appearances of the chord in music before and after Wagner's opera

The two aspects are interrelated in that the quest to categorize the Tristan Chord (TC) within a tonal or non-tonal framework has often led analysts to make comparative references to other compositions in which the chord appears.

One of these analysts is Jean-Jacques Nattiez who, in *Music and Discourse*, points out the various controversies surrounding the chord. Interestingly enough, he begins his analysis by emphasizing that the TC in Wagner's *Tristan* attains real "entity" status because of its duration and frequent recurrence throughout the opera. In contrast, the TC appears in Beethoven's 18th *Piano Sonata Op. 31, No. 3* (1802) within an *Allegro* setting (see fig. 65) and is resolved almost instantly.[873] In Alban Berg's string quartet *Lyrische Suite* (1925/1926), the chord is placed as a quotation into an atonal setting (see fig. 66) within which, as Nattiez refers to George Perle's analysis,[874] the TC makes an extramusical connection between Berg's love affair with Hanna Fuchs and the tragic love story in Wagner's opera. The TC in Berg's music therefore entails a multiplicity of ambiguity, in part as the unresolvable chord that it is but also because it functions as extratextual memory – as borrowed material with "semantic charge".[875]

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[873] "[...] if the Tristan Chord causes problems, it is because this 'bizarre' configuration has a long enough duration to attain the status of a harmonic *entity*. […] We can have fun finding the Tristan Chord in earlier works […]. In this example [Beethoven, *Sonata Op. 31, No. 3*], however, one sees how great the difference from *Tristan* really is: in Beethoven, the tempo is *allegro* (♩=160), and the immediate resolution of the Eb to D does not convey the same sense as the resolution in the Tristan Chord; in Wagner, the tempo is *langsam und schmachtend*. Beyond this, however, Wagner also places the chord at the opening of the work and repeats it three times (in measures 6, 10, and 12); it recurs frequently, and finally at the end of the last act. Dramatically and harmonically it has the character of a 'statement.' […] [Jacques Chailley] writes, '*Tristan*'s chromaticism, grounded in appogiaturas and passing notes, technically and spiritually represents an *apogee of tension*. I have never been able to understand how the preposterous idea that *Tristan* could be made the prototype of an *atonality* grounded in destruction of all tension could possibly have gained credence. This was an idea that was disseminated under the (hardly disinterested) authority of Schoenberg, to the point where Alban Berg could cite the Tristan Chord in the *Lyric Suite*, as a kind of homage to a precursor of atonality' (1962:8)." Nattiez, *Music and Discourse*, 219-220.

[874] See Ibid., 220. For more, refer to George Perle, "The Secret Programme of the Lyric Suite, 2," *Musical Times* 118, no. 1615 (1977): 709-713.

[875] See Plaza, "Intertextuality and 'différance' in the third movement of Luciano Berio's Sinfonia," http://www.academia.edu/1468061/Intertextuality_and_diff%C3%A9rance_in_the_third_movement_of_Luciano_Berio_s_Sinfonia (accessed November 27th, 2014).

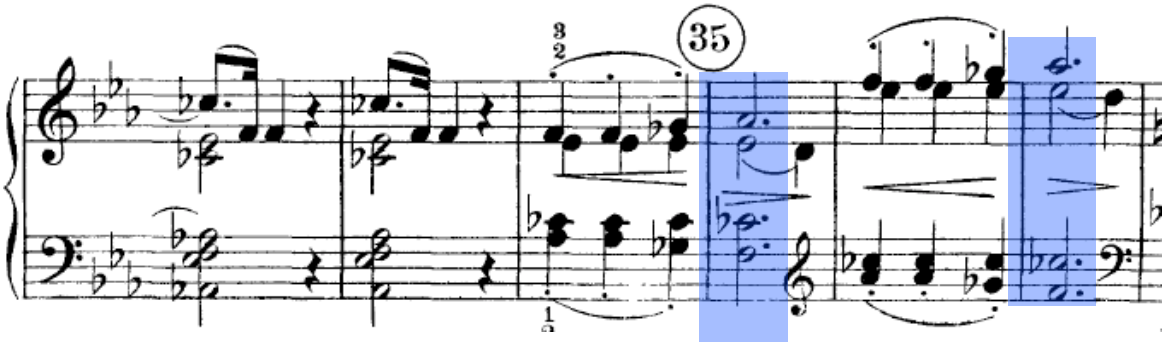

Figure 65 - Beethoven: Sonata Op. 31, 3 - Tristan Chord (Score, mm. 32-37)

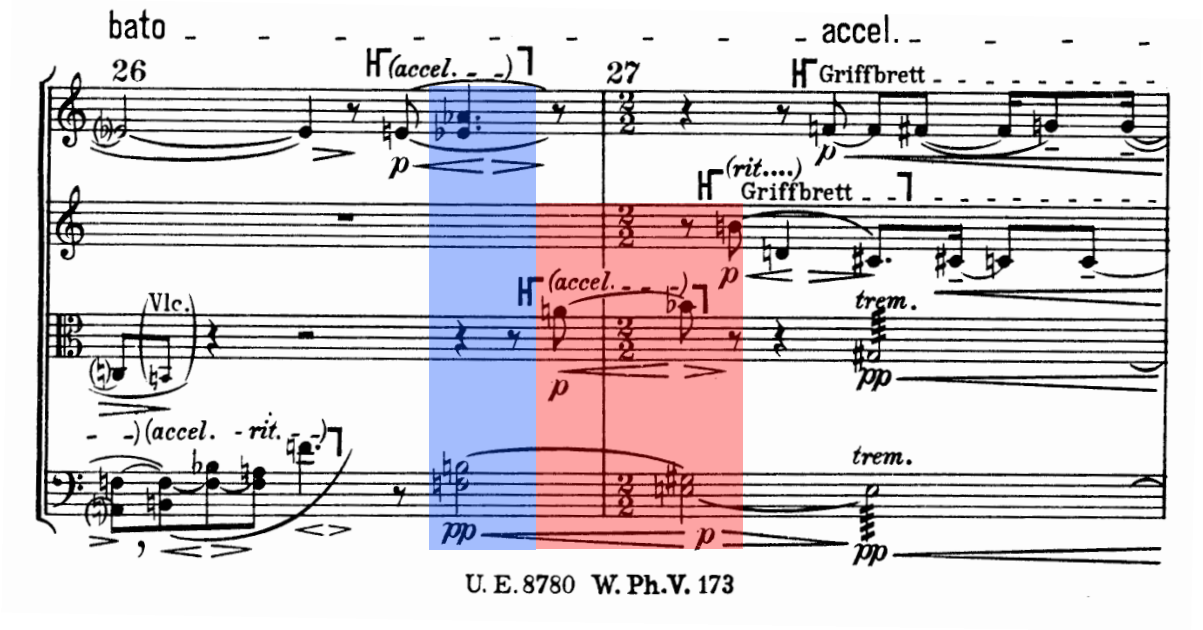

Figure 66 - Berg: Lyrische Suite, mvt. 6 – Quotation of Tristan Chord (blue) and its Melodic Content (red) (Score, mm. 26-27)

Based on Nattiez's observations, I became aware of the legacy of Wagner's Tristan Chord. This legacy reveals to have generated much confusion and uncertainty in relation to the chord's harmonic function[876] on the one hand, and to its origin and earlier appearances on the other.

[876]Nattiez points out, in referring to existing interpretations, that the TC can be understood functionally (as iv, V of V, or ii) but then counters "[t]he fact that this is possible is a bit suspicious: can we still maintain that function is relevant when (so to speak) the littlest shove can transport us from one function to another?

But the variability of the functionalist analyses justifies a move to other analytical possibilities, this time, nonfunctionalist analyses. They have one thing in common: they take the G# to be part of the chord, and (unlike the functionalist analyses) they privilege the chord's structure above its function. They take the G# as a characteristic element in the chord's acoustic specificity, and thus seek to explain not F-B-D#-A, but F-B-D#-G#. In the history of the Tristan Chord's analysis, all the same, one needs to differentiate between

Even today, almost 150 years after the premier of Wagner's opera, the chord seems to generate more questions than it provides answers, resulting in a destabilization of musical semantics. The very uncertainty of its meaning led to the decision to base my thesis composition to a large extent on the multi-layered content of the TC: as I will demonstrate, I have created and expanded my musical concepts not only around the intervallic construction and various harmonic resolutions of the TC, but also around questions of its musical etymology and harmonic tension with regards to chronological occurrence and (de-)tuning. In this way, the piece's foundation is a variety of memory – outer-musical cultural memory, inner-musical memory, digital memory. In complex ways, I imagined, these different forms of memory could simultaneously inform the *becoming* of my musical material:

I wanted to incorporate the ambiguity of the Tristan Chord directly into my thesis composition. Rather than solely using the chord as quotation, I thought of ways to integrate the essence of the chord in my own musical material and to create a network of musical connections between the different historical resources. I set out to construct musical material on the basis of the TC's inner-musical structure, and envisioned that the complex intertextual quality of the chord's historical heritage could be embraced by other materials.

First, I employed a number of other resource compositions in addition to Wagner's *Tristan*. These compositions are: Ludwig van Beethoven's *Piano Sonata Op. 31, No. 3* (1802), Robert Schumann's *Cello Concerto Op. 129* (1850), Frédéric Chopin's *Mazurka op. 68.4* (1855), Franz Liszt's Lied *Ich möchte hingehen* (1860), Claude Debussy's piano composition *Golliwogg's Cakewalk* (from the Children´s Corner Suite) (1908), Alban Berg's *Lyrische Suite* (1925/1926).

As my intention was to create a kind of historical depth around the TC rather than providing a comprehensive list of every known occurrence of the chord throughout musical history, I chose the above compositions based on the fact that the particular

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two important and quite distinct families of nonfunctionalist analyses: those that characterize the chord's structure *vertically*, and those that, influenced by Schenkerian teachings, are *linear analyses* that deal with the chord with respect to the melodic continuity that forms its context." Nattiez, *Music and Discourse*, 226.

pieces themselves had a curious identity – a notably indwelling history, if you will.[877] Implementing a variety of such strong work identities side-by-side in one piece, I imagined that very different interpretations could arise from within my piece of the aspect of *secret knowledge* – as suggested by Carolyn Abbate and Lawrence Kramer.[878] This opens up many doors to a complicated hermeneutical network within *#ffffff*.

The historical references are used in four distinct forms: first, as a kind of musical distillation, TC memory is contained within composed *models*, upon which I will expand in the following sections. Secondly, these models are recorded and stored as files on the computer. During the piece, these are played back which means that musical distillation of memory becomes a mediated distillation of memory.

Thirdly, the resource pieces are directly quoted within the written score and are played by the live instrumentalists. Verbatim quotation therefore occurs within the same medial parameters as other musical material, which is performed by the live performers; i.e. TC

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[877] For example, Schumann rewrote, or rather *transcribed* his *Cello Concerto* in A-minor as a *Violin Concerto.* Interestingly, this version was only discovered in the 1967. See Joachim Draheim, "'Dies Concert ist auch für Violine transscribirt erschienen': Robert Schumanns Cellokonzert und seine neuentdeckte Fassung für Violine," *Neue Zeitschrift Für Musik* 148, no. 11 (1987): 4-10.

Chopin's Mazurka op. 68.4 is a work that is surrounded by an abundance of questions: it has been assumed that the piece is the last work of Chopin, written in the same year in which the composer succumbed to his multiple diseases, in 1849. Furthermore, there exist dramatic differences between published scores. In the edition of Polish Chopin expert Jan Ekier's (Warsaw, PWM 1965), the piece has a length of 101 bars. The urtext edition of the G. Henle Verlag (Munich, 1975/2003), however, comprises only 62 bars. See Norbert Müllemann, "La dernière pensée musicale de Chopin" – eine Mogelpackung?," published on the website of G. Henle Verlag. http://www.henle.de/blog/de/2012/01/23/%E2%80%9Ela-derniere-pensee-musicale-de-chopin%E2%80%9C-%E2%80%93-eine-mogelpackung/ (accessed March 4th, 2015).

Liszt's *Ich möchte hingehn* was first composed in 1845. While several editions exist, only one shows the appearance of the TC. Rena Charin Mueller discusses Liszt's drastic revisions of his Lieder in relation to his developed tendency for larger structures in the 1840s. See Rena Charin Mueller, "Liszt's 'Tasso' Sketchbook: Studies in Sources and Revisions," (PhD dissertation, New York University – New York, 1986). 118ff. and 336.

The decision to include Debussy's *Golliwogg's Cakewalk* as a resource piece came with a strong feeling of discomfort due to the inherently racist implications of both imageries: the *golliwogg* and the *cake walk*. As Davinia Caddy points out in her article *Parisian Cake Walks*, however, Debussy implements a quotation of the TC which, with its significant harmonic modifications, creates a more complicated relationship between the questionable adaptation of the racist imagery and musics of Debussy and Wagner and "has a more complex significance than that of a mere canvas on which to poke fun at Wagner or a straightforward reference to a minstrel doll." Referring to Lawrence Kramer's *Opera and Modern Culture: Wagner and Strauss* (2004), Caddy suggests that "[t]he refashioning of the Tristan chord as the cake-walk theme, together with the absorption of the Tristan motif into the carnivalesque sentimentality of the piece's central section, suggests (with tongue in cheek) that conflating Wagner and the popular medium of the cake walk is precisely that: a cake walk." See Davinia Caddy, "Parisian cake walks," *19th Century Music* 30, no. 3 (2007): 288-317.

[878] See Abbate, "Music – Drastic or Gnostic?," 505-536, and Kramer, *Musical Meaning*, 3.

memory is expressed via *immediate* quotation. And lastly, excerpts of recordings of the resource pieces are played back during *#ffffff*. In this case, historical references are cited verbatim in the form of *mediated* quotation.

My theoretical research into cultural memory and its relationships with and in music had led me to understand that temporality within culture entails a type of two-dimensionality: a simultaneous occurrence of cyclical *anachronism* and linear *synchronism*. As I explained in the second chapter, this applies also to musical time.

Cyclicality and linearity have been reflected within distinct musical forms, in line with music's social function at a given time in history. For example, cyclicality was prevalent in the music of the Middle Ages: by means of durational proportions within which any duration or meter is related to a *perfect* primordial temporal unit, a *diachronic order of time* was achieved. This way, the music of the Middle Ages fulfilled its social function of reflecting a *becoming* of divine eternity; musical social function at that time was theological. In contrast, the music of the classical and romantic eras followed the modern notion of time as process, involving musical development and continuous flow.[879]

With this in mind, I conceptualized the form of my composition as a *rondo*. Characteristically, the rondo form entails a principal theme (refrain) which recurs a number of times throughout the composition, alternating with contrasting themes (couplets). Depending on the specific number of themes, a rondo form might look something like this: A-B-A-C-A-D-A.

I imagined that the rondo form might lend itself to express my ideas regarding two-dimensional temporality that comprises both cyclical and linear time: an ever-recurring refrain represents cyclical repetition of a material which, in some way, could make reference to the Tristan Chord. The couplets, on the other hand, could entail developmental sections that are all part of one singular, linear process. However, as this initial idea was realized over months of conceptualizing and first phases of composing, I came to modify the rondo form as follows.

Rather than repeating the same singular material in the refrain, I employed *variations* within the refrain idea. These variations did not entail conventional

[879]See Hindrichs, *Die Autonomie des Klangs*, 126.

modifications of a primary theme after which a characteristic, *memorable* primary theme would still be somewhat *recognizable*.[880] The repeating and varying refrain theme could be perceived as analogous to "ritual-based representation".[881] However, I decided to compose what I had mentioned earlier as refrain *models*: within seven *models*, I distilled different subjective *interpretations* of each of the seven resource compositions which themselves exhibit very distinct musical and, at an underlying level on the basis of *secret knowledge*, social contexts of the Tristan Chord. Hence, the conception of *#ffffff*'s rondo *refrain* involved a type of *polythematic interpretation* of the seven historical layers of the Tristan Chord, by way of which the idea of "text-based interpretation"[882] is compositionally realized within my rondo refrain.

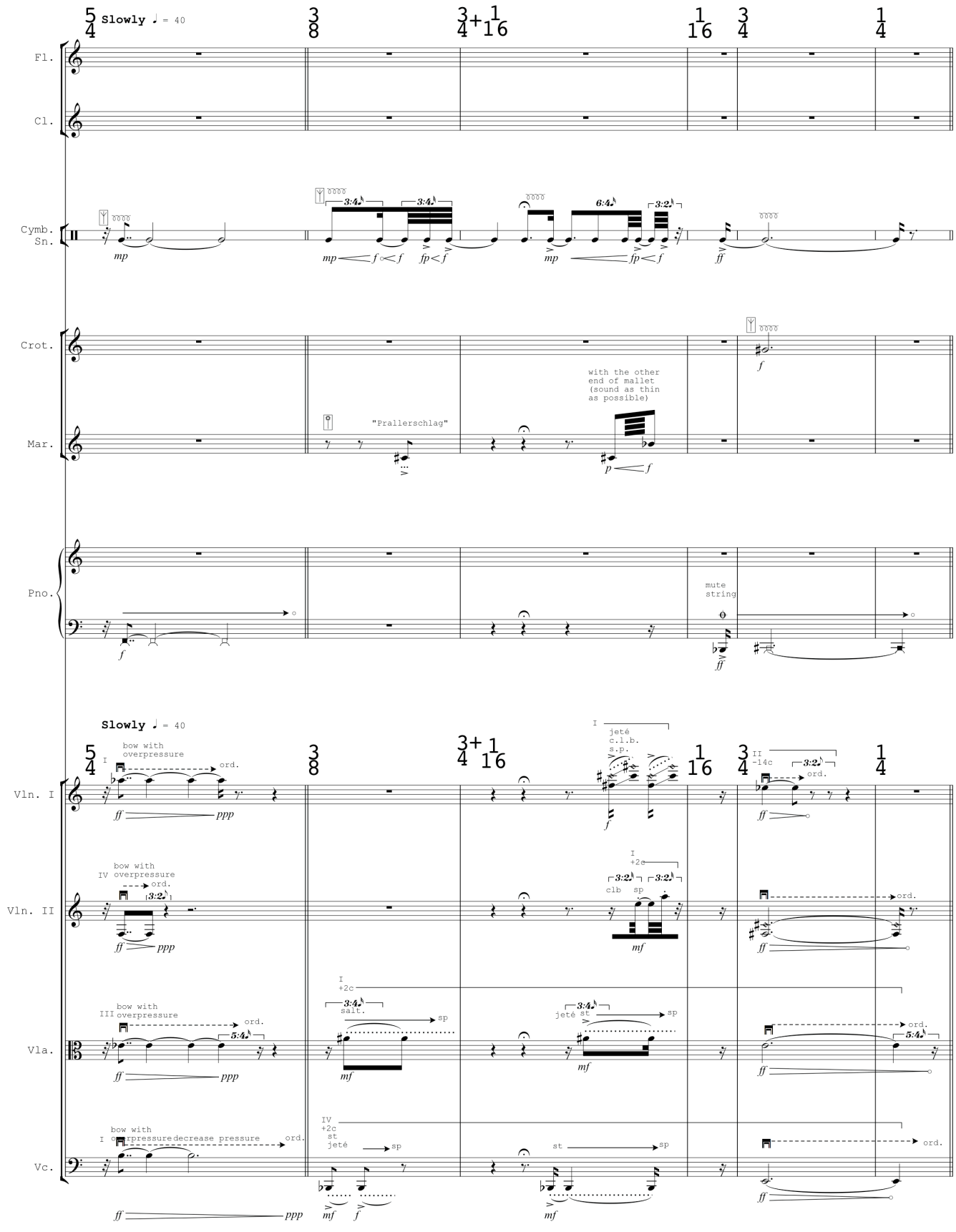
The next score examples show the resource compositions' seven models in chronological order: Beethoven Model, Schumann Model, Chopin Model, Wagner Model, Liszt Model, Debussy Model, Berg Model.

[880] Compare Schoenberg, *Fundamentals of Musical Composition*, 8-9.

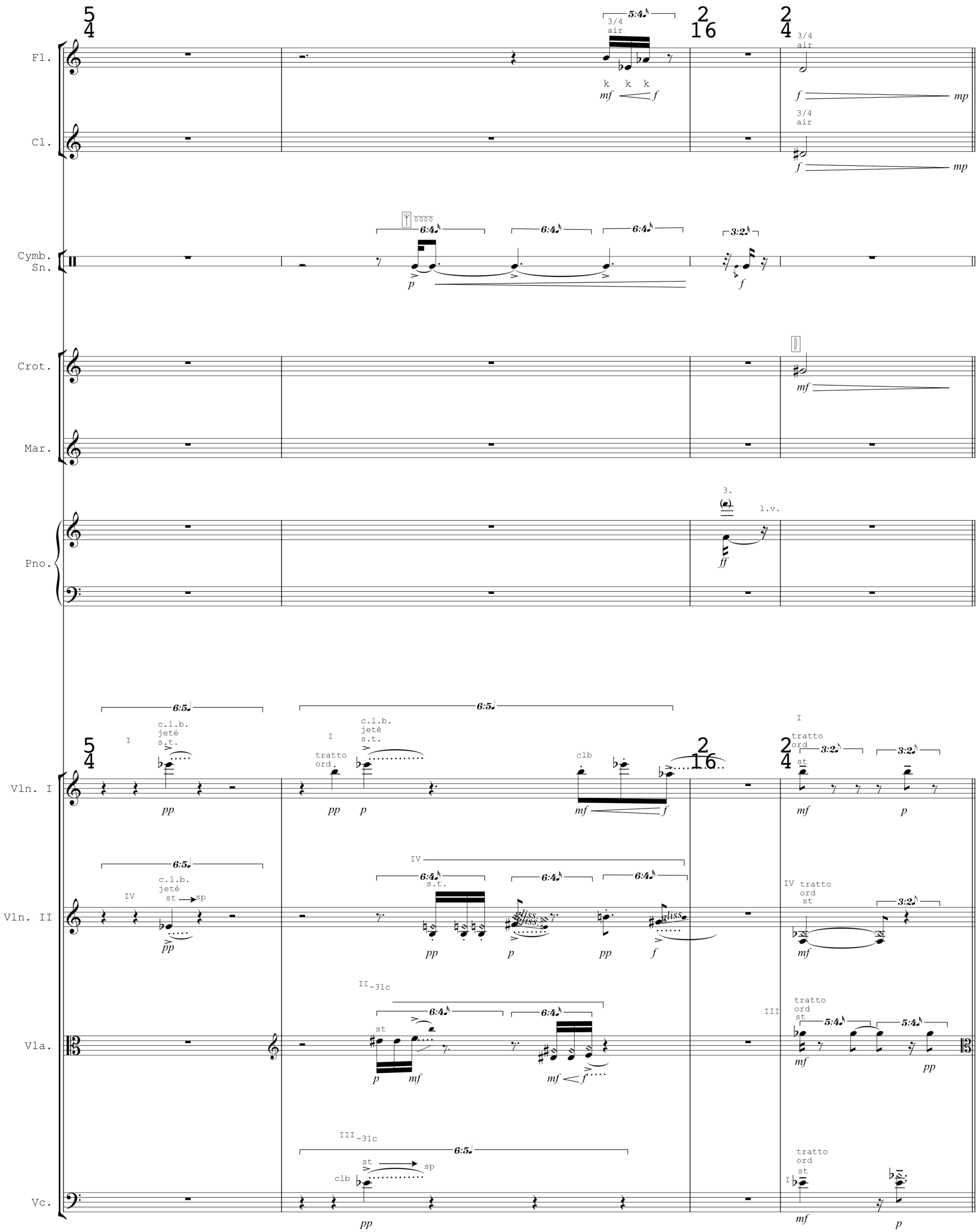
[881] See Assmann, *Das Kulturelle Gedächtnis*, 96.

[882] Ibid.

BEETHOVEN **Schumann**



Chopin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Cymb.
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Vln. I
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Vla.
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mf
f
mp
p
l.v.
ff
c.l.b.
jeté
s.t.
tratto
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II
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III
I
tratto
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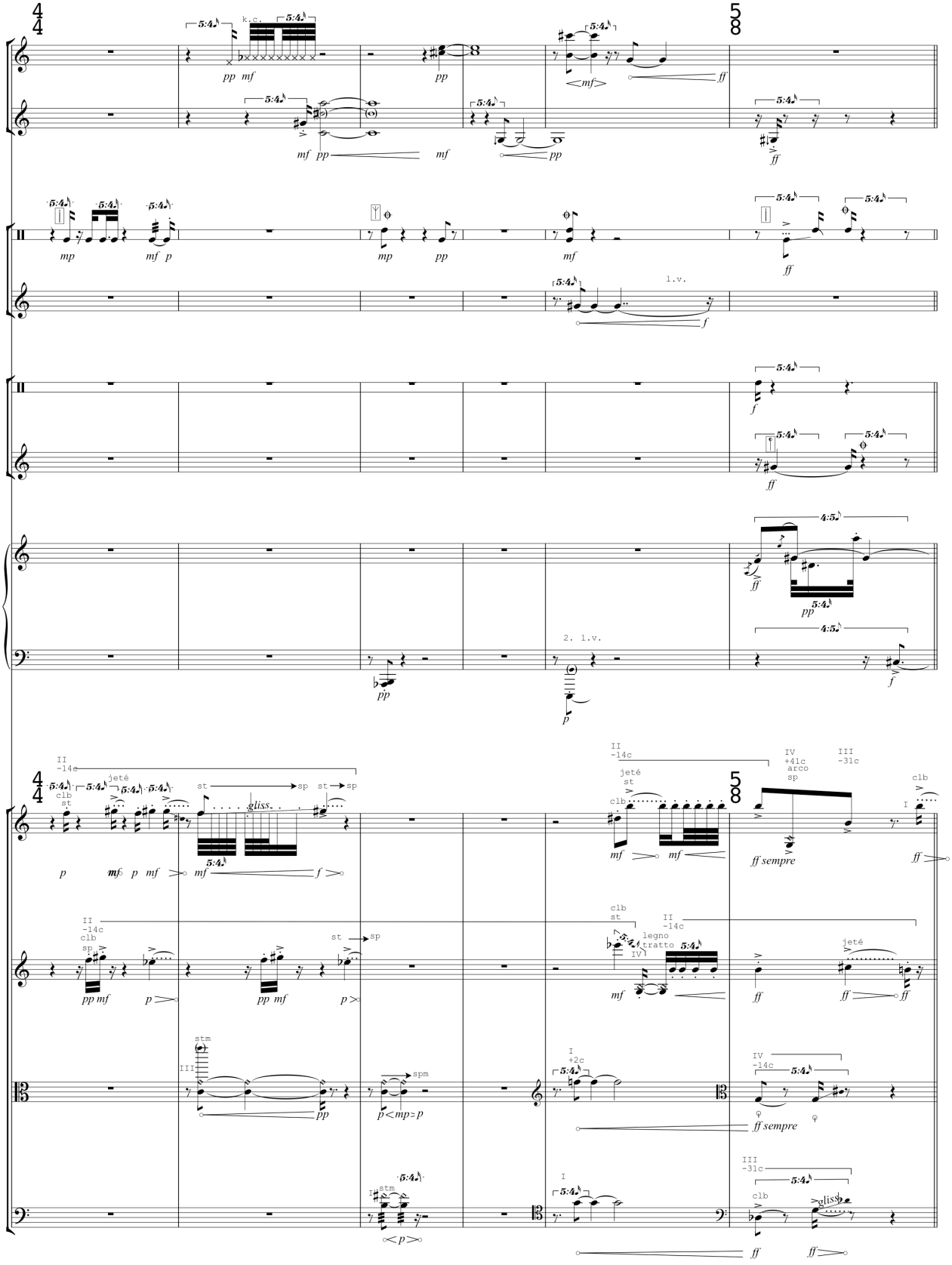
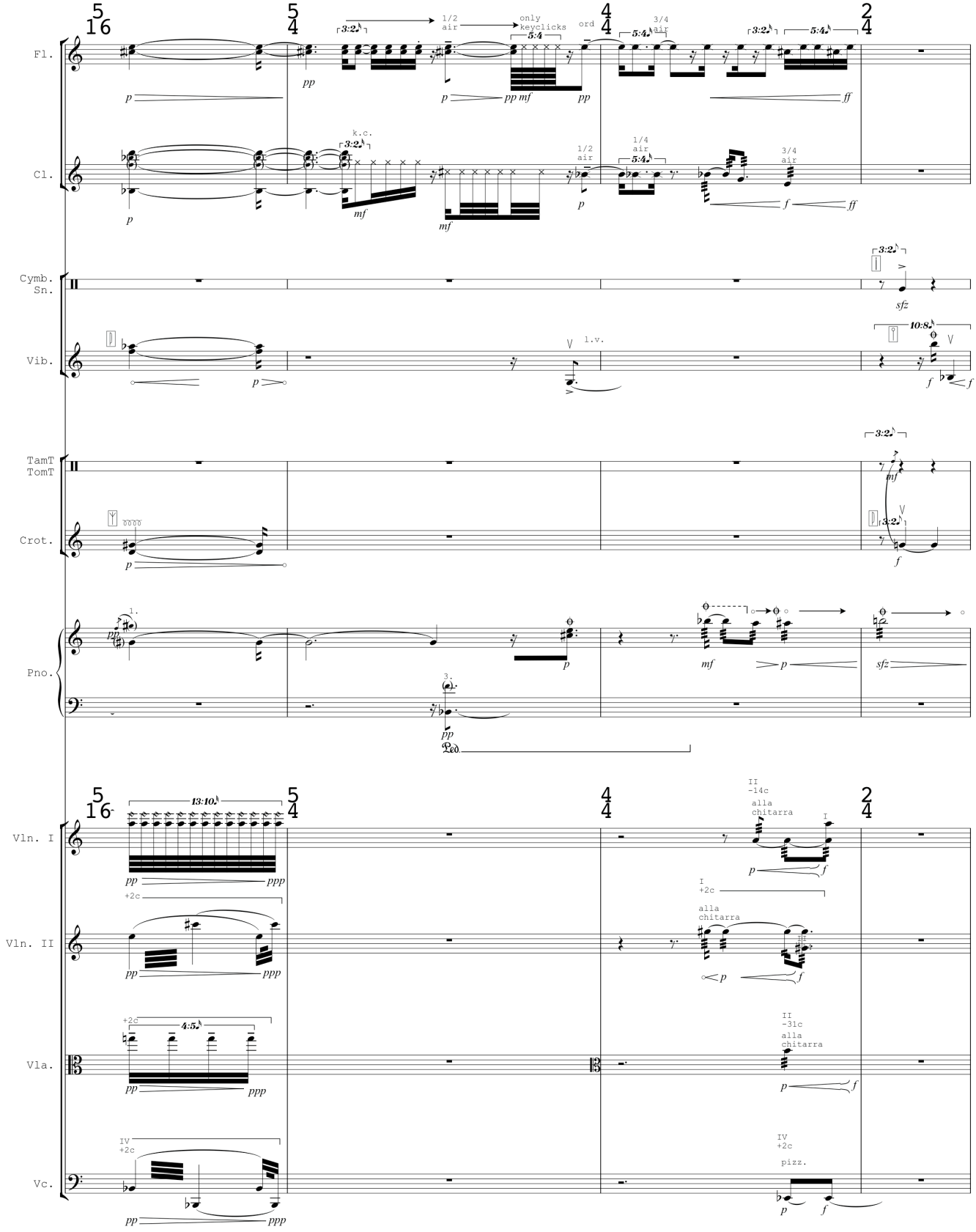
WAGNER


Fl.
Cl.
Cymb.
Sn.
Vib.
TamT
TomT
Crot.
Pno.
Vln. I
Vln. II
Vla.
Vc.
4/4
5/8
k.c.
1. l.v.
2. l.v.
jeté
gliss.
legno tratto
ff sempre

LISZT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Cl.
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Vib.
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TomT
Crot.
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1/4 air
k.c.
l.v.
alla chitarra
pizz.

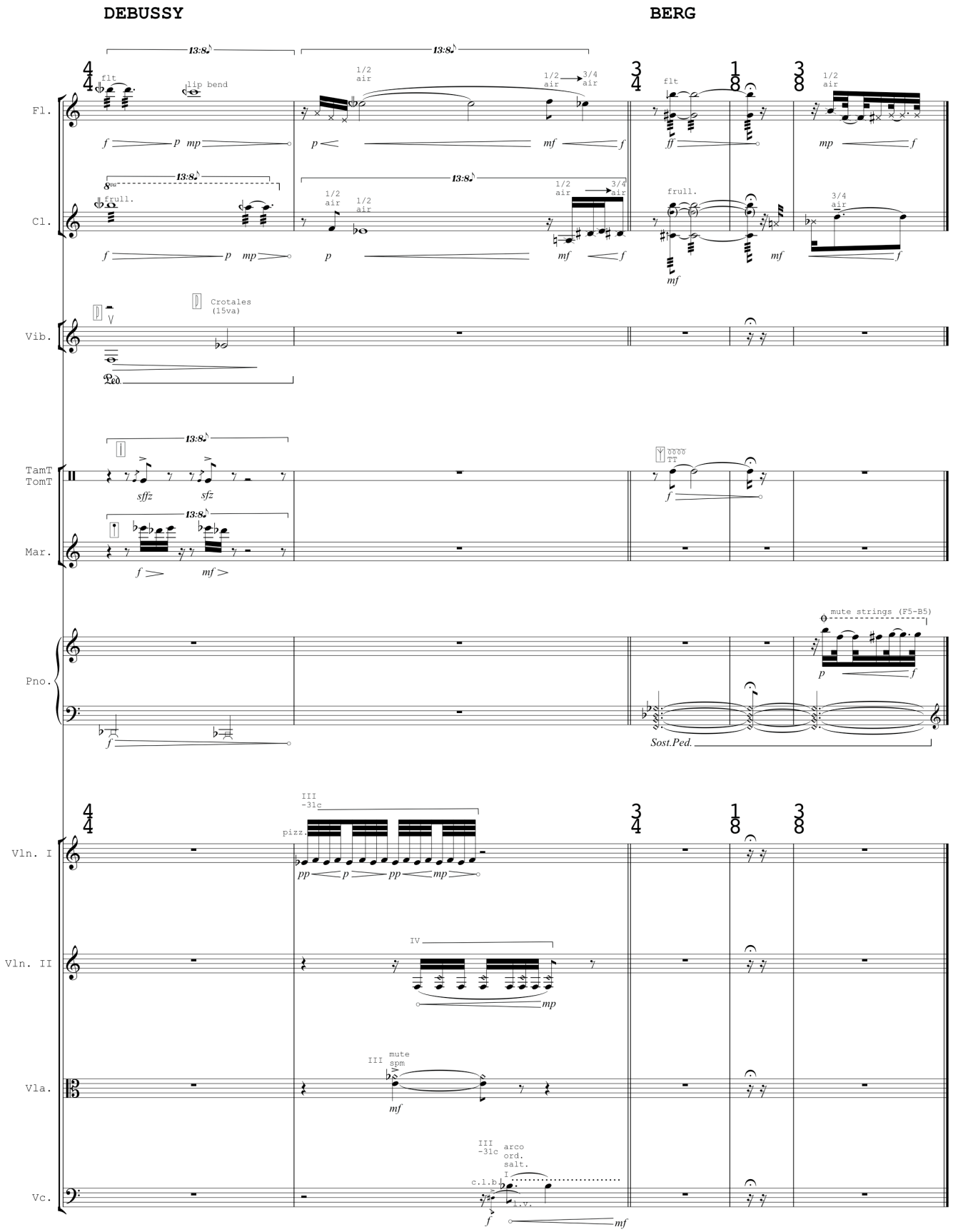

Figure 67 - Brosin: Seven Models of #ffffff (Score in C)

For the couplets, on the other hand, I composed an extremely "slowed down" progressive melodic development that I then divided into four parts. Due to the characteristic nature of this very sparse section, the couplet sections could actually be perceived as varied repetitions of one single theme, particularly in contrast to the decidedly differentiated nature of the *model* themes.

As a consequence, the traditional relationship between refrain and couplets was both maintained and inverted in my rondo form. The following illustration portrays the cyclical material tendency of the refrain *models* as opposed to the linear material tendency of the couplets.

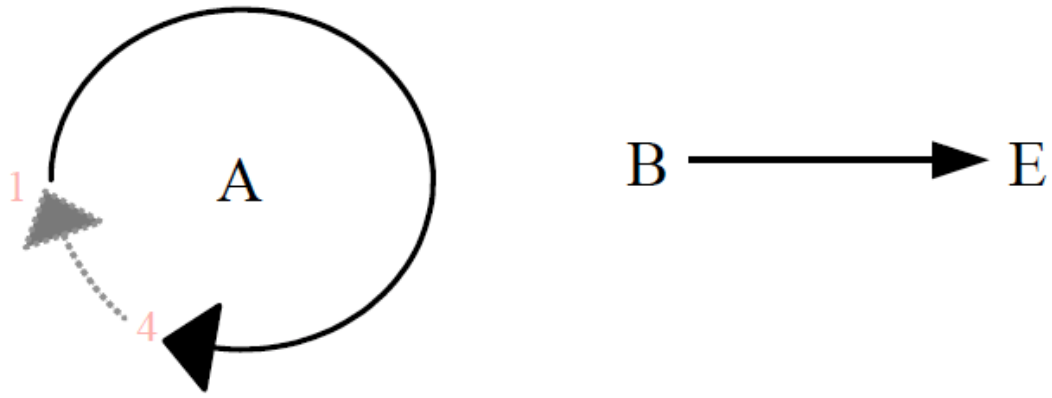

Figure 68 - Cyclical Material Tendency of the Refrains (left) and Linear Material Tendency in the Couplets (right) in #ffffff

As will be explained, refrain material A comprises interpretations (models) of all seven resource pieces which are distributed within four distinct refrain sections. Couplets B through E are four parts of one extremely slow, linear process.

With regards to the micro-structural concepts of the models, it is important to note that my understanding of temporal perception via memory was critical. As was described in the second chapter, this understanding indicates that historical continuity (a perceived present) is every so often interrupted by change, which then allows for the perception of the past (before the change) as opposed to the present (after the change).

I thought of a simple sequence of events that could represent this concept, entailing the following three entities: 1) buildup, 2) impulse, 3) decay

It seemed intriguing to me that varying the sequential order of the three entities could lead to an interesting shift; i.e. orders of decay-impulse-buildup or decay-buildup-impulse don't reflect the same causality as buildup-impulse-decay. I realized that, as a result, each of these entities can be perceived in direct or indirect relation to each other, depending on their sequence. I went ahead and rotated the order, following the idea of cyclicity, and implemented the seven different sequences as formal layouts of my models.

In addition, aspects of unclarity and clarity – regarding sound production and pitch stability – were put into another framework of rotation, implying various degrees between the two extremes. Transitional phases between noise and pitch were considered as similarly cyclical aspects within the *models'* material (see fig. 69).

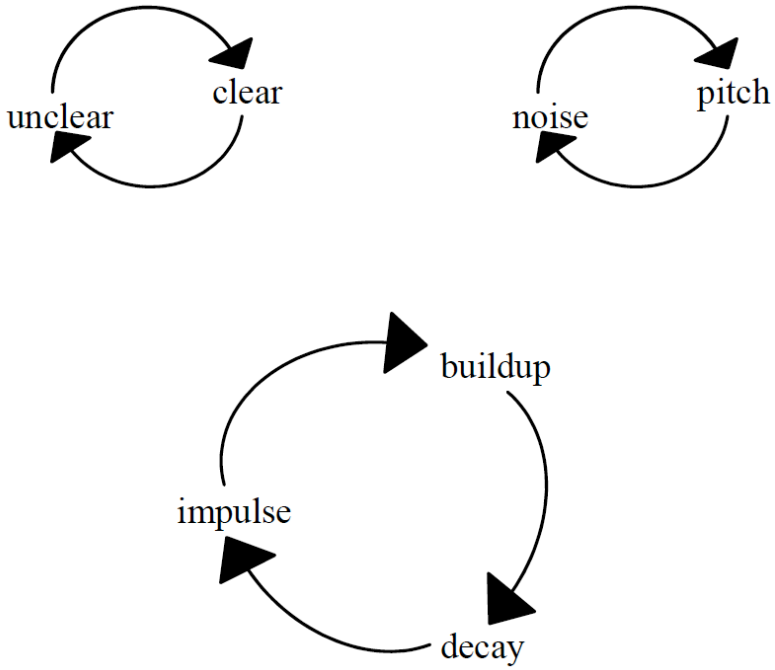

Figure 69 - Cyclical Transitions between Clarity-Unclarity, Noise-Pitch, Impulse-Buildup-Decay in the Models of #ffffff

In various ways, the idea of cyclicality is manifested in the *models,* determining instrumentation, pitch-related clarity, noise-related unclarity, and formal procedure. As the next figure (fig. 70) shows, the transition from Unclear-Clear-Unclear serves to connect all *models* on a macro-formal level.

	Beethoven	Schumann	Chopin	Wagner	Liszt	Débussy	Berg
Formal idea	**UNCLEAR (Decay)**			**CLEAR**			**UNCLEAR (Buildup)**
	Noise	Rhythmic granules- **Impulse-** Noise	Rhythmic granules- **Impulse-** Noise	Rhythmic granules- **IMPULSE** (TC)	Noise- Rhythmic granules- **Impulse**	Noise- Rhythmic granules	Noise- Rhythmic granules

Figure 70 - Table: Integration of Cyclicality in the Forms of Each Model of #ffffff

	Beethoven	Schumann	Chopin	Wagner	Liszt	Débussy	Berg
Woodwinds			Rhythmic Noise Granules; Pitched Noise	Rhythmic granules; **Impulse**	Noisy decay; Rhythmic granules	Noisy Decay; Buildup: Noise and Rhythmic Granules	Noisy Decay; Buildup: Noise and Rhythmic Granules
Unpitched Percussion	Noise	Rhythmic Noise Granules; **Impulse;** Noise	Rhythmic Noise Granules; **Impulse**	Rhythmic granules; **Impulse**	**Impulse**	Decay (Granules)	Decay (Noise)
Pitched Percussion		Pitches	Pitched Noise	Rhythmic granule (one); **Impulse**	Noisy decay; Rhythmic granule (one); **Impulse**	Decay Decay	
Piano	Pitched Noise (scratched String)	**Impulse;** Pitched Noise	**Impulse**	Rhythmic granules; **Impulse (Melodic)**	Noisy decay; Rhythmic granules; **Impulse**	Noisy Decay	Melodic Buildup (related to Wagner **Impulse**)
Strings	Pitched Noise (overpressed)	Rhythmic Noise granules; Pitched Noise (overpressed)	Rhythmic granules; Pitches	Rhythmic granules; **Impulse**	Noisy decay; Rhythmic granules (end)	Rhythmic Granules Buildup	

Figure 71 - Cyclicality Expressed in Instrumentation, Articulation, and Playing Technique in the Models of #ffffff

In the couplets, I approached the intervallic structure of the TC melodically – i.e. as a sequence rather than as a simultaneous occurrence of all pitches. Accordingly, each couplet section revolves around one of the TC pitches: F-B-D#-G#. Furthermore, I regarded each of the four pitches as individual leading tones towards pitches E and A – two of the possible resolutions of the TC and prominent harmonic fields in Wagner's *Tristan*, as suggested in the various scholarly analyses.[883] I interpreted F and D# as

[883] Nattiez lists different functional analyses of the chord. For example, the TC can be interpreted as a subdominant chord in the key of A, requiring a transformation of the D# to D natural, and G# to A, which results in a D minor chord in first inversion. In retaining the D#, the chord becomes an augmented sixth chord as a derivation of D minor. Nattiez refers to the analyses of Max Arend, Hugo Riemann, Alfred Lorenz, Vincent d'Indy, and Célestin Deliège (Nattiez, *Music and Discourse*, 223-224). Nattiez discusses another interpretation, favoured by Emil Ergo, Ernst Kurth and Hugo Distler, which suggests B as the root of the TC. Here, the TC serves as secondary dominant – V of E7 (ibid., 225). Lastly, Nattiez refers to Richard Goldman, who proposed that the TC represents the second scale degree of A as a French sixth chord (F-A-D#-B). Goldman justifies this in maintaining that 'the IV chord is actually, in the simplest mechanism of diatonic relationships, at the greatest distance from I. In terms of the circle of fifths, it leads

tensions towards E, and the pitches B and G# as leading to A. The four couplets present a gradual, microtonal movement towards the individual TC pitches. This means that couplet B exhibits a *becoming* of pitch F, couplet C entails a *becoming* of pitch Eb. Couplet D then introduces the *becoming* of pitch G#, and B is finally reached in the last couplet E.

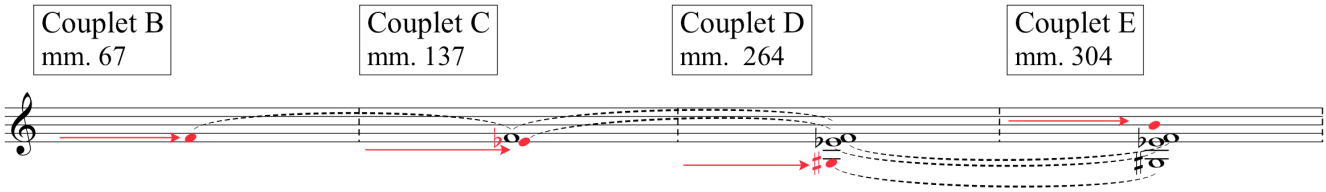

Figure 72 – The Melodic *Becoming* of TC Pitches in the Couplets of #ffffff

Importantly, the four pitches accumulate rather than substitute each other, therefore the couplets' melodic progress means that their harmonic content becomes gradually more complex: the Tristan chord *becomes* over the course of four couplets, melodically and harmonically.

The decision to begin the melodic *becoming* of the TC on pitch F and to end it on B reflects the large-scale form of Wagner's piece: the F constitutes the foundation of the first TC in *Tristan* while the dramatic ending of the opera finally resolves in a brilliant B major. Furthermore, only three bars before this final B major, the last TC is heard in its original constellation (F-B-D#-G#) – except for the fact that the B is now in the bass. The figure below describes the final form of the piece's rondo.

away from I, rather than toward it.' Richard Goldman, *Harmony in Western Music*. (New York: WW Norton & Co., 1965), 68, as quoted in Nattiez, *Music and Discourse*, 225.

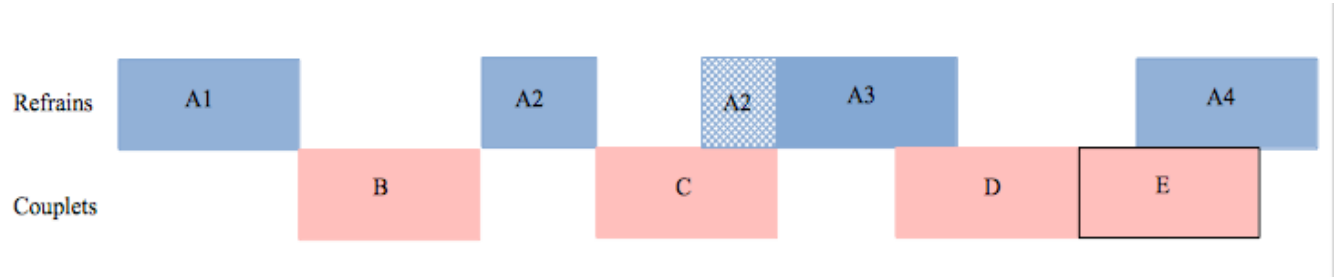

Figure 73 - Sections of #ffffff's Rondo Form

As one can see in the scheme, the rondo form is modified in additional ways. For example, couplet C begins before the end of refrain A2. The ending of A2 is only played at the end of couplet C, and then connects immediately to A3. Couplet D overlaps with the ending of refrain A3 and immediately connects to the last couplet E, which then overlaps with the final refrain A4.

For the structuring of aspects such as form, durations of sections, tempi, pitches, I used various aspects of the Fibonacci series. Importantly, I employed the numbers in sequence (as addition) and in ratios of successive numbers of the sequence (as division). This way, the idea of linearity is represented by the series itself, while the concept of verticality is described by the arithmetic operation of division of one number of the series with its predecessor, through which the quotient progressively approximates the golden ratio (i.e. ~1.618, or inversely ~0.618). The following schemes illustrate this:

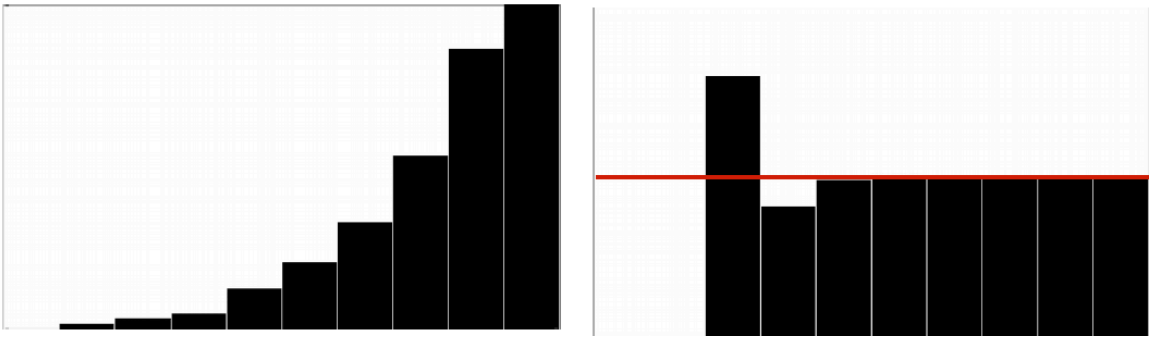

Figure 74 - Fibonacci Numbers in Addition (left) and in Proportional relationship (right)

The fibonacci series as a *recurrence sequence* presents linearity, while the ratios of neighbouring fibonacci numbers present a cyclic image, as the *fibonacci spiral* approximates the golden spiral (see fig. 75).[884]

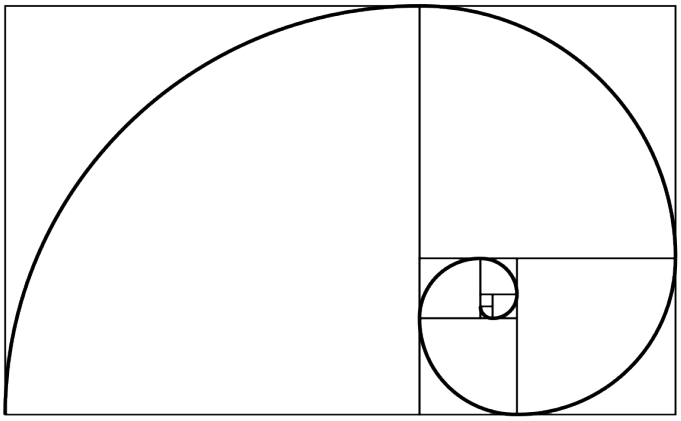

Figure 75 - Golden Spiral (Graph from Wikipedia)

The following numbers were employed in the piece:

Fibonacci Sequence	Ratio of Fn/F(n+1)	Inverse Ratio of F(n+1)/Fn
0	0	-
1	0.5	2
2	0.667	1.5
3	0.6	1.667
5	0.625	1.6
8	0.615	1.625
13	0.619	1.615
21	0.617	1.619
34	(0.618)	1.617
(55)	(0.618)	(1.618)

Figure 76 - Table: Fibonacci Numbers Employed in #ffffff

I applied the proportional characteristics of the fibonacci series to the durations of my models. The first (*Beethoven*) *model* has a duration of 7.5 seconds, consisting of one 5/4 bar at tempo quarter = 40. The other *models* relate as follows:

Schumann, as 3/2 of *Beethoven* has a duration of 11.25 seconds; *Chopin* relates to *Schuman*n at a ratio of 5/3 and therefore takes 18.75 seconds. The *Wagner model* was considered as a central theme and has the longest duration with 30 seconds, and a

[884] For more on this, refer to Keith Ball's eighth chapter "Fibonacci's Rabbits Revisited" in Keith Ball, *Strange Curves, Counting Rabbits, and Other Mathematical Explorations*. (Princeton, NJ: Princeton University Press, 2003) 154-187.

relationship of 8/5 with the *Chopin model*. From here on, I used the inversed proportions in order to decrease the length of durations. For example, the *Liszt model* has a duration of 18 seconds, presenting a 3/5 ratio to the *Wagner model*. The durations of the last two *models* were obtained in the same way.[885]

As the figure below shows, the *model* durations follow the motion of a half-cycle, with the duration of the *Wagner model* at its peak:

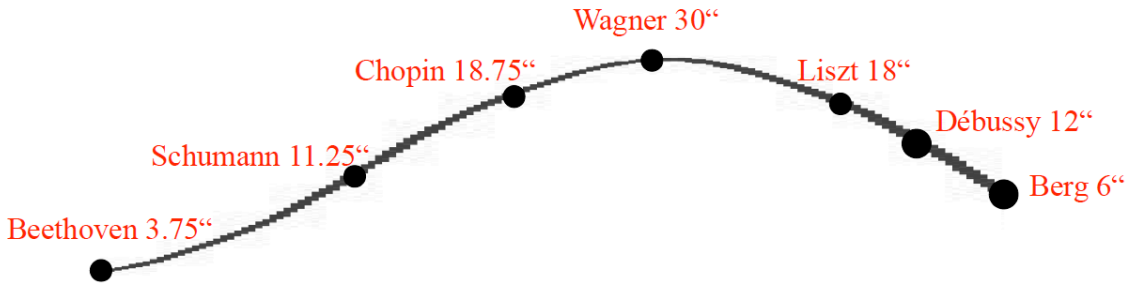

Figure 77 - Durations of Models in #ffffff

The dichotomy between the linear and cyclical aspect of the fibonacci series is reflected in the tempo changes in the composition: the refrains have tempo changes, which follow the proportional (cyclical) characteristics of the series:

A1: quarter = 40 (equivalent to half note = 20; a decelerando leads to eighth = 30 at mm. 20, the tempo from the introduction); A2: quarter = 50, A3: quarter = 80, A4: quarter = 65 (equivalent to eighth =130).

Following the linear sequence of the fibonacci numbers, the tempi of the couplets become steadily faster, beginning at couplet B: quarter = 40, which accelerates to quarter = 45 (+5), then to quarter = 53 (+8) and quarter = 66 (+13). The same pattern is followed by the tempi in couplet C, and D. With the immediate connection into couplet E from couplet D, however, tempo quarter = 66 slows down to quarter = 50 and, as a precursor of the overlapping with refrain A4, adopts the proportional tempo relationships of the refrains. Beginning at mm. 337, when couplet and refrain are overlapping and merging, the tempo relations of both sections merge as well.

[885] Debussy model ~12 seconds (18x2/3), Berg model ~6 seconds (12x1/2).

The fibonacci series also provided the foundation for the construction of tuning systems, with the purpose of reflecting historical depth: with the notion of the TC as a chord with several historical dimensions, I categorized its original occurrence on pitch F as a type of "fundamental" within a harmonic series.

Next, I conceptualized other "fundamental" TC's, of which all seven TC's – of the historical resource pieces – *could* be "partials". The chronological order of the resource pieces is reflected in the succession of the partials, as the following illustration demonstrates.

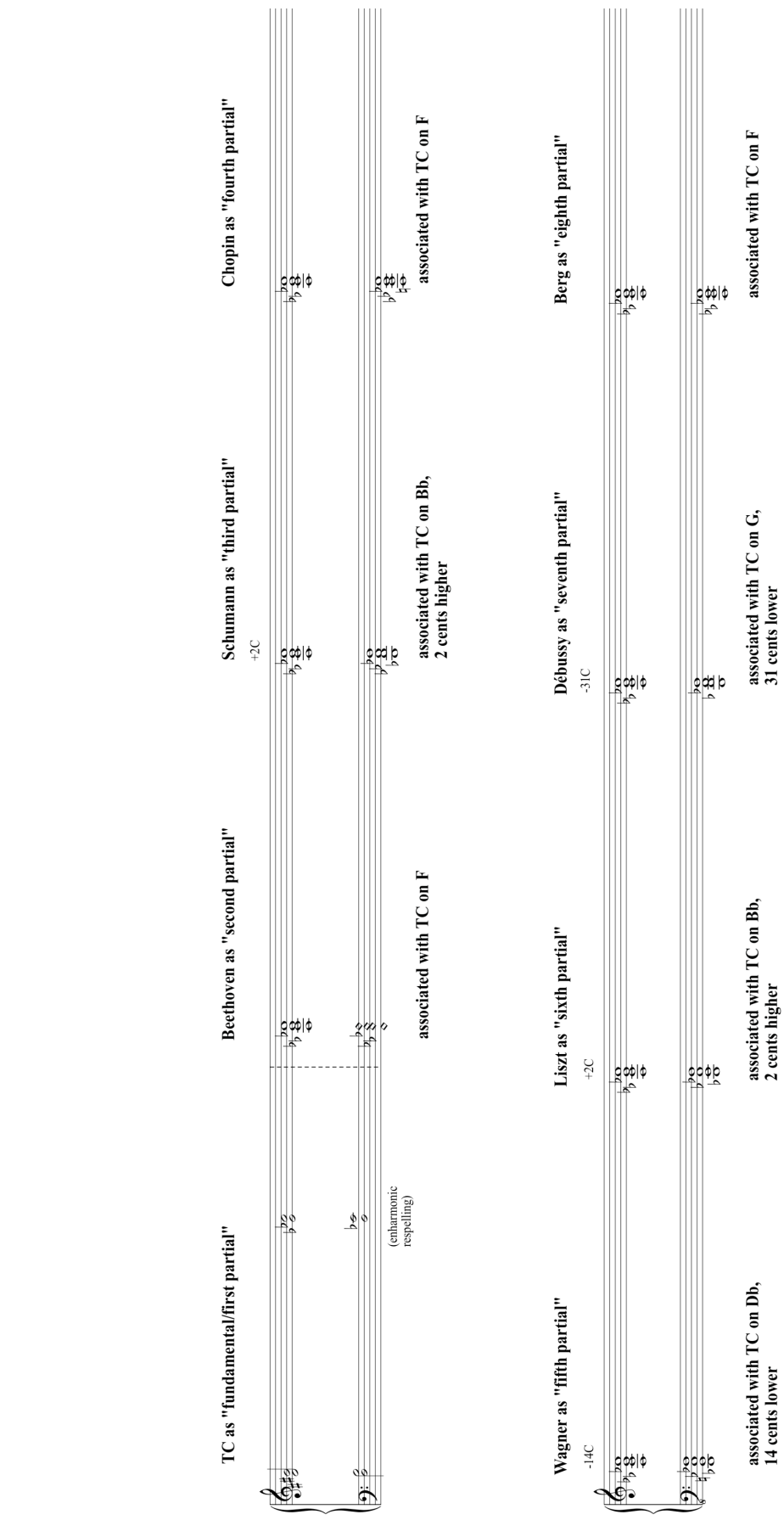

Figure 78 - TC's of Models as Hypothetical Partials of an Imagined Fundamental TC

Each *model* therefore contains the TC in various transpositions and with distinct intonational identities.

Beethoven	Schumann	Chopin	Wagner	Liszt	Débussy	Berg
F-B-D#-G#	Bb-Fb-Ab-Db	F-B-D#-G#	Db-G-Cb-Fb	Bb-E-Ab-Db	G-Db-F-Bb	F-B-D#-G#
	+2C		-14C	+2C	-31C	

Figure 79 - TC's of Models as Transpositions with Intonations Corresponding to Imagined Fundamentals

As explained above, the couplets exhibit a long, linear unfolding of the TC pitches. This occurs primarily between the flute and the clarinet, while pitched percussion instruments and piano emphasize given TC pitches. In addition, this melodic progress through the TC is reflected in each couplet's harmonic field: partials for all four TC pitches were constructed and specific collections derived. These collections are then played by the string quartet and the MIDI piano.[886] The particular collections entail a selection of partials which follows the fibonacci sequence, i.e. involving partials 1, 2, 3, 5, 8, 13, 21, 34 (see fig. 80).

[886]Please note that the following illustrations are based on an enharmonic rewriting of F-B-D#-G#. I will therefore be writing about F-B-Eb-Ab.

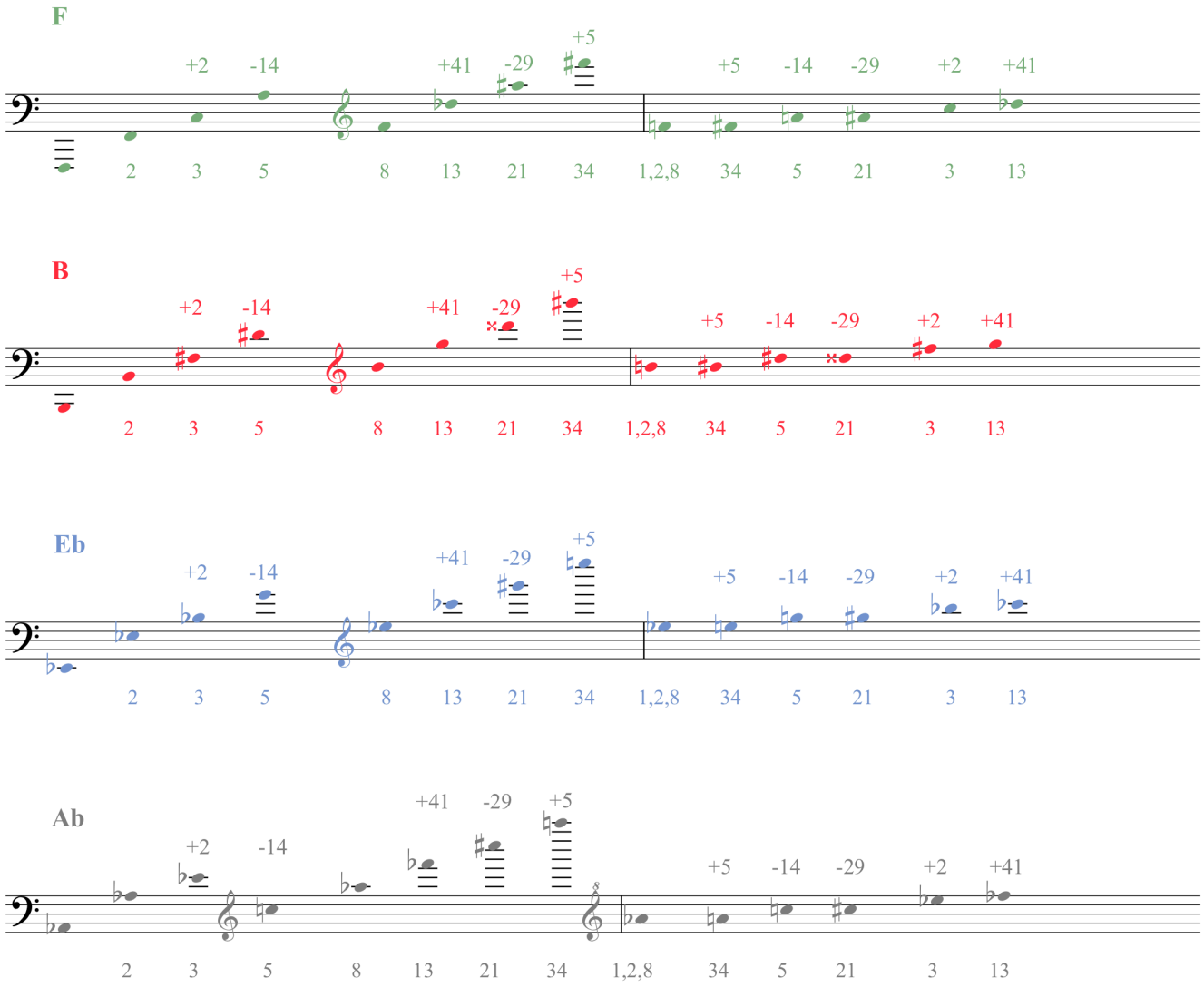

Figure 80 – Partials of TC Pitches According to Fibonacci Sequence Numbers

The final pitch collections are obtained by way of cyclical selection: for example, in order to get the pitch collection of couplet B – which is melodically centred on the TC pitch F – I started at Fibonacci-Partial 3 (FP3):[887] the first pitch of the collection in Couplet B is therefore a C 2 cents higher. From there, I "cycled" through the other FP-series, from F to Eb, to B and to Ab (or G#). In order to get the 34th FP, I "turned around", back to the FPs of B. The first collection of FPs is therefore: C +2C (FP3), G -14C (FP5), G +41C (FP13), C# -29C (FP21), B# +5C (FP34). This pattern is similarly

[887] I wanted to avoid a doubling of the already very prominent "fundamental" F. Hence, FP's 1, 2, 8 are omitted from the pitch collections in the couplets.

applied to the pitch collections for couplets C, D, and E. The following illustration shows the four PC's defining the harmonic fields of the couplets:

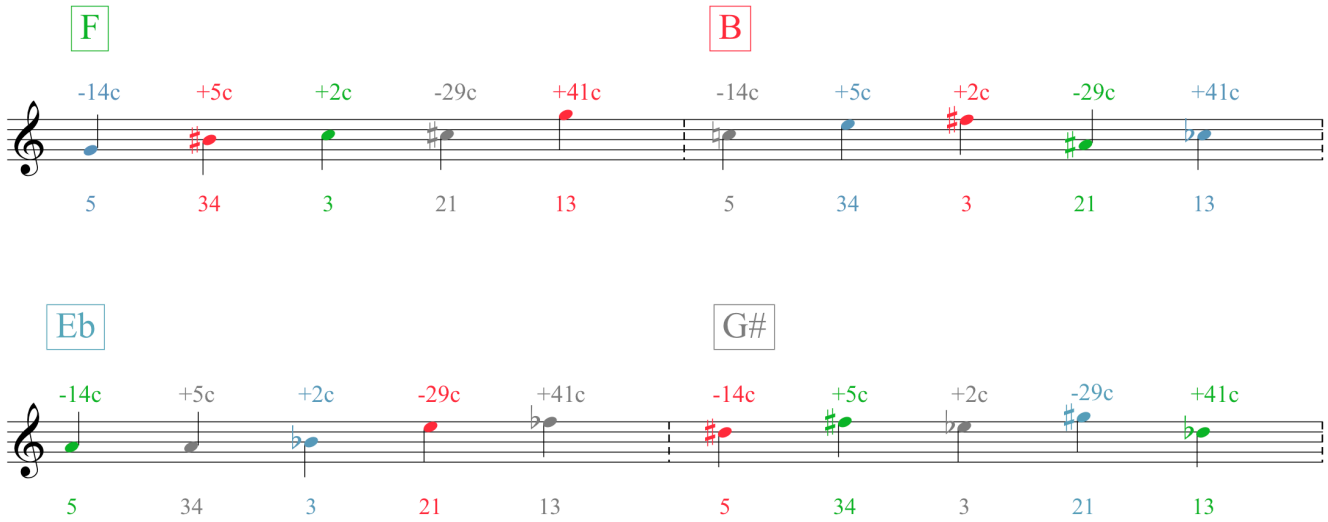

Figure 82 - Pitch Collections of Couplets, Based on "Fibonacci-Partials"

The melodic *becoming* of the Tristan Chord throughout the four couplets is therefore immersed in the harmonic fields created by the pitch collections of the Fibonacci Partials.

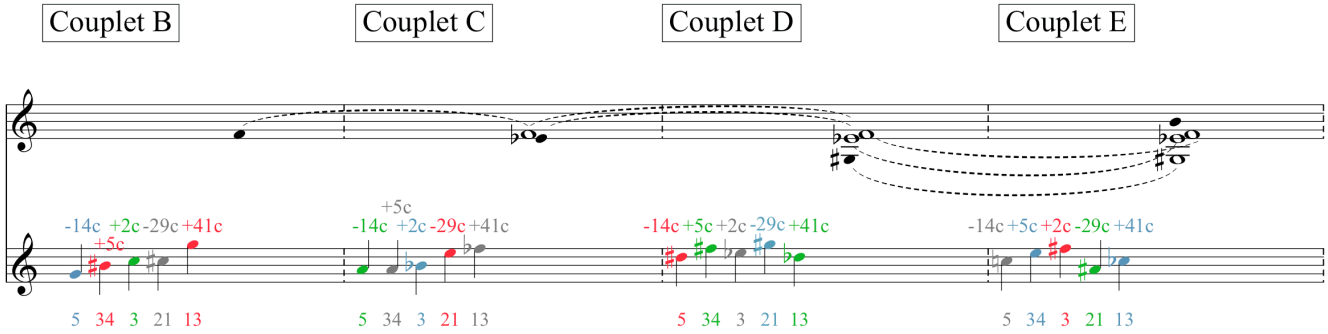

Figure 81 - The Melodic *Becoming* of the Couplet and the Harmonic Fields of "Fibonacci-Partials"

The following score excerpts are taken from the first couplet and show the melodic wavering around TC pitch F and the underlying harmonic field (red note heads).

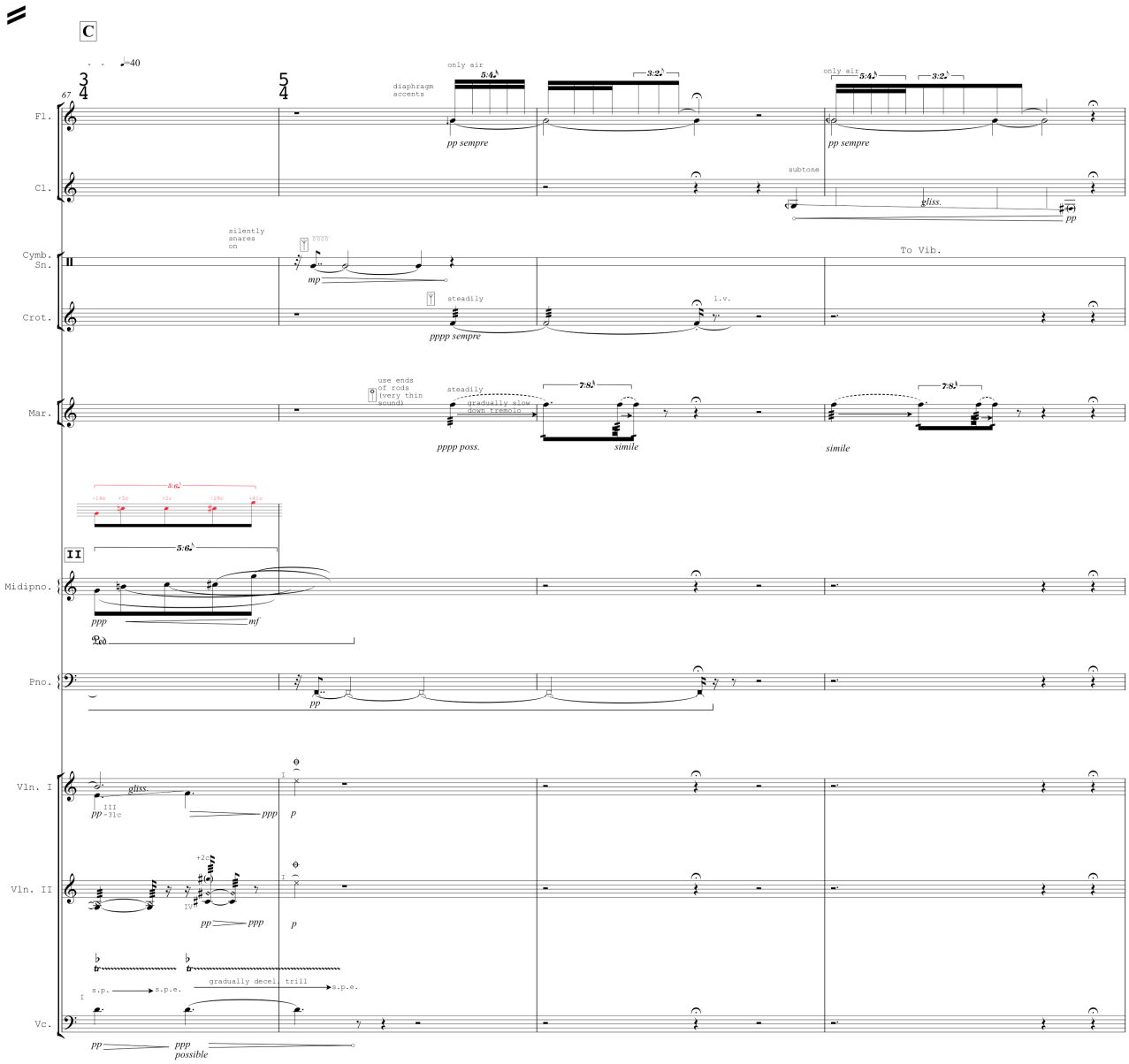

Figure 83 - Brosin: #ffffff (Score, mm. 67-70)

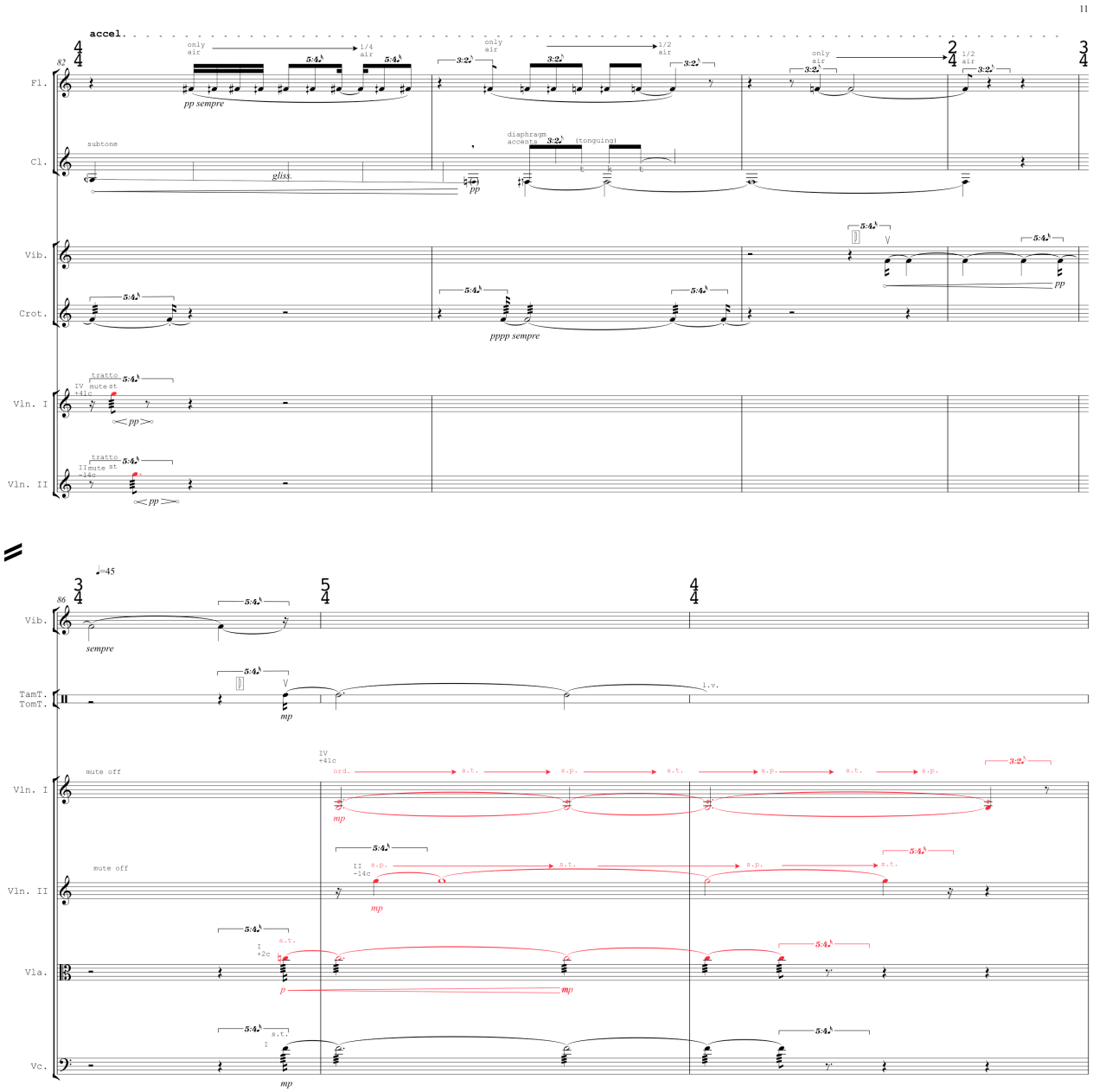

Figure 84 - Brosin: #ffffff (Score, mm. 82-88)

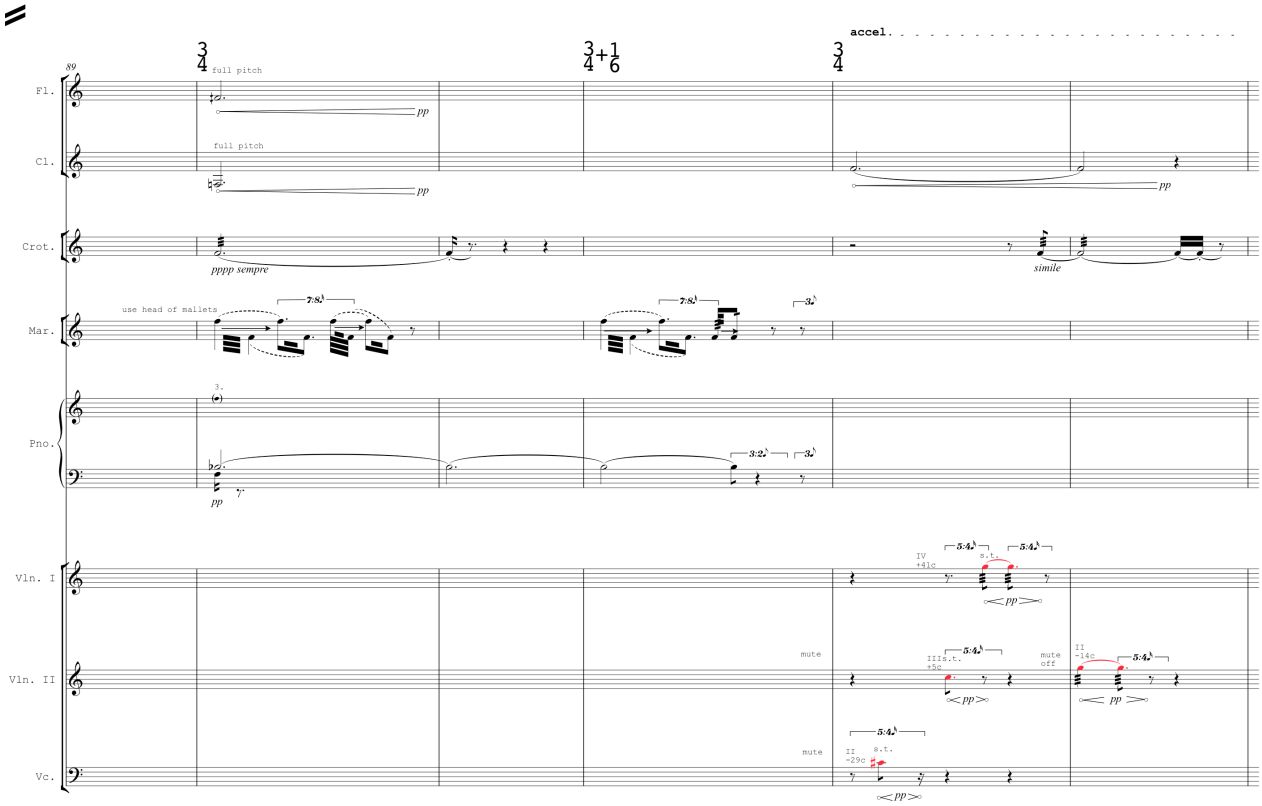

Figure 85 - Brosin: #ffffff (Score, mm. 89-94)

The specific intonations in the strings and piano required modifications of the instruments' tunings. The scordatura of the string quartet is as follows:

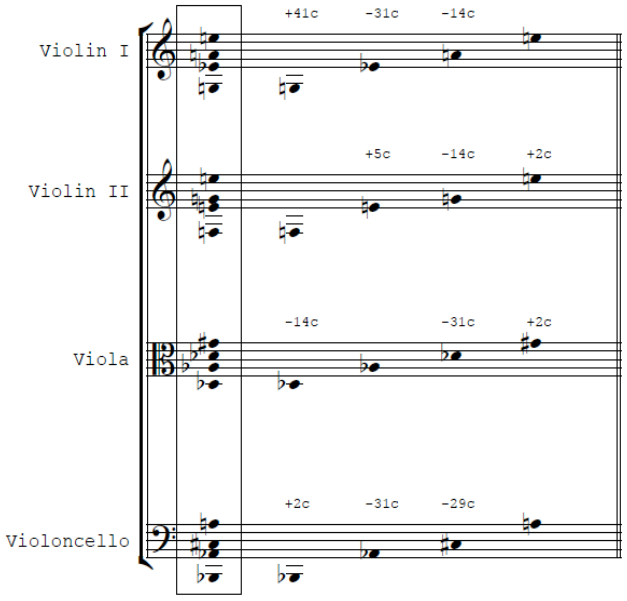

Figure 86 - String Scordatura in #ffffff

The following score example shows the use of the detuned MIDI piano at the beginning of couplet C in which the pitch Eb is exhibited – the upper ossia stave shows the resulting pitches.[888]

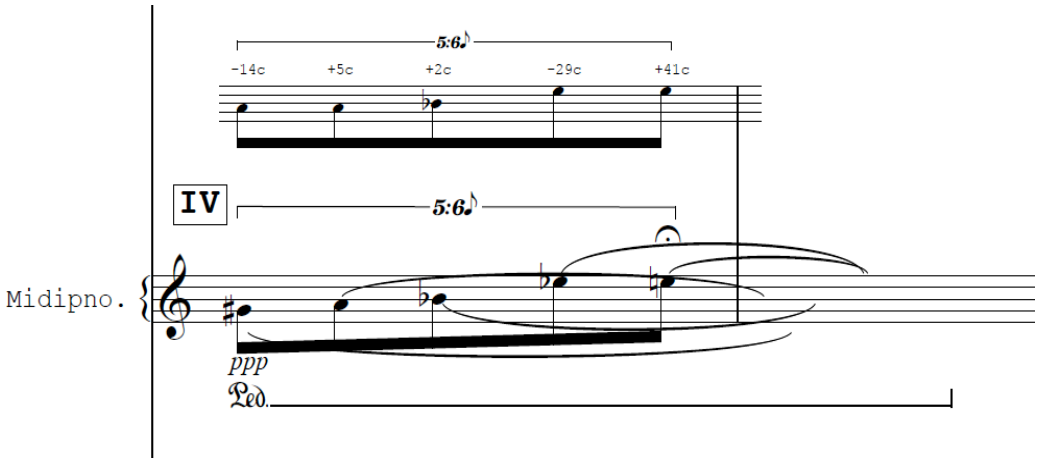

Figure 87 - Detuned MIDI Piano in #ffffff

Embracing the ubiquitous presence of digital technology in contemporary culture, I contemplated compositional methods of integrating the live electronics in a culturally meaningful way. As I had learned through my research, this must entail various possibilities for the emergence of *différance* within which the temporal and social dimension of culture – the "connective structure" – is taken into consideration.[889]

As a primary step, the live electronics should inform a simultaneity of linear and cyclical temporality, in a similar way as the composed musical materials in the score. In addition, the technology itself is understood to entail "dynamic modes"[890] of memory – as was described in the sixth and seventh chapter – and thereby reveals a musical

[888]In the MIDI piano part, boxed roman numerals specify the presets for the software piano. Depending on the preset, pitches are affected as follows:

a) all detuned equally, or

b) detuned as specified in ossia (see example), or

c) constantly randomly detuned within the specified range (in cents).

[889]This entails: 1) contextualization and re-orientation, 2) active participation of the members of the cultural group, 3) circuits for transindividuation, and 4) an inherent two-dimensional temporality [*Zweizeitigkeit*] therefore facilitating both ritualistic (anachronism) aspects and communicative or social interaction (synchronism). This temporality – as has been pointed out – is extended by the "chaotic time" structure which is intrinsic to numeric technics.

[890] See Ernst, "Discontinuities: Does the Archive Become Metaphorical in Multimedia Space?," 139.

performance with an inherently "chaotic time". Specifically, a performance of *#ffffff* requires:

- 2 computers – 1 with Max/MSP for the electronic part, 1 with an application that runs a sampler piano with editable fine tuning options.[891]
- audio interface with 2 inputs, 4 outputs
- 2 omnidirectional microphones installed high above the ground (for AB stereo), in a way that signals from both ensemble and audience are picked up well (as in graphic below).
- 4 speakers which are to be arranged in a quadraphonic setting, surrounding ensemble and audience (as in fig. 88).

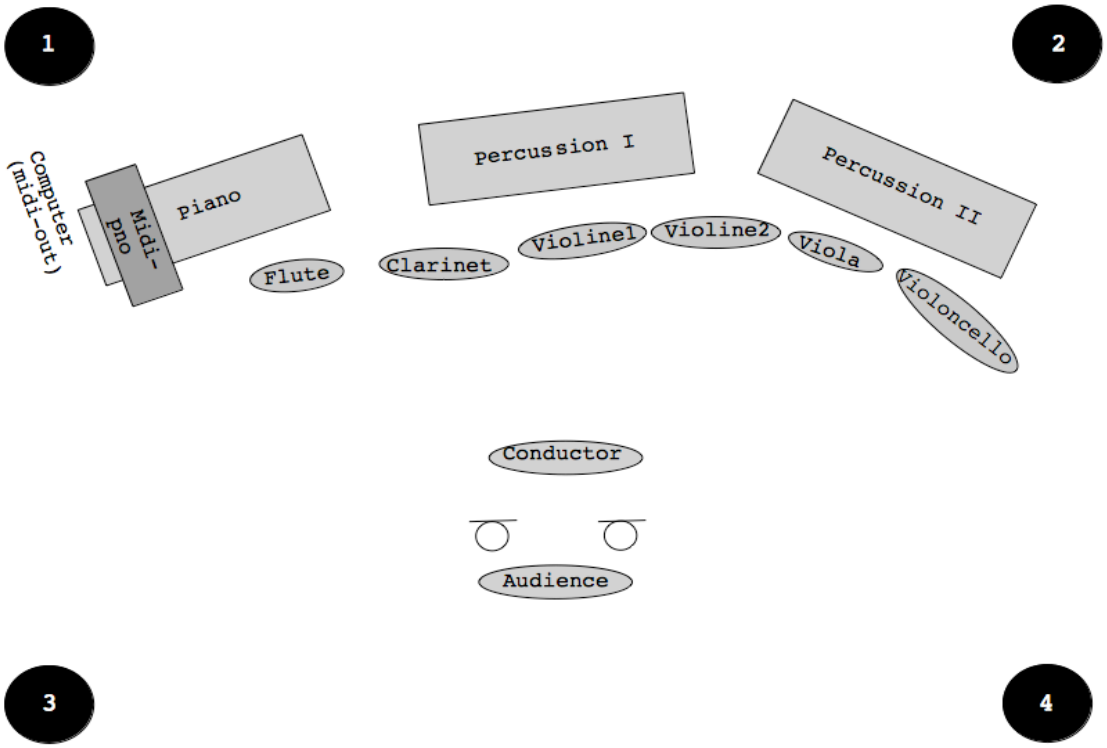

Figure 88 – Stage Plan for #ffffff

[891]A total of twelve presets for the MIDI piano is required:

1) mm. 8 (all pitches -14C), 2) mm. 67 (PC for couplet B), 3) mm. 132 (all pitches +2C), 4) mm. 137 (PC for couplet C), 5) mm. 178 (all pitches -31C), 6) mm. 203 (all pitches -14C), 7) mm. 213 (all pitches randomly -14C), 8) mm. 262 (all pitches -29C), 9) mm. 264 (PC for couplet D), 10) mm. 304 (PC for couplet E), 11) mm. 317 (all pitches randomly -29C), 12) mm. 346 (all pitches randomly -31C).

The premiere of the piece used EXS24 mkII Yamaha Piano, on Logic Pro 8.

With this setup, different modes of digital memory are employed: 1) live sampling (memorizing) of performed sounds, 2) playback (recall) of the live samples as well as prerecorded materials which are a) the recorded samples of all seven *models*[892] and b) recordings of interpretations of the resource pieces.[893]

The distinction between live samples and prerecorded materials corresponds to the differentiation between short-term and long-term memory, which I have discussed in the first two chapters. This way, the interaction between social and cultural memory is reflected in a musical interplay between intratextual and extratextual memory. In the realm of long-term memory, I make a further distinction between prerecorded materials played by the ensemble of the *models* and recordings of the resource pieces which – as I have described – are distilled in the composition of the *models* and also directly quoted in the score of *#ffffff*.[894]

Importantly, the *models* are never fully played in *#ffffff*. Except for the *Wagner model*, the other six *models* are compositionally integrated as fragments throughout the piece. The *models* therefore only "exist fully" in the playback of the digital memory. This reveals a compositional reversal of the relationship between orthothetic reproduction (i.e. archiving) and the subject, as orthothesis presents the "surface of *différance*, an instrumental mirror reflecting time as differentiation, differing, as deferred. Orthography is already a sort of clock to be seen, *après-coup*, in a theoretical and not a photographic light; it calls into question another kind of gaze than that of photography."[895] Temporal

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[892] The seven models are to be recorded, edited, and named (beethoven_m, schumann_m, chopin_m, wagner_m, liszt_m, debussy_m, berg_m) prior to the recital. These samples should then be stored as .aif files (joint stereo) in the same folder as the Max/MSP-patch (provided on CD-Rom) and then loaded into the patch, as instructed in the patch.

[893] These audiofiles (beethoven_all.aif; schumann_all; chopin_all; wagnerB_all; wagnerE_all; liszt_all; debussy_all; berg_all) are already stored in the corresponding folder of the patch on the CD-Rom. Instructions as to how to operate the program are written in the patch. Specifications for each cue are listed on page 6 of the performance notes in the score).

[894] For example, I directly quote from Berg's *Lyrische Suite* in mm. 45-50 in the string quartet. This coincides with a playback of my Berg model and the beginning section of the 6th movement of Berg's piece – the movement in which the Tristan Chord appears. Another direct quotation is used in mm. 182 in the violoncello. The quote is taken from mm.10 of Schumann's first movement of the *Cello Concerto op. 129*, where the solo cello melodically enters (from A into G#) and leaves the TC. This compositionally implemented quotation, I juxtapose with two recordings of Schumann's piece, which are triggered at mm. 176: Pablo Casals' interpretation from 1938 and John Storgårds' interpretation of the violin version, recorded in 1996. The start of the playback of the two recordings is timed so that the occurrence of the TC approximately coincides with the melodic quotation in the live cello.

[895] Stiegler, *Disorientation*, 41-42.

deferral itself, the main point on which Stiegler's critique of real time synthesis is grounded, is re-contextualized by the fact that – with regards to the *models* – live performance suggests a fragmentation of memory through which a musical material that originated within the settings of memory is literally lessened in the present. In a way, the orthothetic archivization of the *model* material becomes a type of beforeness, *avant-coup*.[896]

Within the composed music, the playback – or *recall* of memory – is integrated on various levels. Two different procedures reveal an adaption of the musical form and material by the playback speed of the buffers.

The first method relates to the *models* and distinct sets of intonation and harmonic identities: as described, the *models* are constructed from overtone-based relationships to the TC as fundamental. Particular identities are thereby created with regards to intonational properties.[897] These intonational identities can be adapted by playing back samples at the appropriate factors. In order to play back "in tune", for example, the playback speed would be "1". In order to play back a sample 14 cents lower, the speed needs to be "0.991946". Naturally, the speed factor affects the recording's intonation as well as its overall duration, involving a "collateral" time stretch. In the case of -14C, the sample is slightly slower.[898]

The playback of buffers occurs in a second, different manner through which the aspect of playback speed parallels the idea of Fibonacci-related proportions. As I have explained above, proportions such as 1/2, 5/3, 13/8 etc. inform the overall structure of *#ffffff*. The same proportional numbers are additionally used to control the playback speed

[896] A comparison with Ferneyhough's *Time and Motion Study II* might emphasize this: in Ferneyhough's composition, the cellist's live performance conditions, feeds, and preserves the memory-containers of the tape samples. In his piece, technology is dependent on the performance. In the performance of *#ffffff*, I'd like to propose, it remains unclear what conditions what. Furthermore, it seemed curious to me that the origin of the models exists only in the memories of performers and myself, as opposed to the audience members who were not involved in the recording of the models.

[897] I.e. Both Schumann and Liszt models entail a detuning of +2C, the Wagner model -14C, Debussy -31C, and the others are even-numbered multiples of the "fundamental" and are therefore not "out of tune".

[898] The comprehensive list involves all harmonic-related detunings from the refrains and the couplets. The following proportions are used: +2C=1.001156, -14C=0.991946, -31C=0.982253, +5C=1.002892, -29C=0.983388, -41C=0.976596.

of the pre-recorded materials. Sometimes *accelerandi* or *decelerandi* are generated via transition from one proportional value to another.[899]

There exists an important difference between the slight speed deviations in relationship to harmonic detuning (the greatest deviation here is -41 cents which equals a playback speed of 0.976596) and those playback speeds which are based on Fibonacci proportions such as 21/34 (=0.617). The manipulations of speed in the former case are much less noticeable while frequency-relations alter within the boundaries of what is referred to as microintervallic 'tuning' rather than larger-scale inter-intervallic relations.

Based on the above descriptions, it should be evident that the manipulation of playback speed determines the degree of difference, or *différance*, between sound production and sound reproduction. In the context of *#ffffff's* historical materials, one might say that the electronics control the difference between historical distance and immediacy by means of playback speed, just as the live instruments reveal the piece's inherent historiality via harmony and intonation.

Historical depth is reflected in a different way through the deliberate use of recording *quality*. Quite literally, temporal distance becomes perceptible in the form of the medium's noisiness – the medium's innate sonic characteristic.

As Wolfgang Ernst points out in his article "Toward a Media Archaeology of Sonic Articulations":

> True media archaeology starts here: the phonograph as media artifact preserves not only the memory of cultural semantics but past technical knowledge as well, a kind of frozen media knowledge embodied in engineering and waiting to be revealed by media-archaeological consciousness.[900]

With this in mind, I chose the oldest available recordings of the resource compositions. In this way, the historical resources of the TC become noticeable as

[899]For example, at mm. 102 the Beethoven model is played back at 13/21 and decelerates to 1/2. Specifically, this means that the playback speed slows down from 0.619 to 0.5.

[900] Ernst, "Toward a Media Archaeology of Sonic Articulations," 182.

archival memory – their externalization is revealed and musically integrated into the piece.[901]

Michael Gallope's following statement struck me as relevant:

> It [listening to recorded music] involves merely hearing the end product as human, extending the definition of human music out through the prosthesis of recording, extending the definition of *the music itself*.[902]

From this perspective, the historiality of technical prostheses becomes perceptible in *#ffffff*, as the historical filter of the recording techniques reveals the age of the recordings and thus tinges the musical product performed by the humans. The sound represents the *what* as much as it represents the *who* and another layer of historical distance from the performance's *now* is emphasized.[903] The result is a type of *différante* historiality transindividuated through the musical interplay of analog, mechanical memory and extratextual musical memory – transmitted via digital memory. This reveals a material pre-formation on the foundation of an inherently semiotic intertextuality interlocked with an audible medial intertextuality. The perceptibility of analogue and

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[901] The playbacks of these recordings – individually and in combination – are notated in the score, specifying spatial location and playback speed. These recordings are: Arthur Schnabel's performance of Beethoven op. 31.3 (1932-35). An excerpt is played back in my piece at mm. 58.

Schumann's Cello Concerto op. 129 is played back at mm. 176. I used Pablo Casals' interpretation from 1938 and John Storgårds performance of the violin transcription (1996).

At mm.191, Vladimir Sofronitsky's 1960 recording of Chopin's op. 68.4 is played back. The live pianist of *#ffffff* plays along with the remembered Sofronitsky.

The opening bars of Wagner's *Tristan* are played back at mm. 213. I decided to use a recording of Karl Elmendorff's 1928 interpretation and Artur Bodanzky's from 1936. This decision was made based on the idea to create a technical *différance* between the Wagner sources, the basis of the idea for the piece.

A comparably long excerpt from Liszt's *Ich möchte hingehen* is played back at mm.229-234, using a recording from 1977, with Gundula Janowitz, soprano, and Irwin Gage accompanying.

Interestingly enough, the oldest recording of Debussy's *Golliwogg's Cakewalk* was in fact a recording made of a piano roll on which Debussy himself plays piano (Welte-Mignon Piano Roll #2733, 1913). Excerpts are used at mm.178.

Finally, the 1935 recording of Berg's *Lyrische Suite*, performed by the Galimir Quartet, is played back at mm.47.

At mm. 213, all these recordings are played back simultaneously.

[902] Gallope, "Heidegger, Stiegler, and the Questions of Musical Technics," 10.

[903] In a way, these old recordings could be seen as what Deleuze called "those cases in which the actual is surrounded by increasingly extensive, remote and diverse virtualities: a particle creates ephemera, a perception evokes memories." Deleuze, "The Actual and the Virtual," 150.

numeric technics at play – mechanical and digital technologies – has cultural significance which becomes clear when Ernst states:

> The phonograph as media artifact not only carries cultural meanings like words and music but is at the same time an archive of cultural engineering by its very material fabrication – a kind of frozen media knowledge […]. The microphysical close reading of sound, where the materiality of the recording medium itself becomes poetical, dissolves any semantically meaningful archival unit into discrete blocks of signals. […] Let us investigate the notion of the cultural sonosphere. In a free interpretation of McLuhan, to listen media-archaeologically is to pay attention to the electronic message of the acoustic apparatus, not primarily to its musical content as cultural meaning. [...] Here the medium talks on the level of both enunciation and reference. What do we hear: message (the formerly recorded songs) or noise (the wax cylinder scratch and groove)?[904]

The historically multi-dimensional TC "is immersed in noise" in *#ffffff*, similar to "the body is immersed in noise"[905] in Billone's music. As the sound of the medium, one might say that technology *becomes* music in a similar way as noise *becomes* music. This way, the conventional perception of both reproduced music and the transmitting medium is re-contextualized via *différance*.

Another moment of *différance* is generated by the employment of live samples – the digital short-term memory. This "chaotic storage method" is integrated within the linear perception of time as the piece progresses in the following way.

Approximately five minutes before the performance of *#ffffff* begins, a long buffer starts to record. Through an AB stereo system with two omnidirectional microphones, audio signals from both ensemble and audience are recorded. This first buffer ("livesample1") contains the audio content of the time-frame in which the audience is still getting seated in the venue. It also records the ensemble coming up on stage to get seated as well as the first few bars of the music of *#ffffff*, until the end of mm. 4. The second buffer ("livesample2") records from the end of the first buffer until the end of

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[904] Ernst, "Media Archaeography: Method and Machine versus the History and Narrative of Media," 60, 68-69.

[905] Iddon, "Siren Songs: Channels, Bodies, Noise," 85.

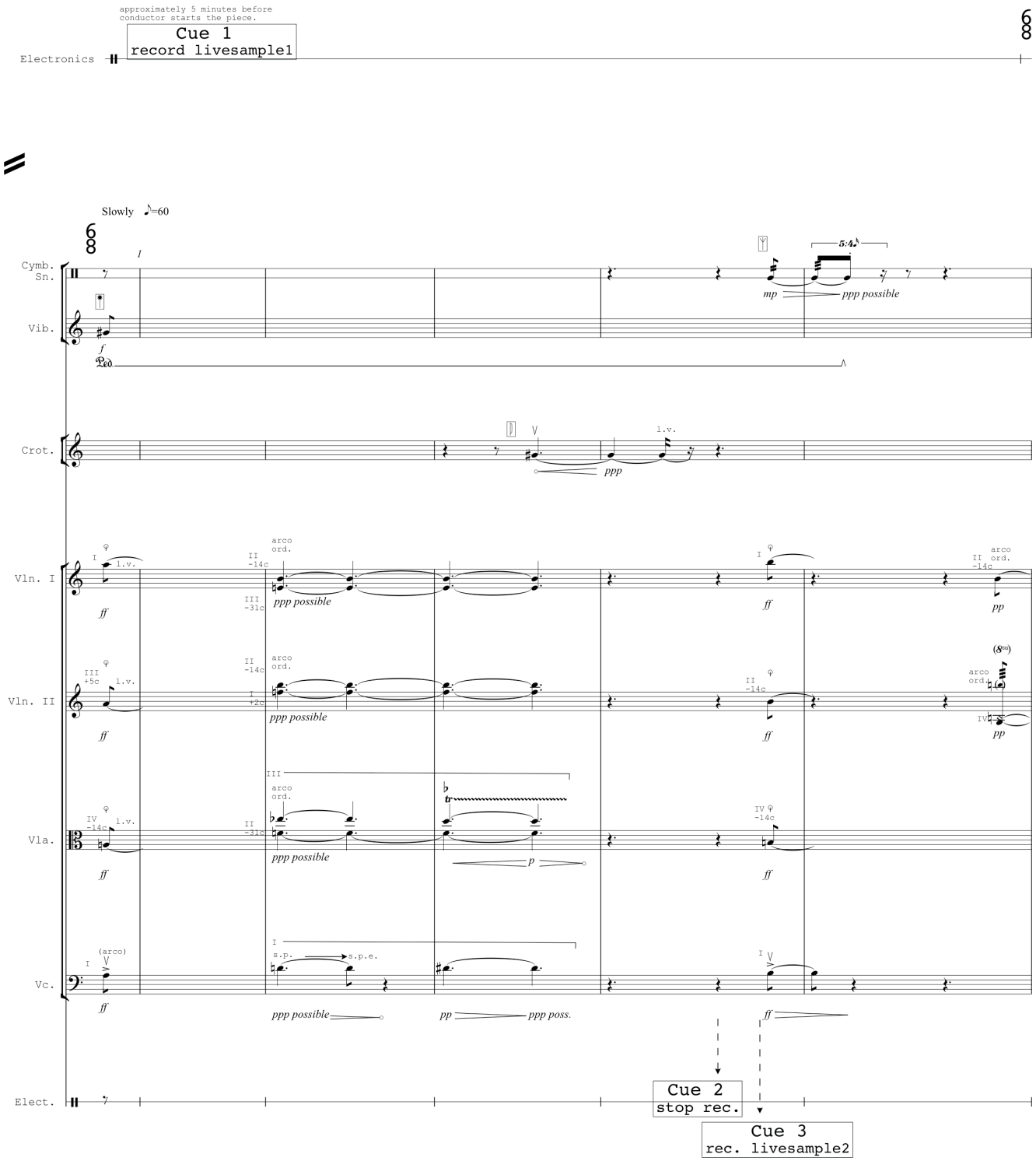
mm. 8 and is then relieved by the third buffer ("livesample3), which records until the end of mm. 19.

The three buffers therefore record the time before the music starts and the introduction of the piece. They are played back in reorganized sequence: at mm. 134 the middle sample ("livesample2") is played back, connecting the second refrain A2 with the second couplet at the regular speed. As the playback sounds from the rear speaker pair, however, the spatial separation between *remembered* ensemble and *present* ensemble might prevent a unified perception of the two sound sources.

The next entry of the live-sampled buffer occurs at mm. 207 (see fig. 90), also at the original speed. At this point, the pianist plays an altered version of Chopin's *Mazurka* with both hands on two different keyboards and at different intonations. The *denaturalization* of the piano player is mirrored in the playback of "livesample1": the pianist comes to a halt at a fermata in bar 211 on the "natural" Ab of the TC after the other three TC pitches (F-Cb-Eb) resounded 14 cents flat in the MIDI piano, just as "livesample1" gradually fades into the four speakers. The audience members perceive themselves *denaturalized* – immersed in a reproduction of the moments before the music had begun, sounding from all four speakers. The audience's memory of the past becomes the centre of the piece; the perception of #*ffffff*'s *beginning* becomes blurred.

#ffffff

Annette Brosin



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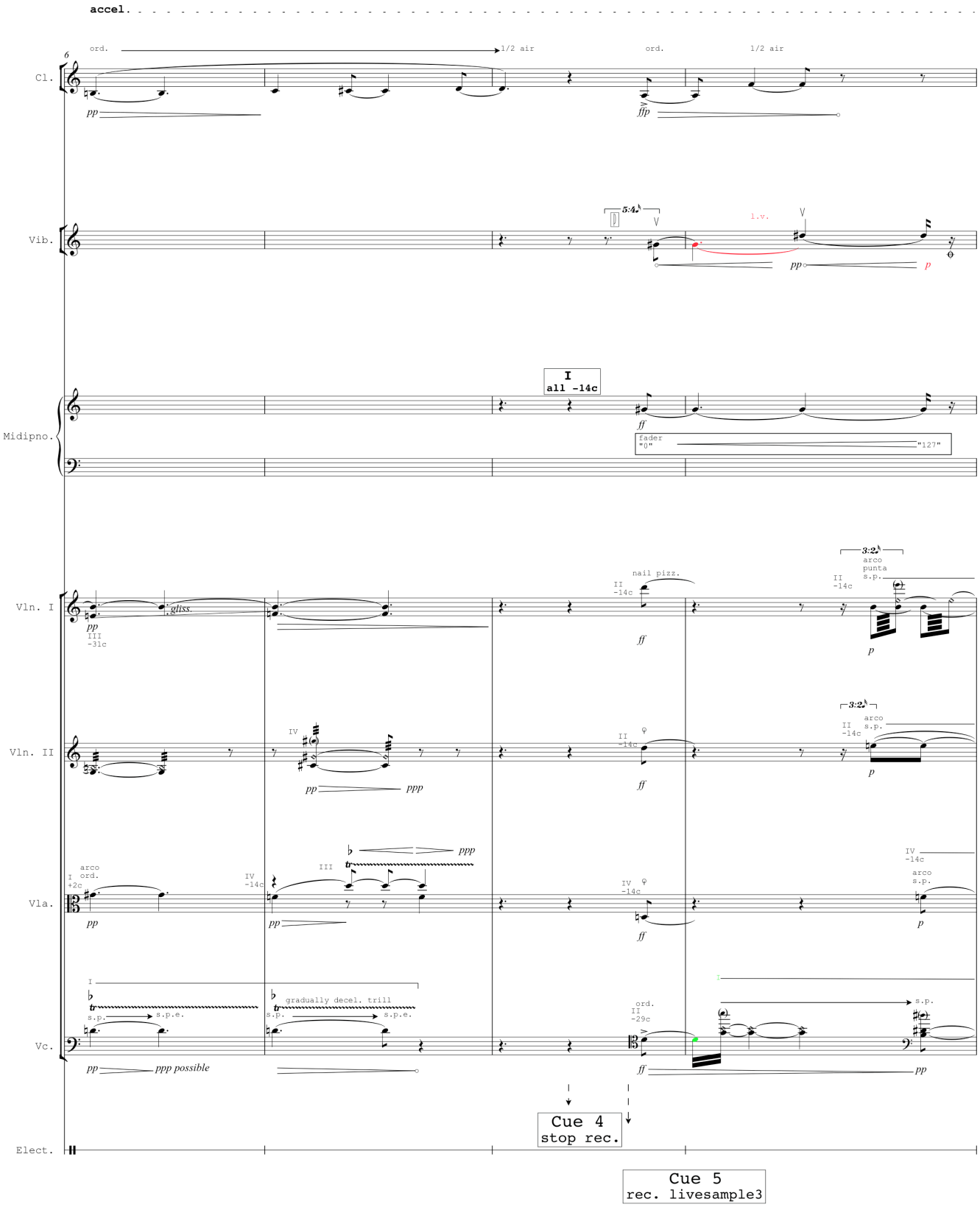
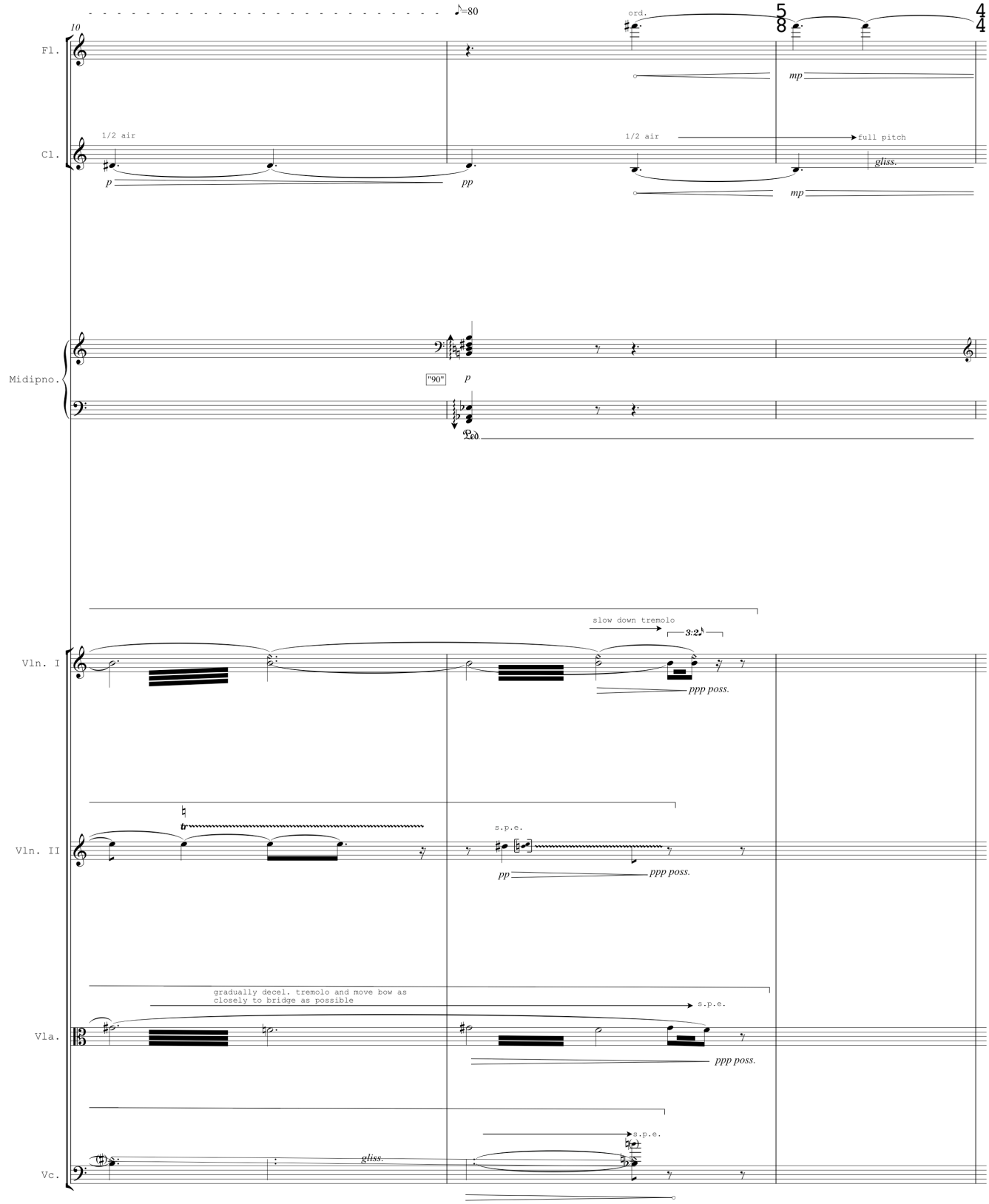
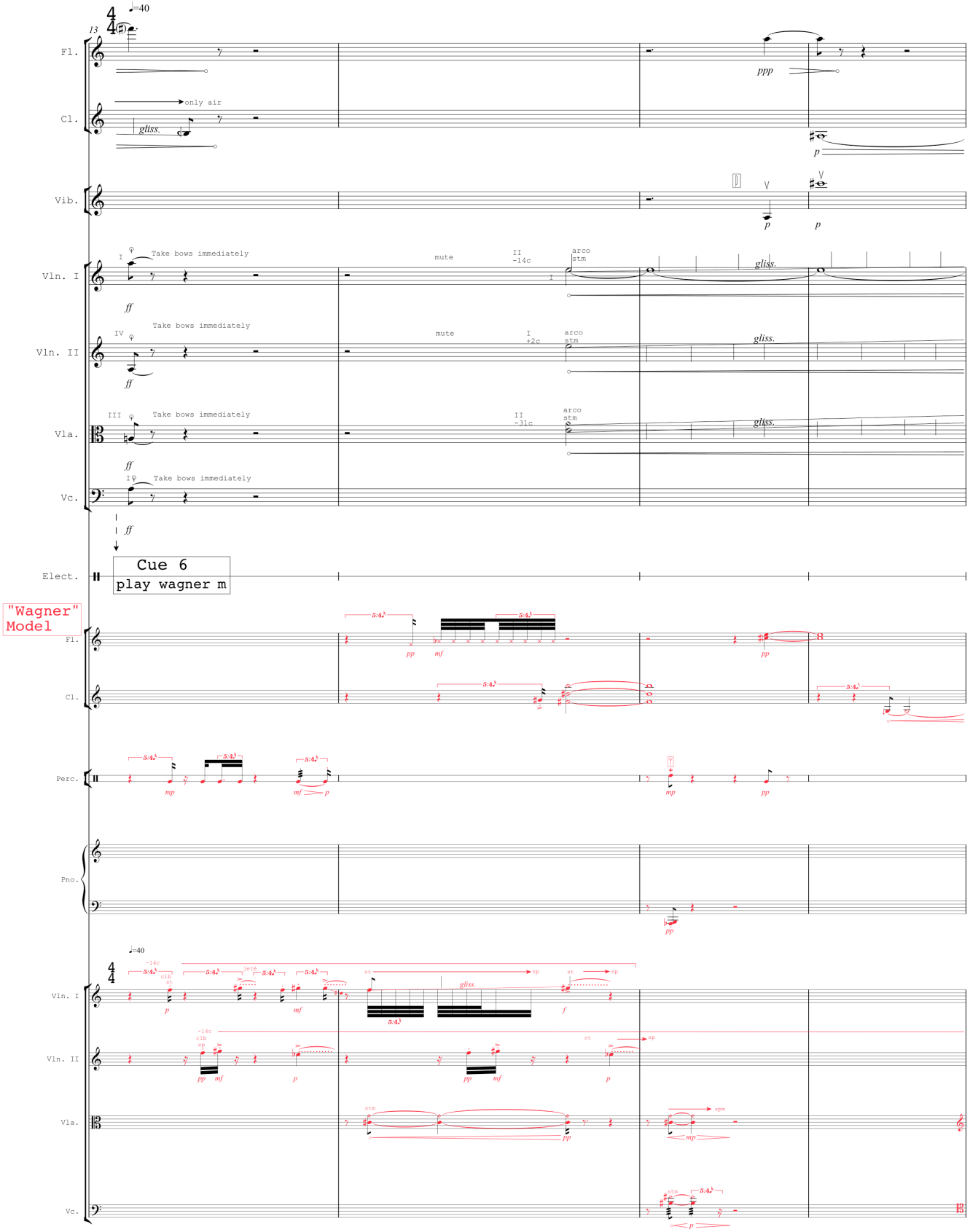

accel.
6
Cl.
ord.
1/2 air
ord.
1/2 air
pp
fffp
Vib.
5:4
l.v.
pp
p
Midipno.
I
all -14c
ff
fader
"0"
"127"
Vln. I
gliss.
pp
III
-31c
nail pizz.
II
-14c
ff
3:2
arco
punta
s.p.
II
-14c
p
Vln. II
IV
pp
ppp
II
-14c
ff
3:2
arco
s.p.
II
-14c
p
Vla.
arco
ord.
I
+2c
pp
IV
-14c
pp
III
ppp
IV
-14c
ff
IV
-14c
arco
s.p.
p
Vc.
I
s.p.
s.p.e.
pp
ppp possible
gradually decel. trill
s.p.
s.p.e.
ord.
II
-29c
ff
I
s.p.
pp
Elect.
Cue 4
stop rec.
Cue 5
rec. livesample3


♪=80
10
Fl.
ord.
5/8
4/4
mp
Cl.
1/2 air
p
pp
1/2 air
full pitch
gliss.
mp
Midipno.
"90"
p
Ped.
Vln. I
slow down tremolo
3:2
ppp poss.
Vln. II
tr
s.p.e.
pp
ppp poss.
Vla.
gradually decel. tremolo and move bow as closely to bridge as possible
s.p.e.
ppp poss.
Vc.
gliss.
s.p.e.

Colla Parte with Wagner Model



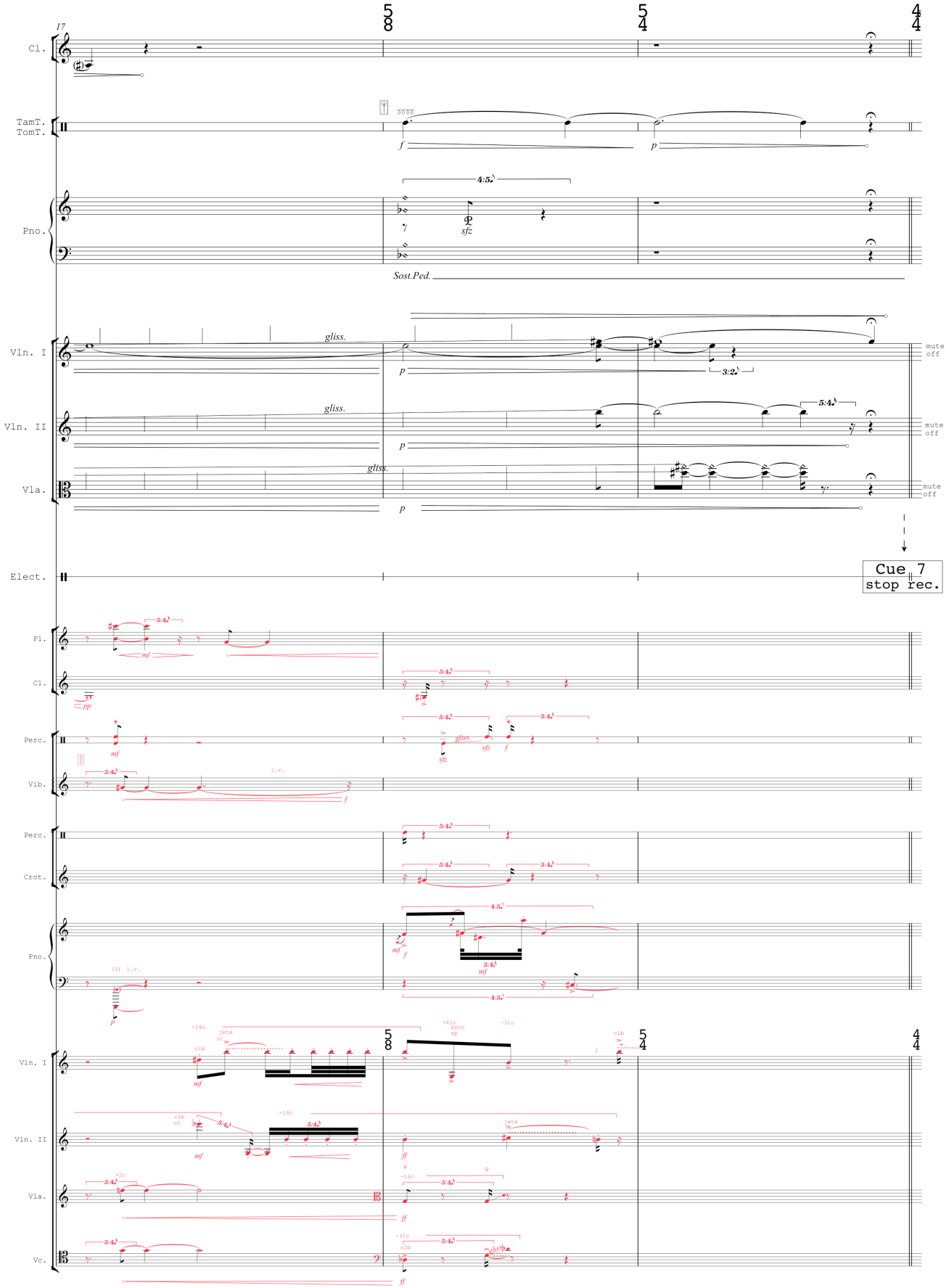


Figure 89 – Brosin: #ffffff, Beginning Section (Score, mm. 1-19)

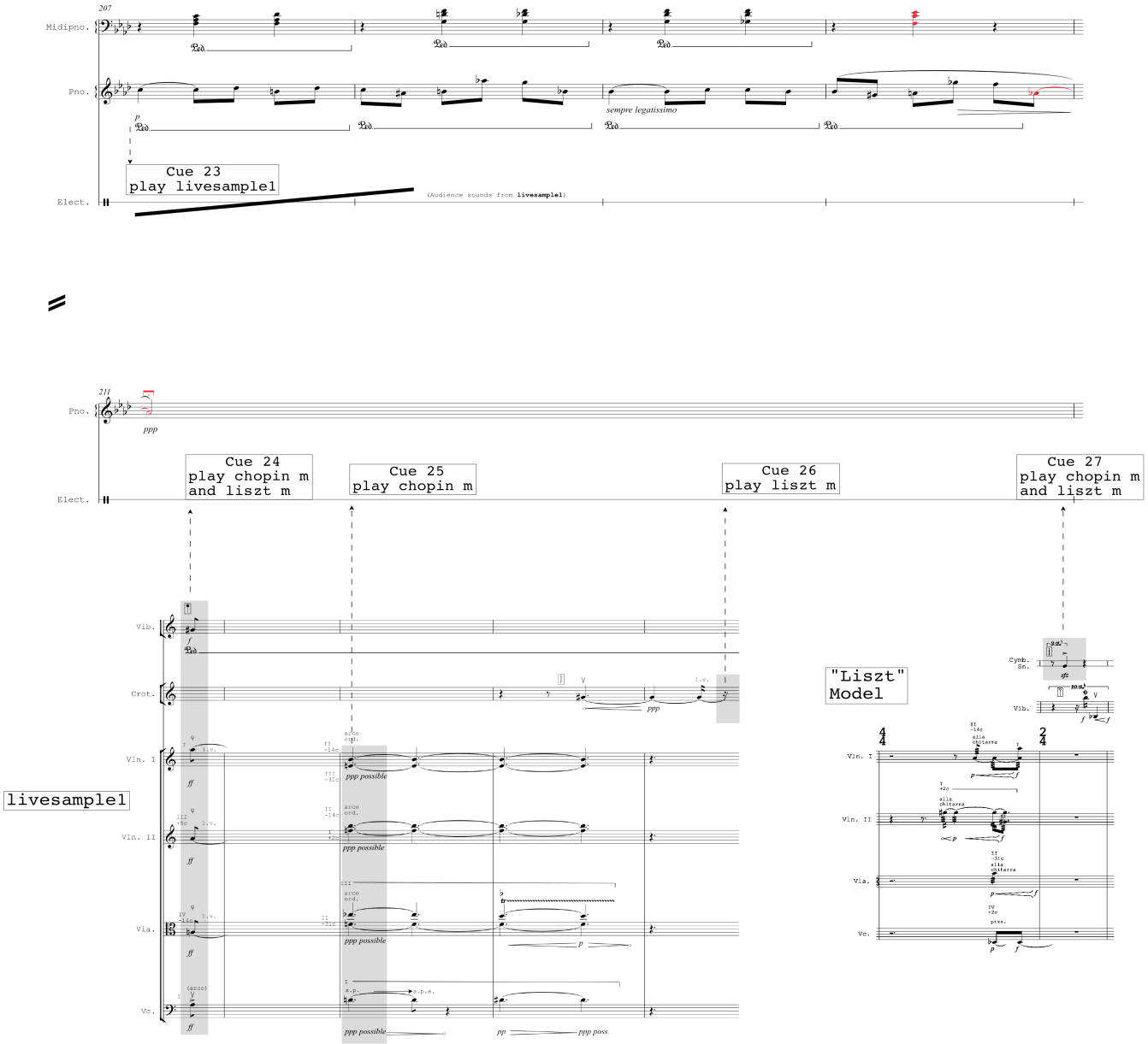


Figure 90 - Brosin: #ffffff (Score, mm. 207-211)

Deferred spatially and temporally, the audience's memory of the moment at which "before-the-music-starts" changes to "music-begins" is re-contextualized, embedded within a multiplicity of musical memory.[906]

The last sample ("livesample3") is played back at mm. 357 (see fig. 92), the last time that the entire quartet plays its characteristic *impulse* on D#, doubled by a forceful slap tongue in the flute and a long resonating accent on the crotale. D# – the pitch on which the initial cello melody in Wagner's *Tristan* ends (see fig. 91) when it reaches the *Tristan Chord* for the first time, from where the opera's tragedy along with the ambiguous legacy of the *Tristan Chord* unfolds.

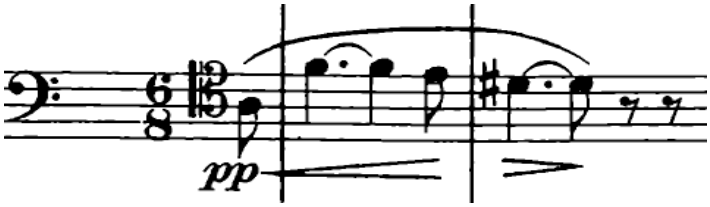


Figure 91 – Wagner: Violoncello Melody Leading to Tristan Chord on D# (Score, mm. 1-2)

[906]Ironically, the premier of *#ffffff* revealed an entirely unexpected realization of that moment: instead of a fluent transition from the ensemble entering the stage (under presumably applause from the audience) and the start of the performance, the cellist came on the stage a little bit late. In addition, it took him a rather long time – it seemed like minutes – to extend the spike and be ready. Of course, this ended up being on the recording ("livesample1") - a length of silence with intermittent, rather abstract sounding moments of clonking, which were the sounds of the cello spike being placed on the floor.

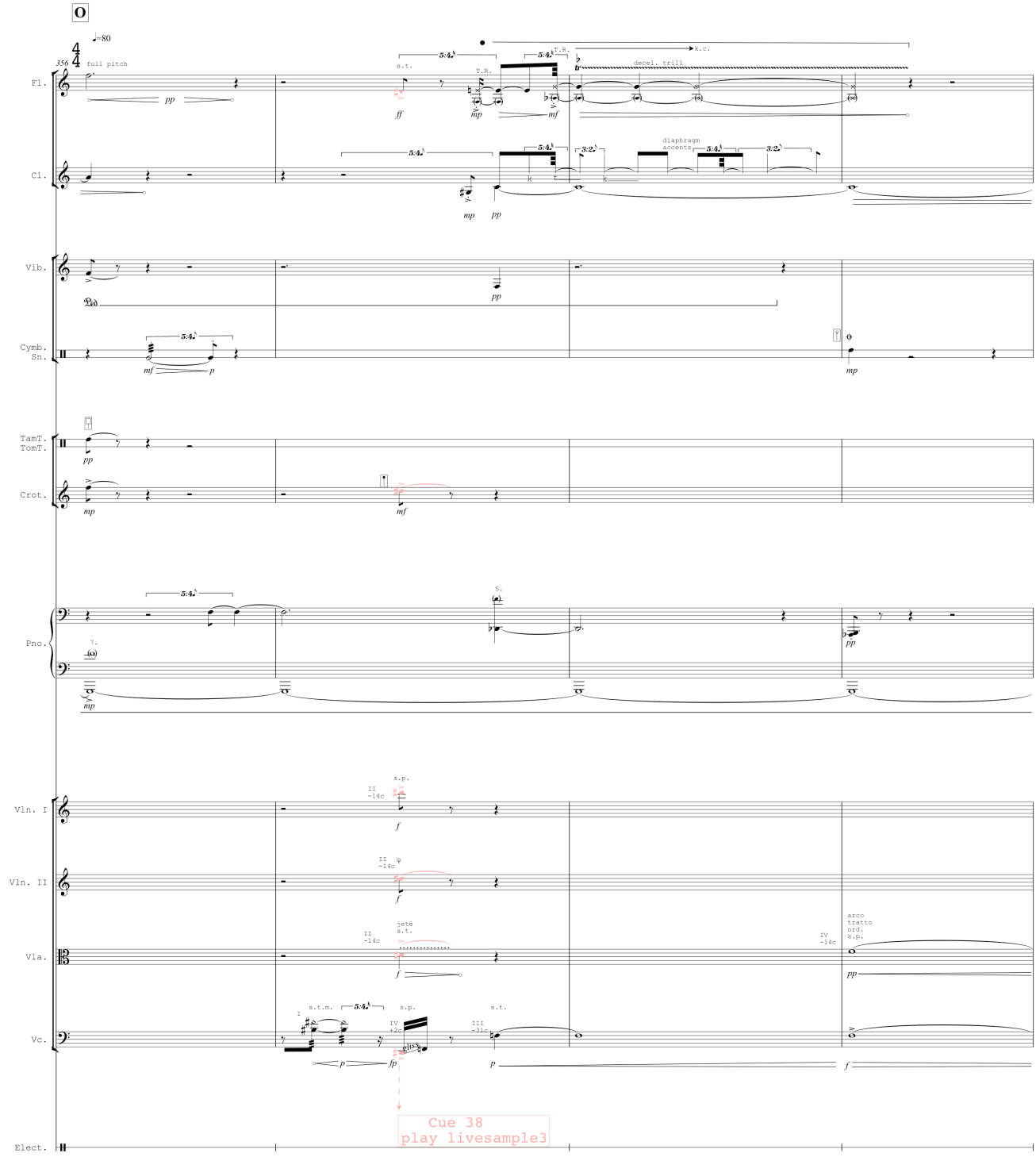


Figure 92 - Brosin: #ffffff, Last Playback of LiveSample (Score, mm. 356-359)

Resounding from the front speakers, from the same direction as the live ensemble, "livesample3" is played back which seems related to the accented D# of the live instruments. It is a D natural impulse in the string quartet, 14 cents flat, leading out of the introduction and into the first section of the piece. The idea of the shifting relationship between buildup-impulse-decay is realized on a macro-level, in a type of simultaneity of *beginning* and *end.*

Conclusions

Inspired by my theoretical research for the present dissertation, my compositional thinking and musical perception have been infused by questions such as "what came first" and by the growing desire to investigate the meaning of *beginnings* and *ends.* These enquiries directed the various artistic decisions in *#ffffff*, as I have tried to pose renewed questions regarding a culturally upheld understanding of instrumentality and performativity.

In my piece, these questions are asked when repetition is confronted with reproduction, and when sounds are heard as fragmentary hints of things that used to be complete – be it the uniform tuning of the piano, the implications of using a string quartet, or the notion of given musical gestures having a predestined direction imposed upon them.

At the same time, my musical material – along with its historical resources – is played back as a prerecorded memory and thus passes through filters of technology, which themselves bear witness to a different level of history.

#ffffff is a hexadecimal code for colour designation used in HTML (a web programming language) and represents the colour white. Most importantly, *#ffffff* implies that all primary colours – red, green, and blue – are present at the same intensity, giving rise to a whole new colour. In the same way, the equal presence of all historic levels behind my composition combine to create another distinct level.

I'd like to conclude this dissertation with a quote by Gilles Deleuze that I deem related not only to my thesis composition but, more importantly, to contemporary musical culture:

> But the inverse movement also occurs: in which, as the circles contract, the virtual draws closer to the actual, both become less

> and less distinct. You get to an inner circuit which links only the actual object and its virtual image: an actual particle has its virtual double, which barely diverges from it all; an actual perception has its own memory as a sort of immediate, consecutive or even simultaneous double. For, as Bergson shows, memory is not an actual image which forms after the object has been perceived, but a virtual image coexisting with the actual perception of the object. Memory is a virtual image contemporary with the actual object, its double, its 'mirror image', as in *The Lady from Shanghai* [movie by Orson Welles (1947)], in which the mirror takes control of a character, engulfs him and leaves him as just a virtuality; hence, there is coalescence and division, or rather oscillation, a perpetual exchange between the actual object and its virtual image: the virtual image never stops becoming actual.[907]

[907] Deleuze, "The Actual and the Virtual," 150.

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Appendix A - *#ffffff* [SCORE]

Please note that the following score has been reformatted from its original size (11x17).

#ffffff

Annette Brosin
© 2012-2014

dedicated in love and gratitude to my friend and colleague
Dr. Darren Miller

Instrumentation:
Flute, Clarinet in Bb, 2 sets of Percussion for 2 players, Piano, String Quartet, Live-Electronics (MAX-patch included)

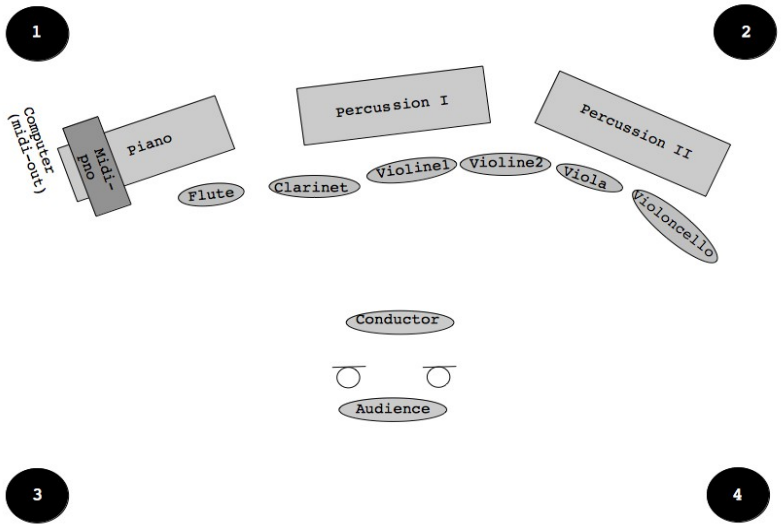
Duration: approximately 30 minutes

Electronics:
Requirements:

- 2 computers – 1 with MAX MSP for the electronic part, 1 with an application that runs a sampler piano with editable fine tuning options. (the premiere of this piece used EXS24 mkII Yamaha Piano, on Logic Pro 8)
- audio interface with 2 inputs, 4 outputs
- 2 omnidirectional microphones installed high above the ground (for AB stereo), in a way that signals from both ensemble and audience are picked up well (as in graphic below).
- 4 speakers. They are to be arranged in a quadraphonic setting, surrounding ensemble and audience (as in graphic below).

The function of the Live-Electronics is to 1) live-sample during the first 19 bars, and to 2) playback these live-samples and also prerecorded materials.
The appendix of the score contains "Models", which are to be recorded, edited, and named (beethoven_m, schumann_m, chopin_m, wagner_m, liszt_m, debussy_m, berg_m) prior to the recital. These samples should then be stored as aif-files in the same folder as the MAX-patch (on CD-rom) and then loaded into the patch (as instructed in the patch). Other prerecorded audiofiles (beethoven_all.aif; schumann_all; chopin_all; wagnerB_all; wagnerE_all; liszt_all; debussy_all; berg_all) are already stored in the corresponding folder of the patch on the CD-rom.
Instructions as to how to operate the program are written in the patch. Specifications to each cue are listed on page 6 of the performance notes).
The score gives cues to the MAX operator and reflects the playback only when colla parte play is demanded and cues come from the playback. Playback that does not affect the ensemble play is not notated in the score.

Seating and Placement:



Notation:

Generally:

indicates that a transition (for example from sul pont. to sul tasto) should be done as smoothly as possible.

Dal niente – out of nothing/silence

Always *senza vibrato*, unless indicated differently. Accents on „strong beats" are to be avoided!
l.v. = let vibrate (*laisser vibrer*)

Accidentals apply to the respective note and the remainder of the bar.

Microtones:


quartertone lower

quartertone higher


slightly higher


slightly lower

Flute:

½ air etc. air-pitch relationship: indicates the amount of air (noise) mixed with pitch – achieved through dynamic embouchure.

mouth closes embouchure hole,

bracket indicates longer passages for the same action

open embouchure hole

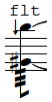
over-emphasized key-clicks with pitch-production as indicated

key click (k.c.)

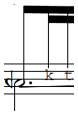
key clicks with closed mouthpiece: the resulting pitch sounds a major 7th lower on. The same is the case for tongue rams (T.R.).

slap tongue, S.T.

overblown harmonic (based on the pitch indicated with diamond notehead)



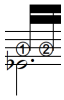
fluttertongue



double-tonguing, specified rhythm

double-tonguing as fast as possible

bisb. bisbligliando/ tone-colour trill



bisbigliando with specified rhythm and specific fingerings

Fingering charts for multiphonics, bisbigliandi, as well as microtones are taken from Carine Levine's „The Techniques of Flute Playing, vol. 1“ (2002).

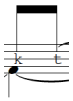
Clarinet:

½ air etc. air-pitch relationship: indicates the amount of air (noise) mixed with pitch.

over-emphasized key-clicks with pitch-production as indicated

key click (k.c.)

key clicks as fast as possible



double-tonguing, specified rhythm

tktk...

double-tonguing (as fast as possible)

frullato

Microtones should be produced via lip-bending.

Fingering charts for multiphonics are taken from Phillip Rehfeldt's „New Directions for Clarinet“, revised edition (2003).

Percussion:

Percussion I: **Suspended Cymbal, Snare, Crotales, Vibraphone**

Percussion II: **TamTam, TomTom, Crotales, Marimba**

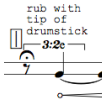
required beaters:

2x drumsticks

2x contrabass bows (each player)

marimba beaters – medium soft and hard (2 each; each player)

2x brushes (each player)



rubbed with tip of drumstick: Press the tip of the drumstick nearly vertically on the Tam-tam surface and, without reducing the pressure, move in a jerky fashion so as to produce a very sharp, clear and reverberating pitch – almost a bright "scream" with echo. (H. Lachenmann, instructions for „nun“)

sound-production through bowing (Crotales, Vibraphone or Marimba)

sound-production via brushing/sweeping over head/cymbal/tam-tam for the entire duration of the note

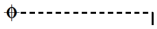
on snare drum: snares on, snares off

mute/dampen

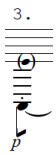
“Prallerschlag”/”Prallerschläge” are beats whereby the point of attack of the stick lies below the mallet´s head. As a result, the stick, when properly controlled by the wrist, should bounce back elastically and produce a rattling sound. The tone colour of this dense succession of beats can be modified from light to dark and from high to deep by a “glissando” shift of the point of attack. (Lachenmann, 1971)

Piano:

silently depressed keys – often in combination with sostenuto pedal, in order to enable resonance of specific notes and overtones.

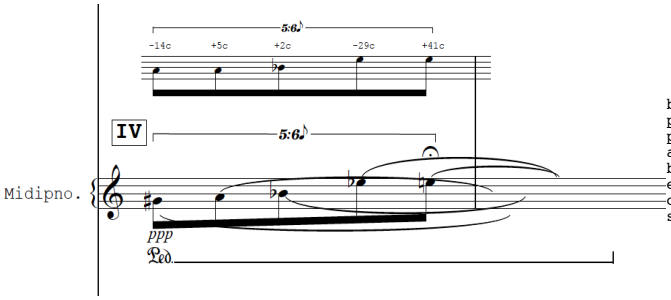


mute strings inside the piano for the duration of the indicated passage



production of indicated harmonic

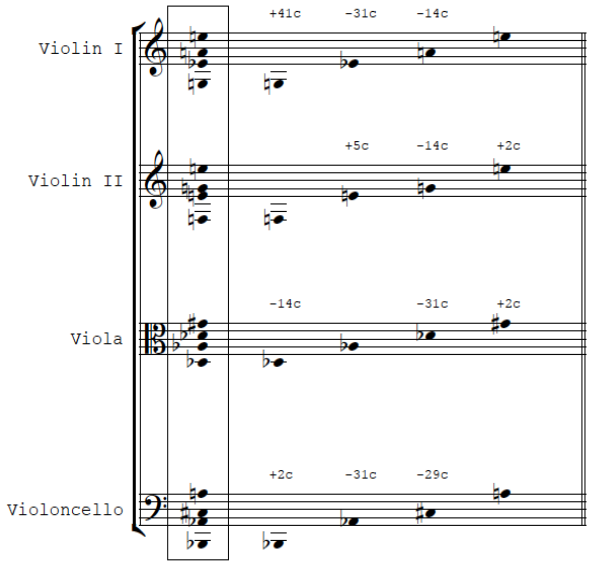
Midipiano:



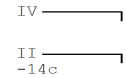
boxed roman numerals specify the software piano (preset). Depending on the preset, pitches are affected as follows:
a) all detuned equally, or
b) detuned as specified in ossia (see example), or
c) constantly randomly detuned within the specified range (in cents).

boxed text indicates volume setting for midi-piano (output); 0-127.
Crescendi indicate fader movement from 0-X.

Strings:
Each string instrument has a scordatura, as specified below. The CD included in this score provides sine tones for each string player as a help to tune their instruments. It is expected that the specific tuning will be lost (more or less), over the course of the piece. Retuning during the piece is not required.



(note: string parts are transposed and indicate what should be fingered, while the score indicates sounding pitches)



indication of string (and respective detuning) for the duration of bracket

c.l.b.	col legno battuto
1/2 legno	half wood, half hair
s.t.	sul tasto
s.t.m.	sul tasto molto
s.t.e.	Sul tasto extremo
s.p.	sul ponticello
s.p.m.	sul ponticello molto
s.p.e.	sul ponticello extremo

harmonic

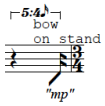
on the bridge; use left hand to mute all strings to avoid any pitch production

overpressed bowing. Dashed arrow to this symbol indicates an increase of bow pressure, a dashed arrow from that symbol means a decrease of bow pressure.

fingernail pizz. (if on one string) or alla chitarra (if on 2 or more strings) with back of fingernail, while all strings involved are completely dampened with left hand.

jeté (also as c.l.b.)- let bow fall on (with a force specified by the dynamic marking) and subsequently bounce off the string. This action requires only that one initial force to let the bow fall on the string. (Please look out for accent marking!)

salt. saltando



carry out the indicated action in a rather theatrical, visible and audible (as pecified by dynamics) fashion. Accordingly, when you do the same action as part of the regular performance (i.e. put away bow in order to do longer sections of pizzicati), be aware to execute this in a distinctively *non*-theatrical, and visually and acoustically *inconspicuous* manner.

List of Cues for Live Electronics:

- start (approx. 5 before conductor starts the piece):
- #1 record livesample1
- mm. 4: #2 stop record livesample1
- mm. 4: #3 record livesample2
- mm. 8: #4 stop record livesample2
- mm. 8: #5 record livesample3
- mm. 13: #6 play wagner_m (1) **out1-2** ***@speed=1***
- mm. 19: #7 stop record livesample3
- mm. 25: #8 play beethoven_m (1) **out1-2** ***@speed=2***
- mm. 32: #9 play berg_m (1) **out3-4** ***@speed=34/21 (1.619)***
- mm. 42: #10 play beethoven_m (1) **out1-2 @speed=1/2;** play berg_m (2) **out3-4** ***@speed=21/34 (0.617)***
- mm. 47: #11 play berg.aif (I) **out3-4 @speed=1;** play berg_m (1) [0-127] **out3-4** ***@speed=21/34-1 (0.617-1);*** play berg_m (4) [0-127] **out3-4** ***@speed=21/34 (0.617)***
- mm. 58: #12 play beethoven_m (1) **out1-2** ***@detuning=-31c***
- mm. 102: #13 play beethoven_m (1)***@speed=13/21 -1/2 (0.619-0.5);*** **out1-2;** play berg_m (2) **out3-4** ***@speed=1-2/3 (1-0.666)***
- mm. 103: #14 play debussy_m (3) **out1** ***@speed=13/21 (0.619)***
- mm. 113: #15 play schumann_m (1) **out2** ***@speed=1.5***
- mm. 124: #16 play debussy_m (1) **out1** ***@speed=1.5***
- mm. 134: #17 play livesample2 **out3-4 @speed=1**
- mm. 176: #18 play schumannS.aif (I) **out1** ***@detuning=+2c;*** play schumannC.aif (II) [both 0-127] **out2** ***@detuning=-31c***
- mm. 178: #19 play debussy.aif (III) **out1** ***@speed=1***
- mm. 179: #20 stop debussy.aif **out1** ***@speed=1***
- mm. 184: #21 fade out schumannS.aif AND schumannC.aif
- mm. 191: #22 play chopin.aif (I) **out1-2** ***@speed=1***
- mm. 207: #23 play livesample1 **out1,2,3,4** ***@speed=1***
- mm. 211: #24 play chopin_m (1) **out3** ***@speed=5/3 (1.666);*** play liszt_m (2) **out4** ***@detuning=13/8 (1.625)***
- mm. 211: #25 play chopin_m (3) **out3-1** ***@speed=5/3-3:5 (1.666-0.666)***
- mm. 211: #26 play liszt_m (4) **out2-4** ***@speed=8/13-1 (0.615-1)***
- mm. 212: #27 play chopin_m2 (1) **out4** ***@detuning=-31;*** play liszt_m2 (2) **out3** ***@detuning=-14***
- mm. 213: #28 play beethoven_m (3) **out3-4** ***@speed=34/21 (1.62);*** play berg_m (4) ***@speed=0.5*** **out1-2;** play originals_all **out1,2,3,4**
- mm. 213: #29 play schumann_m (1) **out2-4** ***@speed=1-2/3 (1-0.666);*** play debussy_m (2) **out3-1** ***@speed=1-13/21(1-0.619)***
- mm. 229: #30 play liszt.aif (I) **out3-4** ***@speed=1;*** then fade out originals
- mm. 233: #31 play liszt_m (1) **out4** ***@speed=1-13/8 (1-1.625)***
- mm. 235: #32 fade out liszt.aif
- mm. 262: #33 play liszt_m (1) **out2-4** ***@speed=2***
- mm. 269: #34 play chopin_m (2) **out3-1** ***@speed=3/5-2/3 (0.6-0.666)***
- mm. 302: #35 play debussy_m (1) (fade in and out) **out1** ***@speed=1***
- mm. 303: #36 play berg_m (2) (fade in and out) **out1-4** ***@speed=1***
- mm. 305: #37 play beethoven_m (3) (fade in to quiet) ***@speed=1*** **out3-2;** play schumann (4)(fade in to quiet) **out1 @speed=1**
- mm. 357: #38 play livesample3 **out1-2** ***@speed=1***

Bibliography of recordings and score excerpts used in this piece:

Recordings:

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- Schumann, Robert. "Cello Concerto in A minor, Op. 129." On *Robert Schumann Vol. 3, Cello Concerto, Violin Concerto*. Pablo Casals, Prades Festival Orchestra, Eugene Ormandy. Documents 290684. Schumann, Robert. "Violin Concerto, Op. posth. / Cello Concerto, 129 (arr. for violin and orchestra)." On Violin Concertos in D & A minor. John Storgårds, Tampere Philharmonic, Leif Segerstam. Ondine ODE879-2.
- Chopin, Frédéric. "Mazurkas In F Minor, Op. 68, No. 4." On *Chopin: Piano Works, Vladimir Sofronizkij*. Vladimir Sofronitsky. Musikstrasse ITK659500049.

- Wagner, Richard. *Tristan und Isolde*. Karl Elmendorff. Nany Larsen-Todsen, Gunnar Graarud, Chorus and Orchestra of Bayreuth Festival. Naxos LCX 64/83.

- Wagner, Richard. *Tristan und Isolde*. Artur Bodanzky, Kirsten lagstad, Lauritz Melchior, The Metropolitan Opera Orchestra and Chorus. Sony Classical 886443901148.

- Liszt, Franz. "Ich möchte hingehn, song for voice & piano" On *Gundula Janowitz: Songs from R. Strauss, Liszt & Schubert*. Gundula Janowitz, Irwin Gage. Gala Records 337.

- Débussy, Claude. *Débussy plays Débussy: Golliwogg's Cakewalk*. Welte-Mignon Piano Roll #2733.

- Berg, Alban. "Berg: Suite Lyrique, For String Quartet." On *The Polydor Recordings - The Galimir Quartet of Vienna: Ravel, Milhaud, Berg*. Rockport Records RR5007.

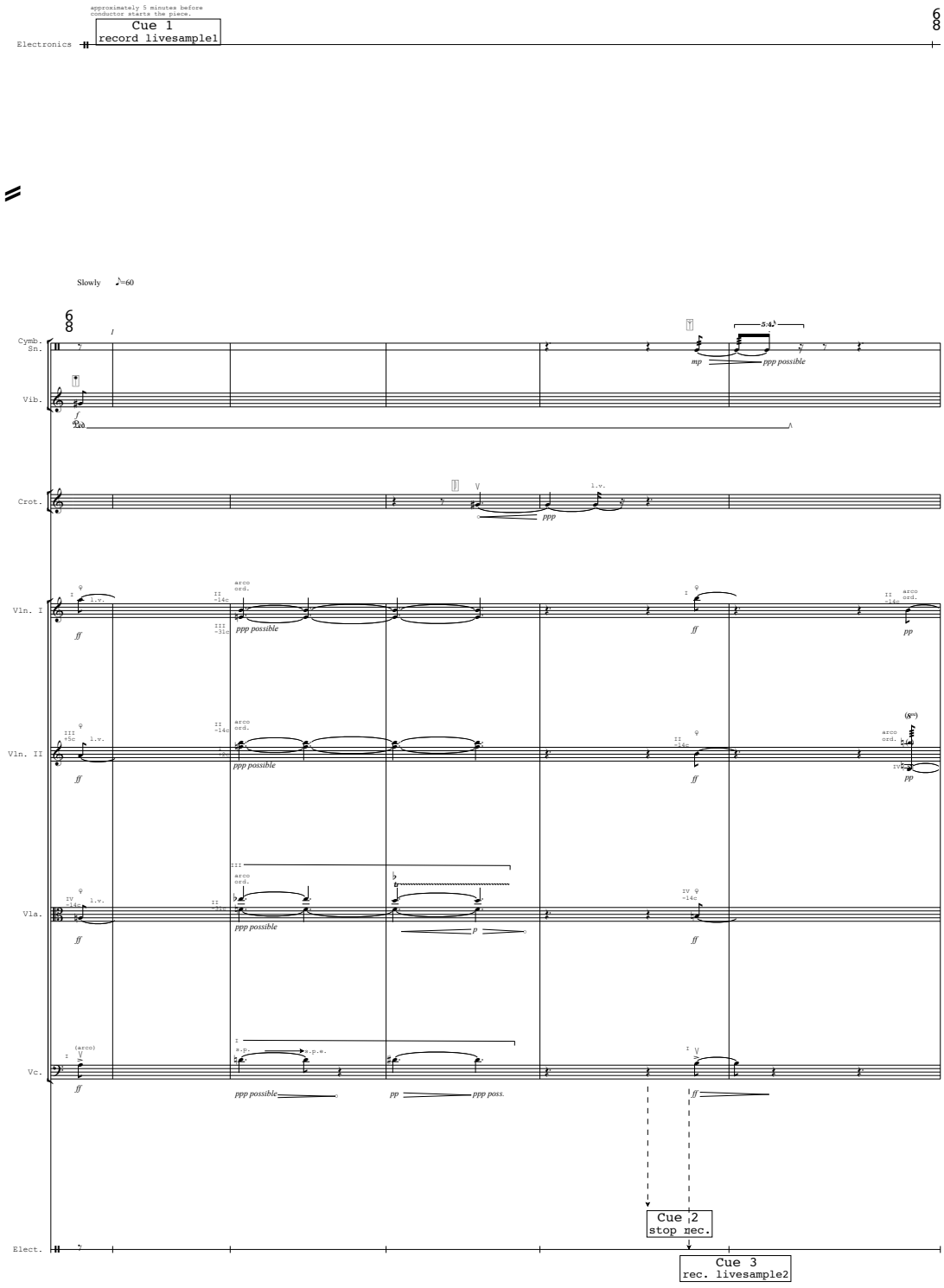
Score Excerpts:

- Chopin, Frédéric. "Mazurka, Op. 68, No. 4." In *Complete Works for the Piano, Vol.2: Mazurkas*. Edited by Joseffy, Rafael. 142-143. New York: G. Schirmer, 1915.

- Liszt, Franz. "Ich möchte hingehn." In *Franz Liszt: Musikalische Werke. Serie VII, Band 2*. Edited by Raabe, Peter, 125-132. Leipzig: Breitkopf & Härtel, 1921.

#ffffff

Annette Brosin



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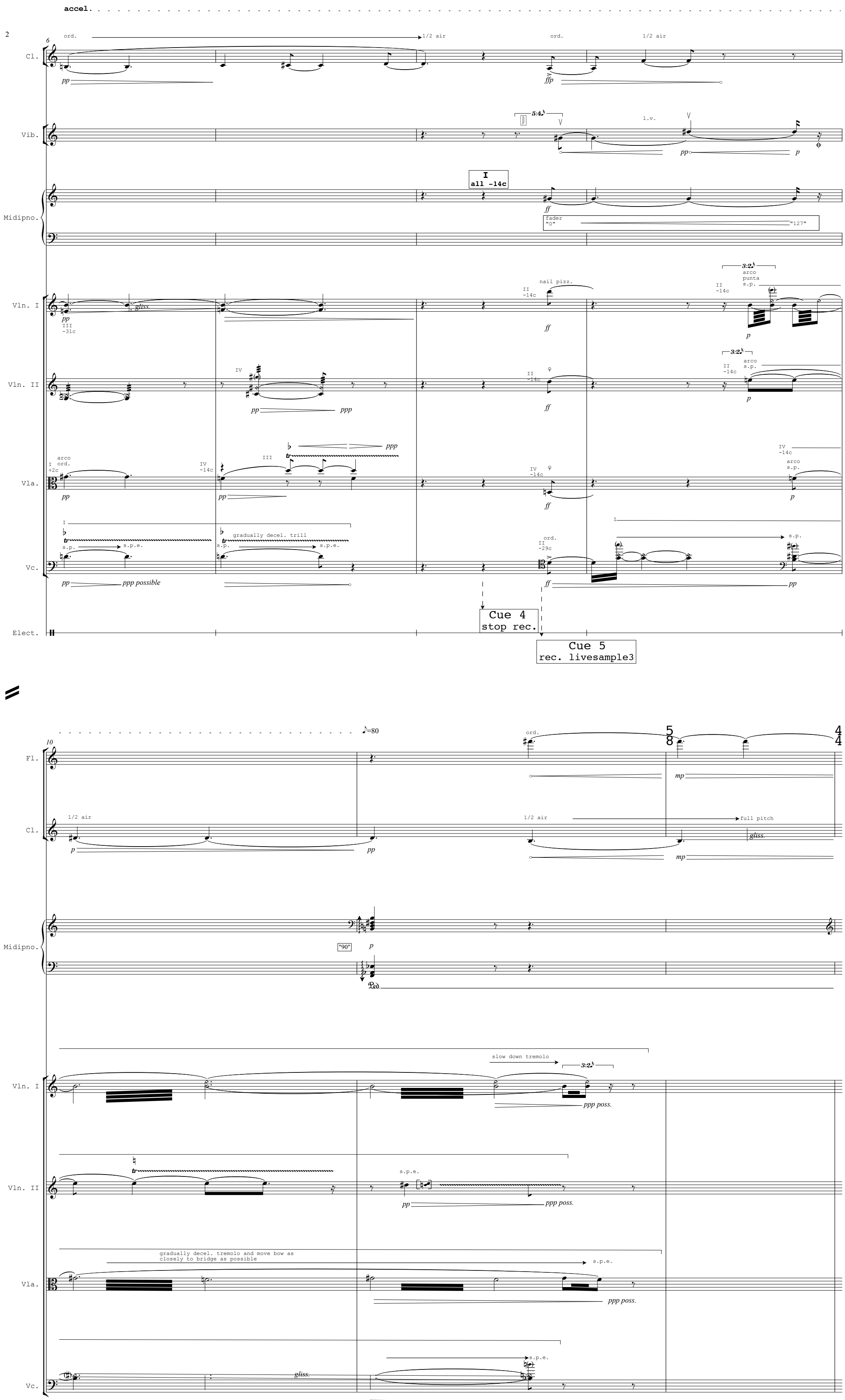
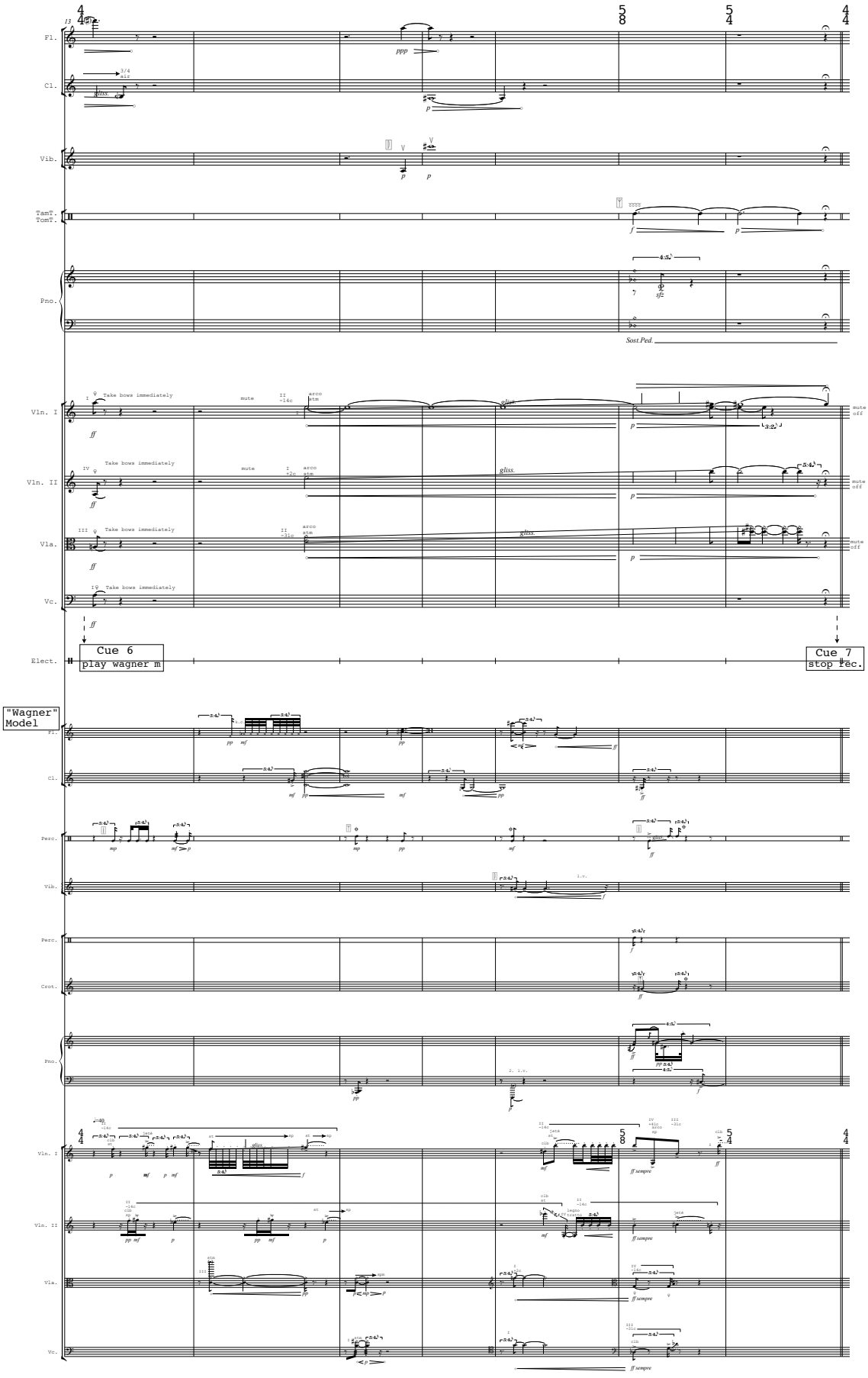
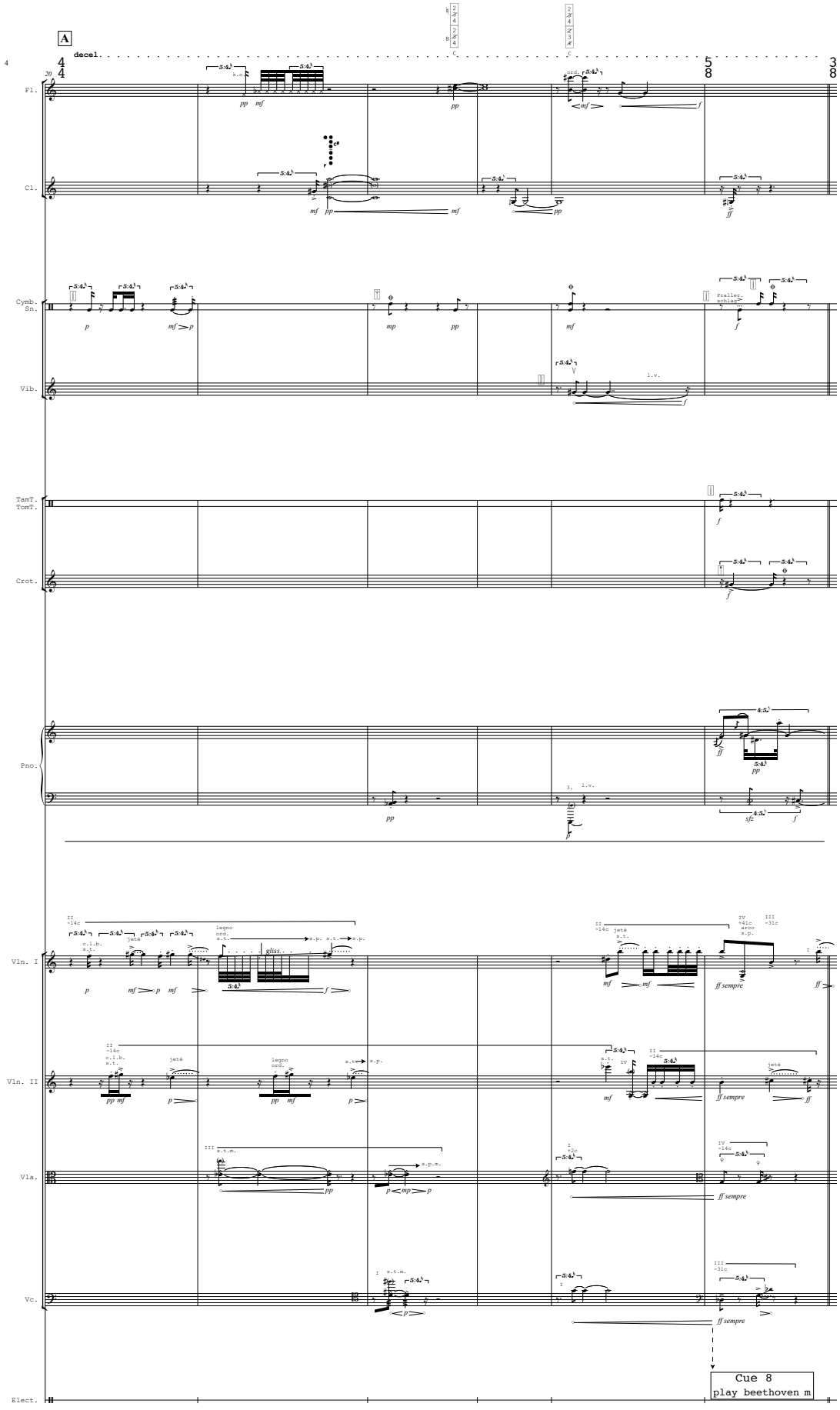
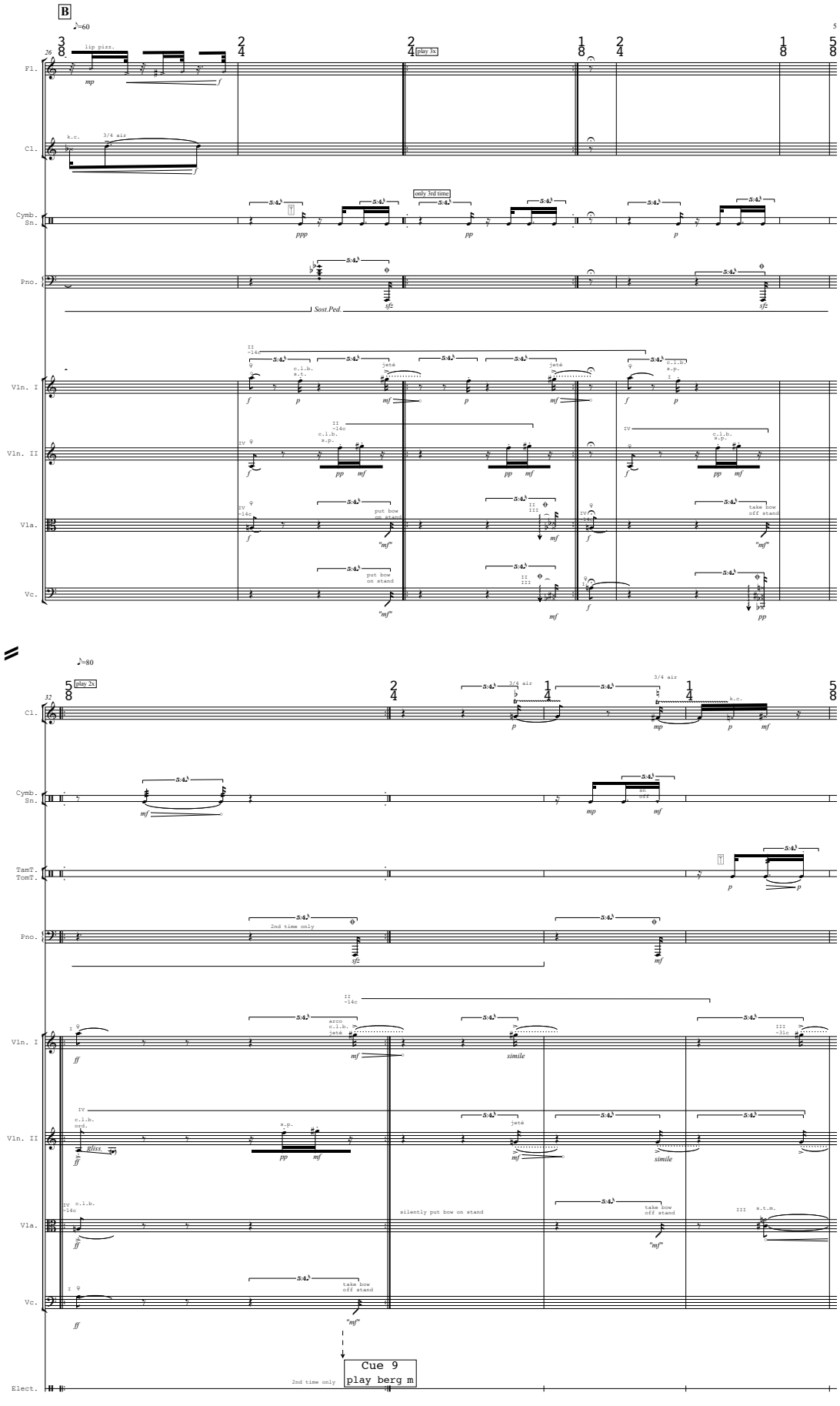

accel.
Cl.
Vib.
Midipno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
ord.
1/2 air
l.v.
I
all -14c
fader
"0"
"127"
nail pizz.
arco
punta
s.p.
III
-31c
gliss.
II
-14c
IV
-14c
ord.
+2c
s.p.e.
gradually decel. trill
-29c
ppp possible
Cue 4
stop rec.
Cue 5
rec. livesample3
♪=80
Fl.
full pitch
"90"
slow down tremolo
ppp poss.
gradually decel. tremolo and move bow as closely to bridge as possible

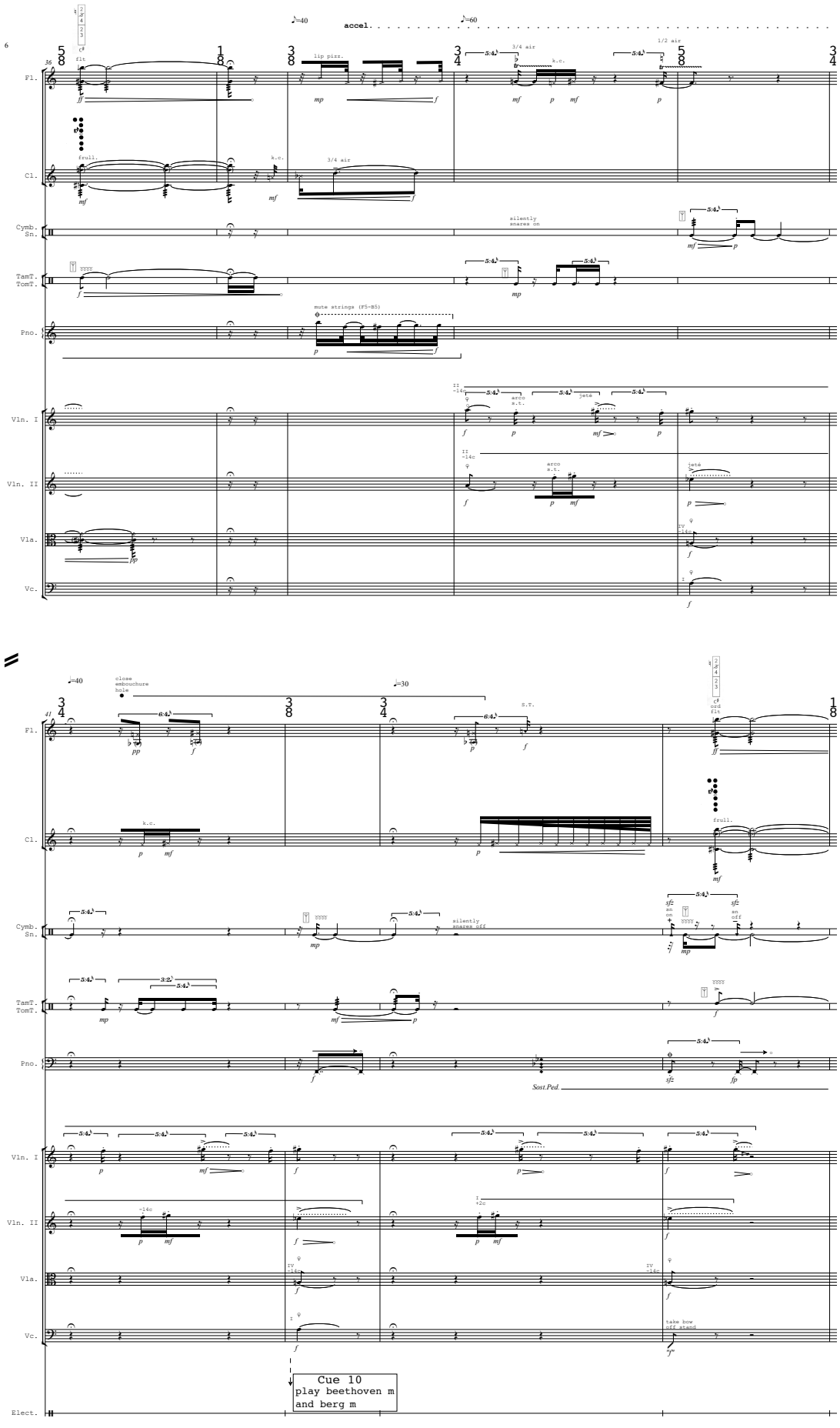
Colla Parte with "Wagner" Model

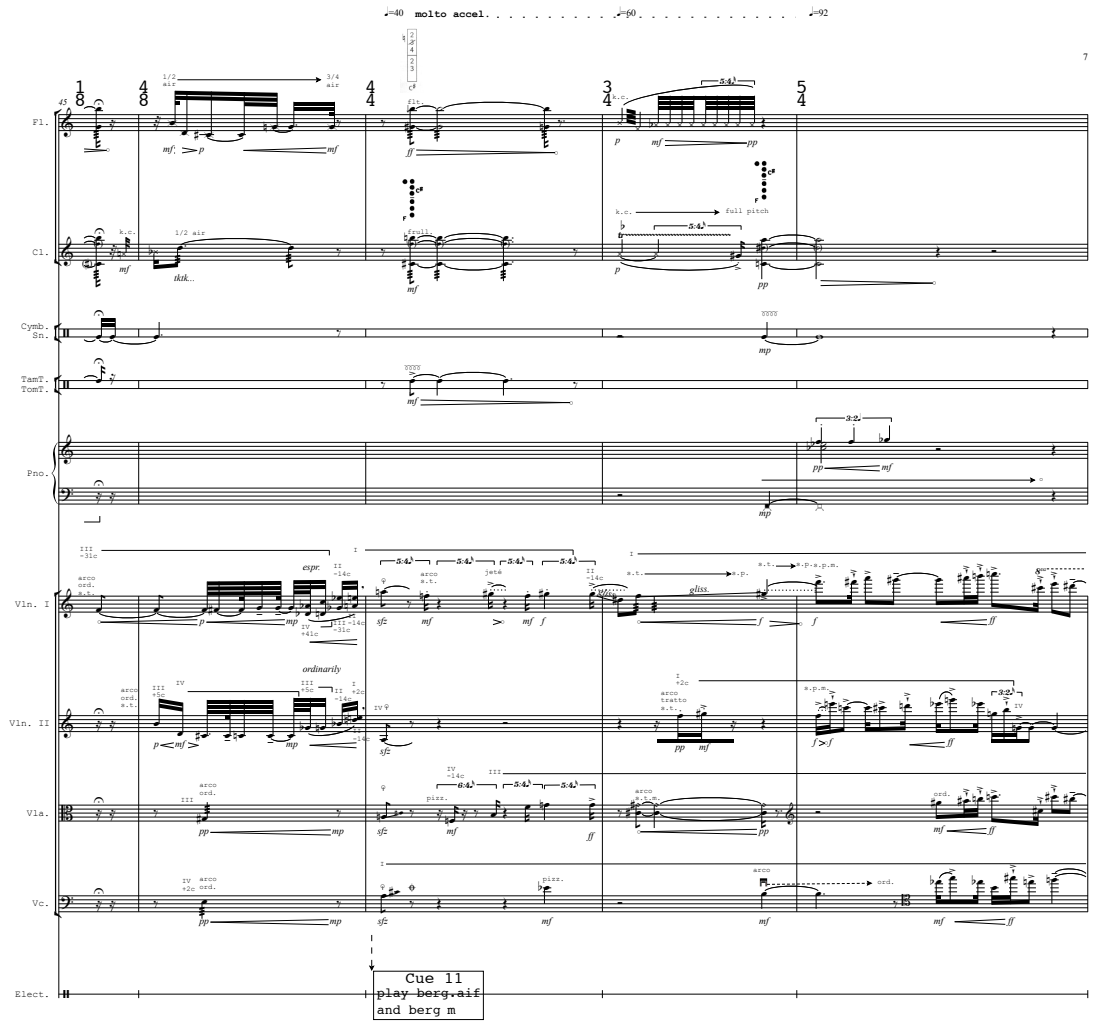
(End Colla Parte)

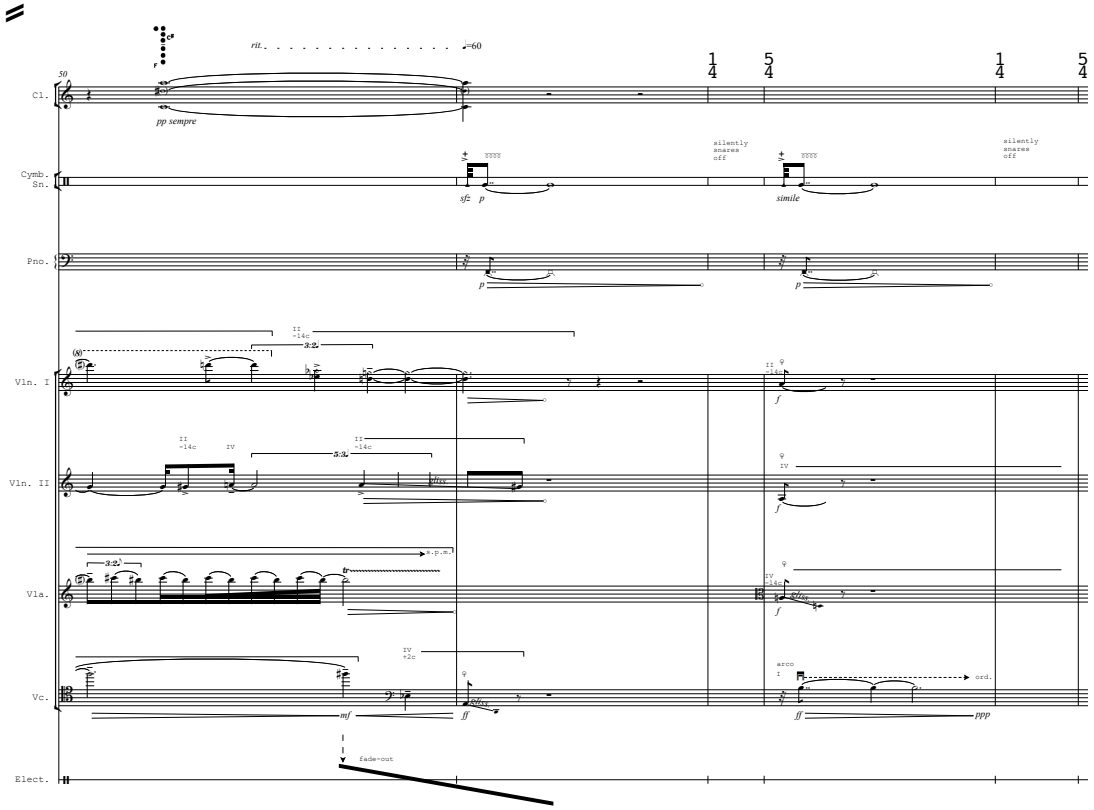


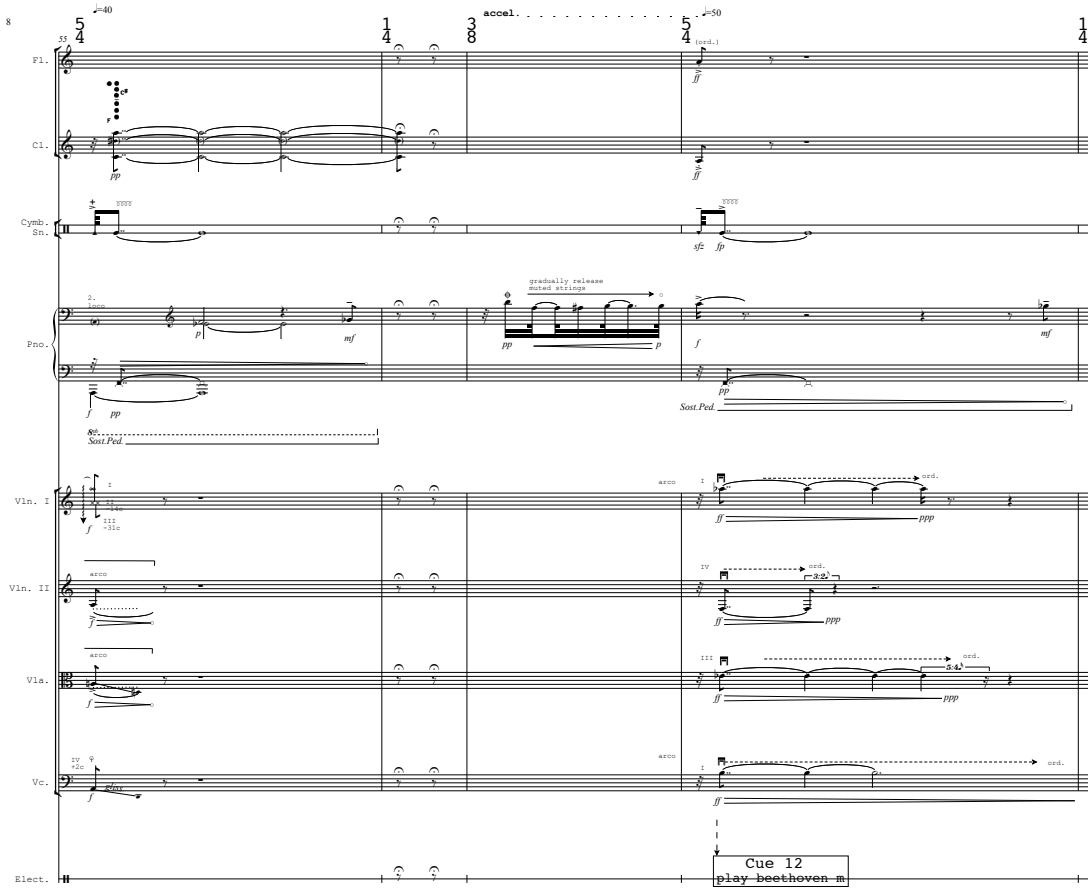

A
decel.
Fl.
Cl.
Cymb.
Sn.
Vib.
TamT.
TomT.
Crot.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
Cue 8
play beethoven m

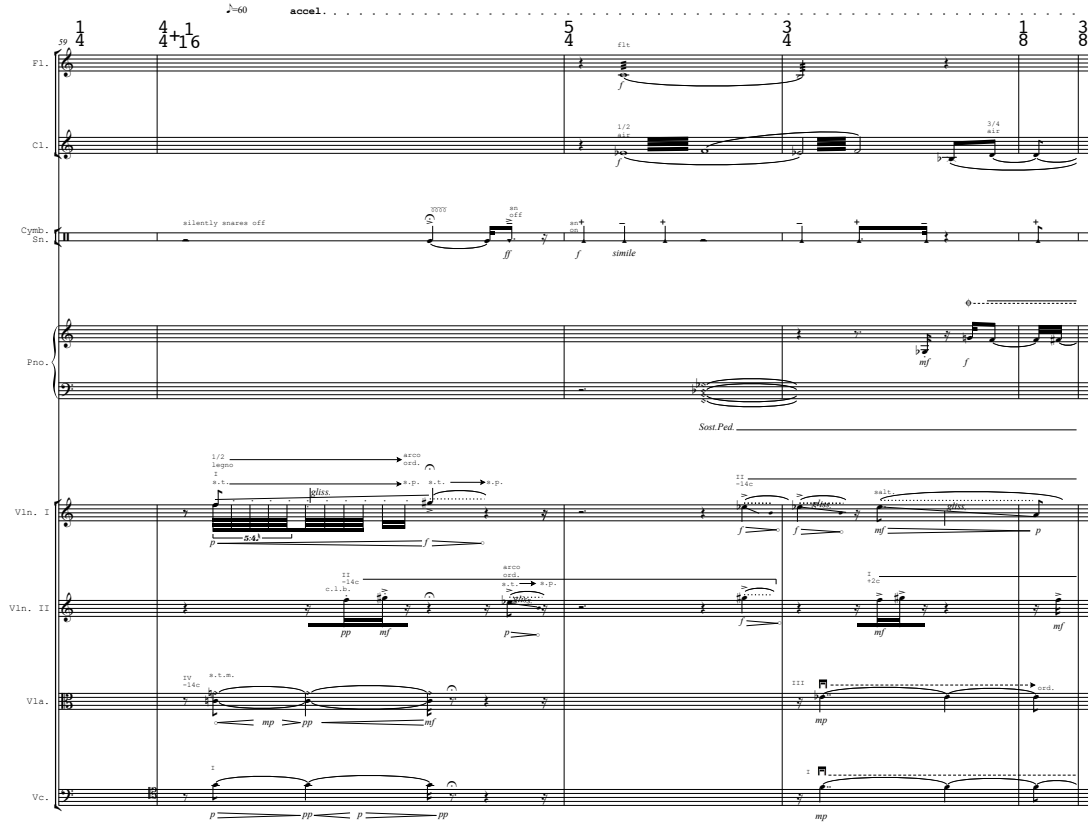

B
♪=60
26
Fl.
Cl.
Cymb.
Sn.
Pno.
Vln. I
Vln. II
Vla.
Vc.
lip pizz.
k.c.
3/4 air
play 3x
only 3rd time
Sost.Ped
c.l.b.
s.p.
jeté
put bow on stand
take bow off stand
♪=80
32
play 2x
TamT.
TomT.
Elect.
2nd time only
arco
ord.
gliss.
simile
silently put bow on stand
s.t.m.
Cue 9
play berg m

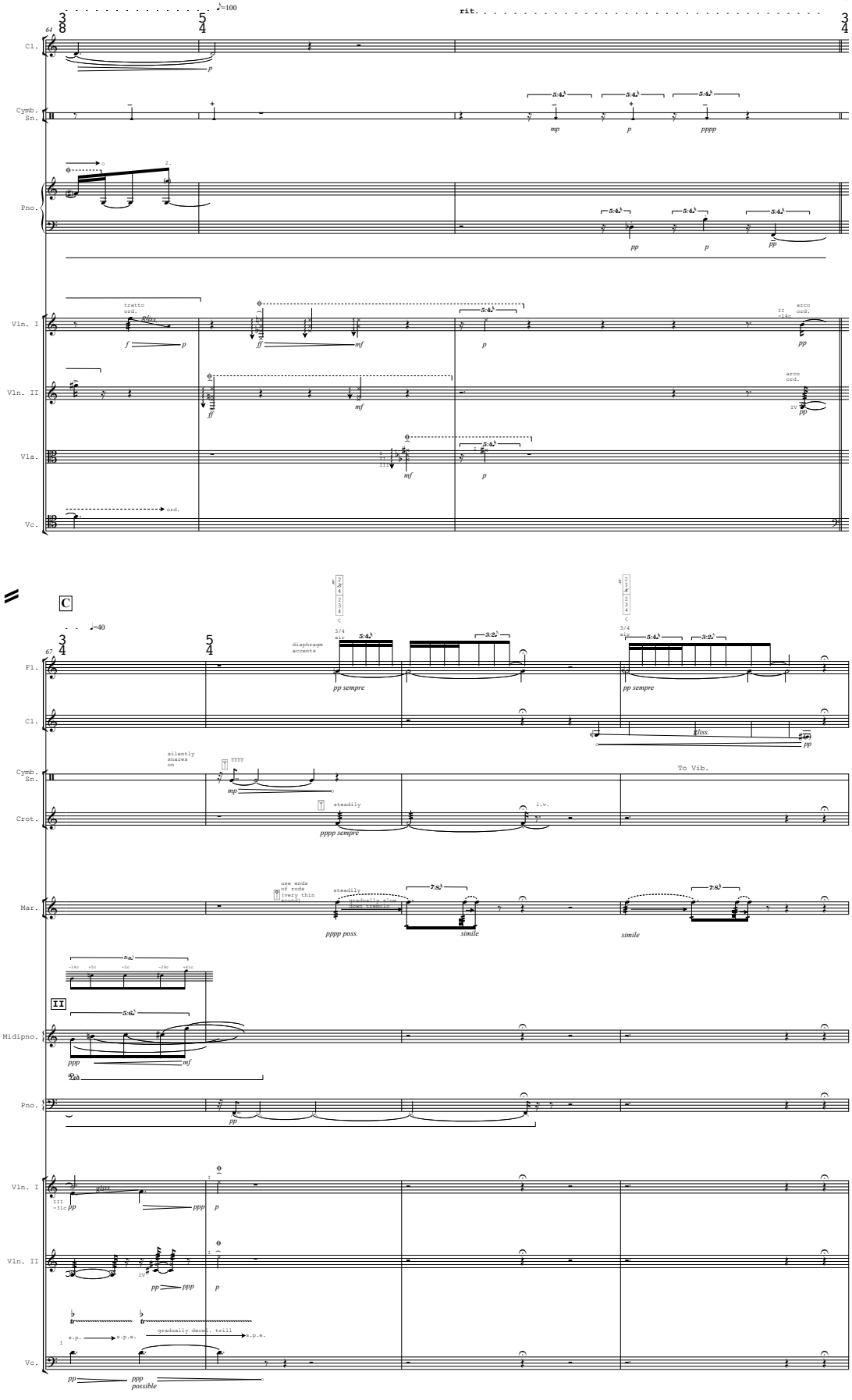

6
36
♪=40
accel.
♪=60
flt
lip pizz.
3/4 air
k.c.
1/2 air
frull.
silently snares on
mute strings (F5-B5)
arco n.t.
jeté
Fl.
Cl.
Cymb. Sn.
TamT. TomT.
Pno.
Vln. I
Vln. II
Vla.
Vc.
41
♩=40
close embouchure hole
♩=30
S.T.
ord flt
silently snares off
Sost.Ped
take bow off stand
Cue 10
play beethoven m
and berg m
Elect.

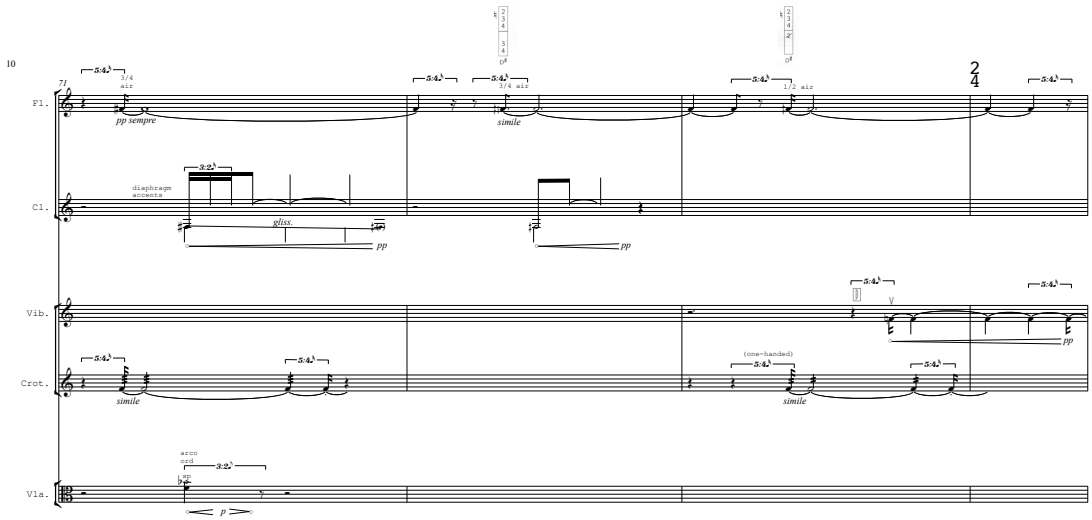

♩=40 molto accel. ♩=60 ♩=92
Fl.
Cl.
Cymb. Sn.
TamT. TomT.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
espr.
ordinarily
gliss.
Cue 11
play berg.aif
and berg m

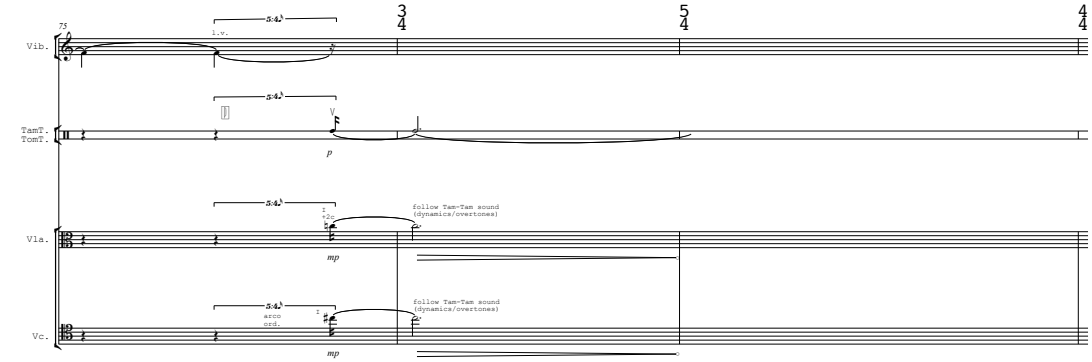

rit. ♩=60
Cl.
Cymb. Sn.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
pp sempre
silently snares off
simile
fade-out

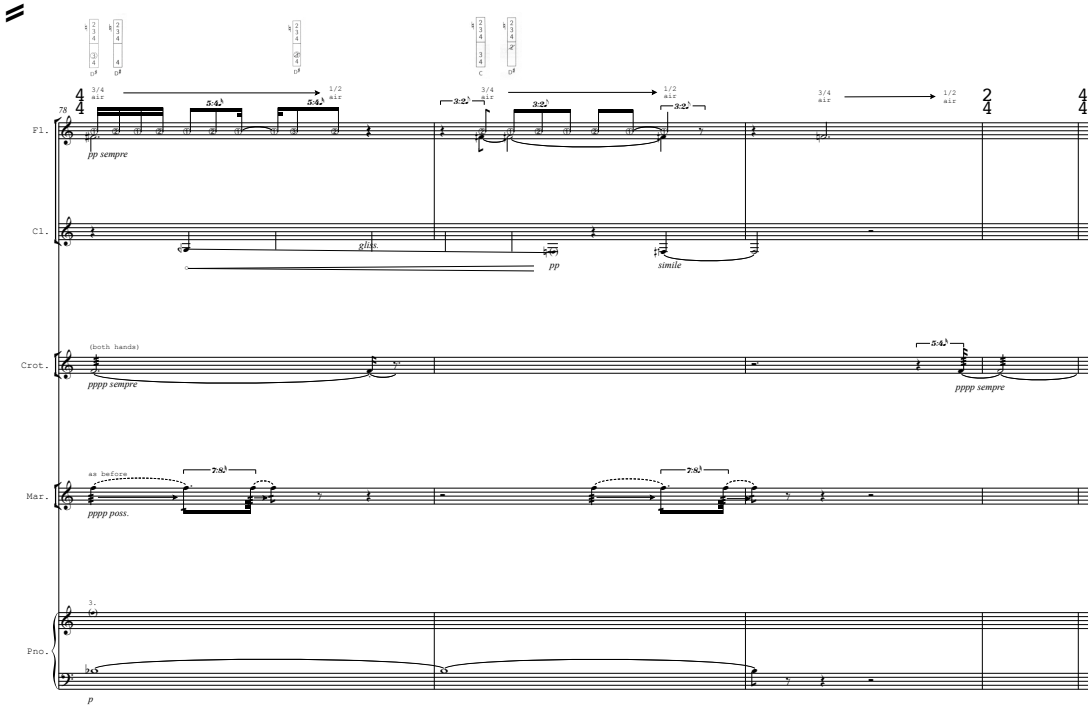

accel.
Fl.
Cl.
Cymb.
Sn.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
gradually release muted strings
Sost.Ped
Cue 12
play beethoven m

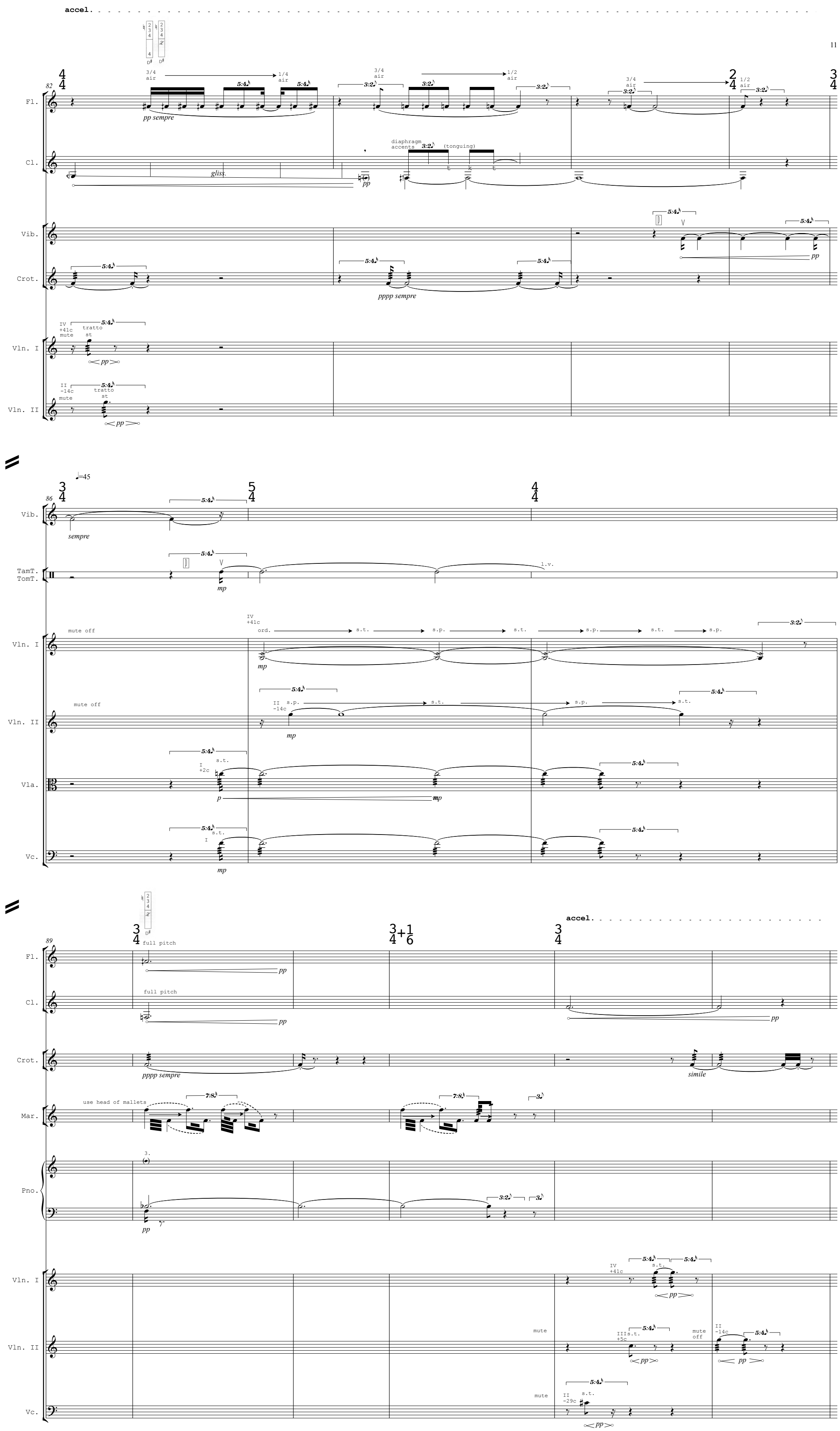

accel.
Fl.
Cl.
Cymb.
Sn.
silently snares off
simile
Pno.
Sost.Ped
Vln. I
Vln. II
Vla.
Vc.

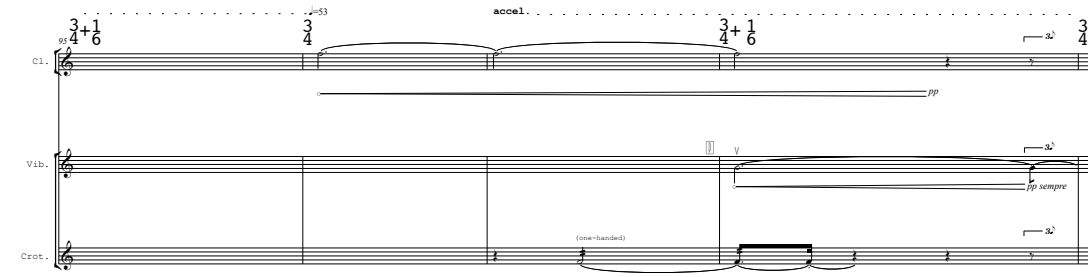

rit.
Cl.
Cymb.
Sn.
Pno.
Vln. I
Vln. II
Vla.
Vc.
tratto
ord.
gliss.
arco
ord.
C
Fl.
diaphragm
accents
pp sempre
silently
snares
on
To Vib.
steadily
l.v.
Crot.
pppp sempre
Mar.
use ends
of rods
(very thin
sound)
pppp poss.
simile
Midipno.
s.p.
s.p.m.
gradually decel. trill
possible

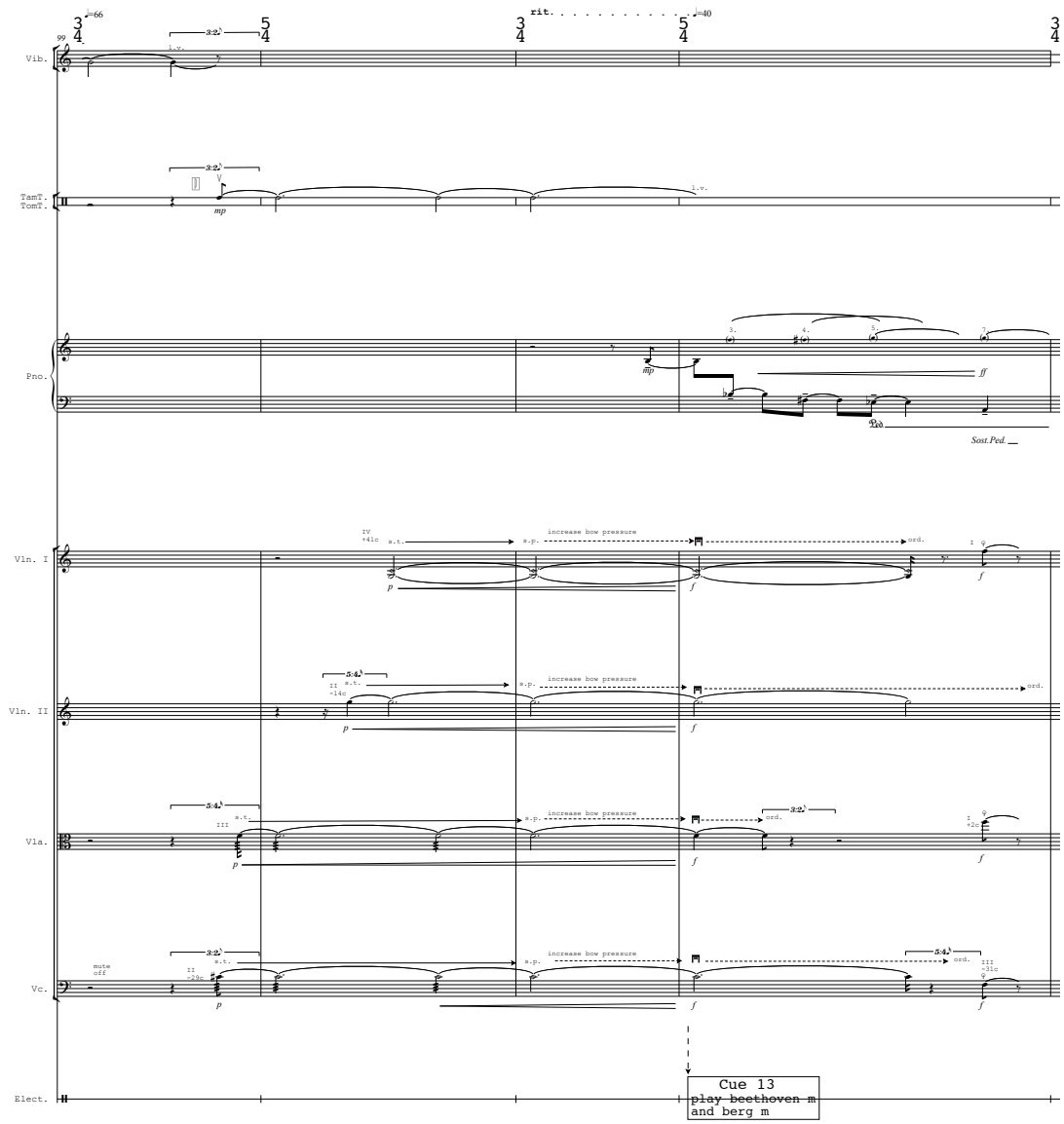

71
Fl.
Cl.
Vib.
Crot.
Vla.
pp sempre
simile
diaphragm accents
gliss.
pp
(one-handed)
arco ord
p

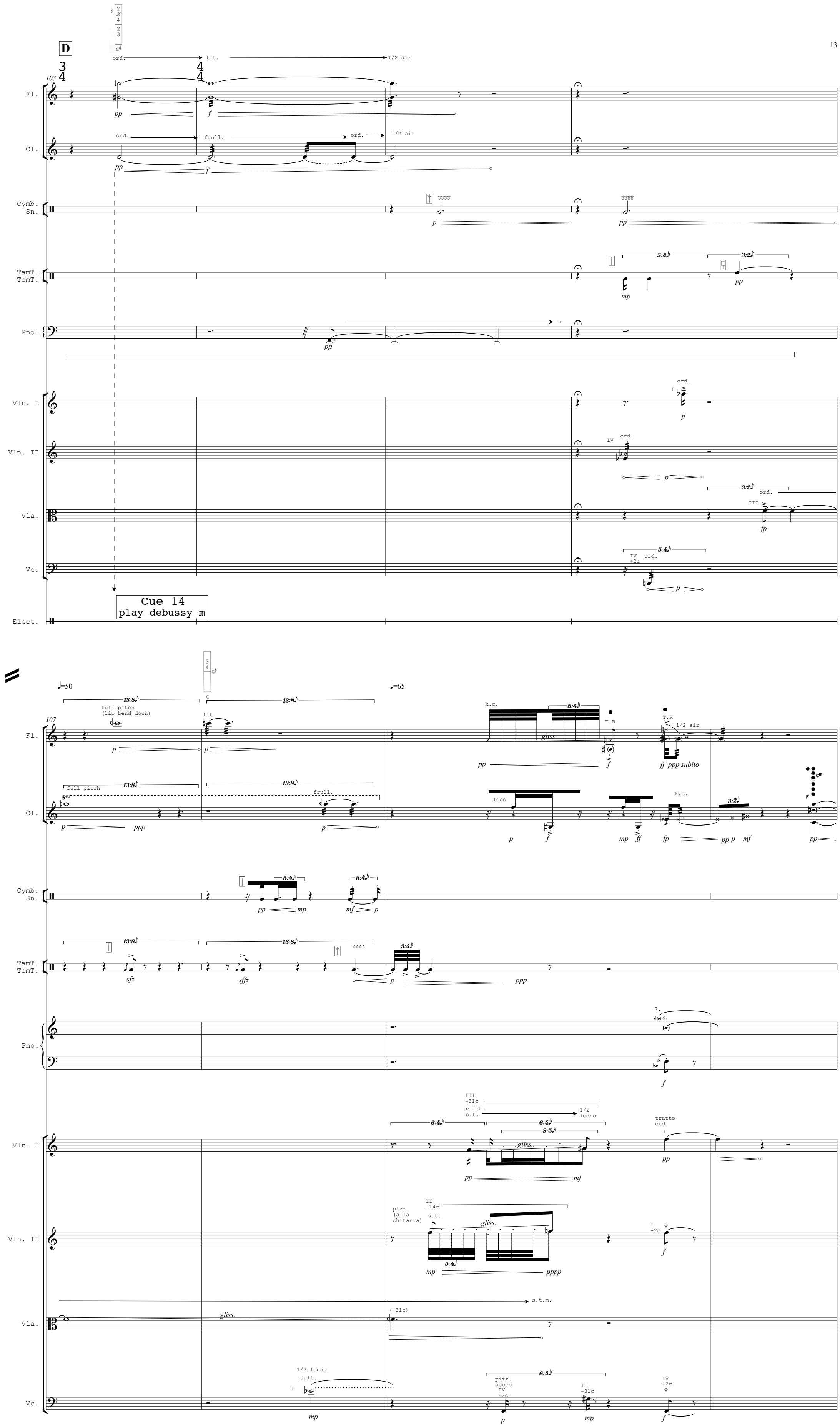

75
Vib.
TamT.
TomT.
Vla.
Vc.
l.v.
follow Tam-Tam sound (dynamics/overtones)
arco ord.
p
mp

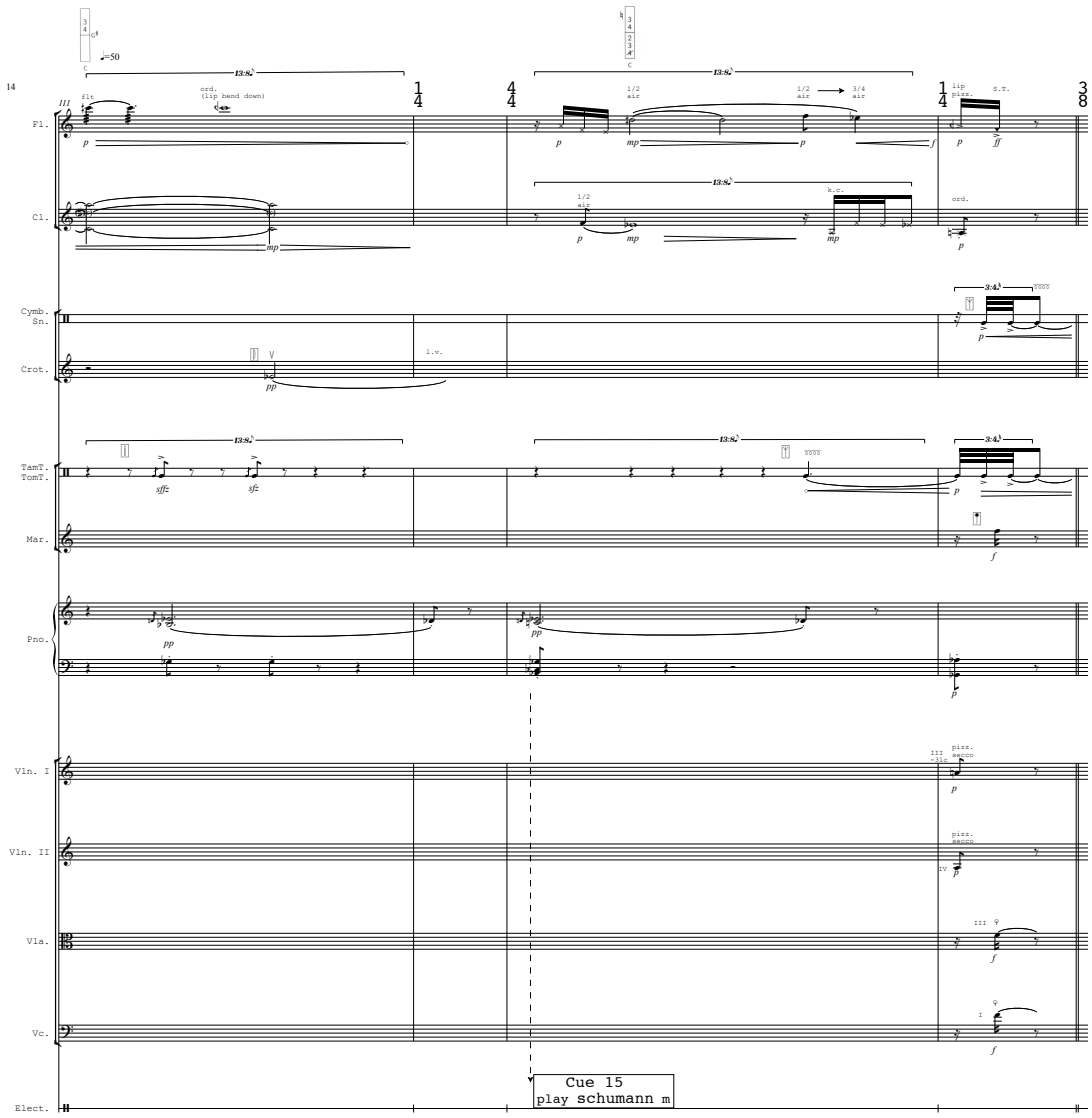

78
Fl.
Cl.
Crot.
Mar.
Pno.
pp sempre
gliss.
pp
simile
(both hands)
pppp sempre
as before
pppp poss.
p

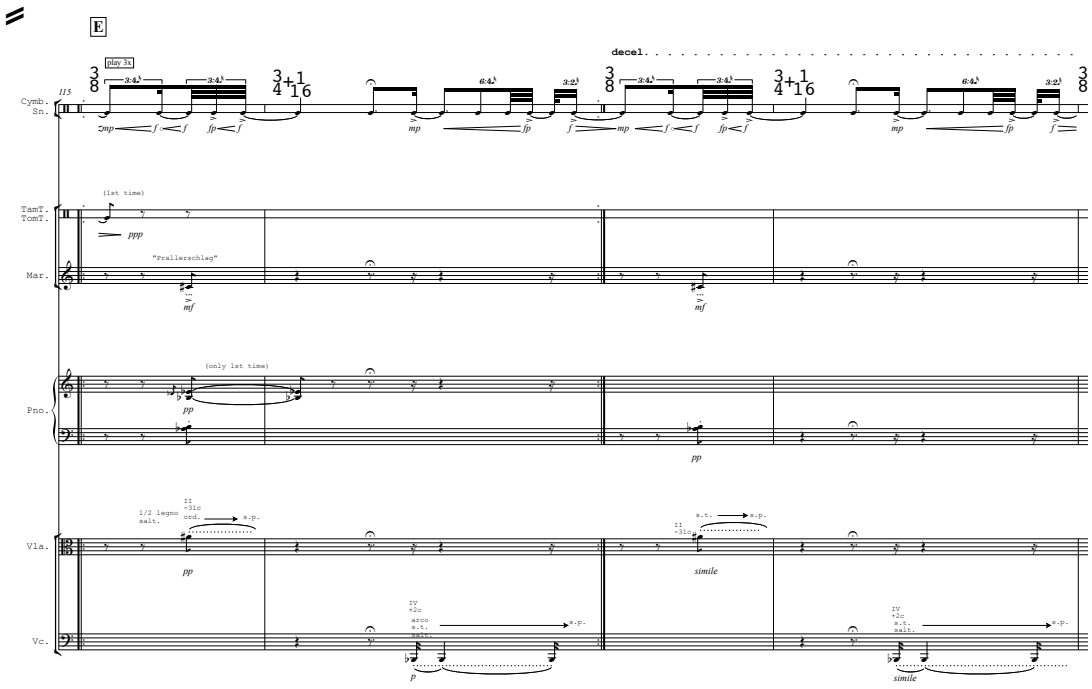

accel.
Fl.
Cl.
Vib.
Crot.
Vln. I
Vln. II
3/4 air
1/4 air
1/2 air
pp sempre
diaphragm accents
(tonguing)
gliss.
pp
pppp sempre
IV +41c mute
tratto st
II -14c mute
♩=45
sempre
TamT. TomT.
l.v.
mp
mute off
ord.
s.t.
s.p.
Vla.
Vc.
I +2c
p
full pitch
Mar.
use head of mallets
Pno.
simile
III +5c
mute
mute off
II -29c

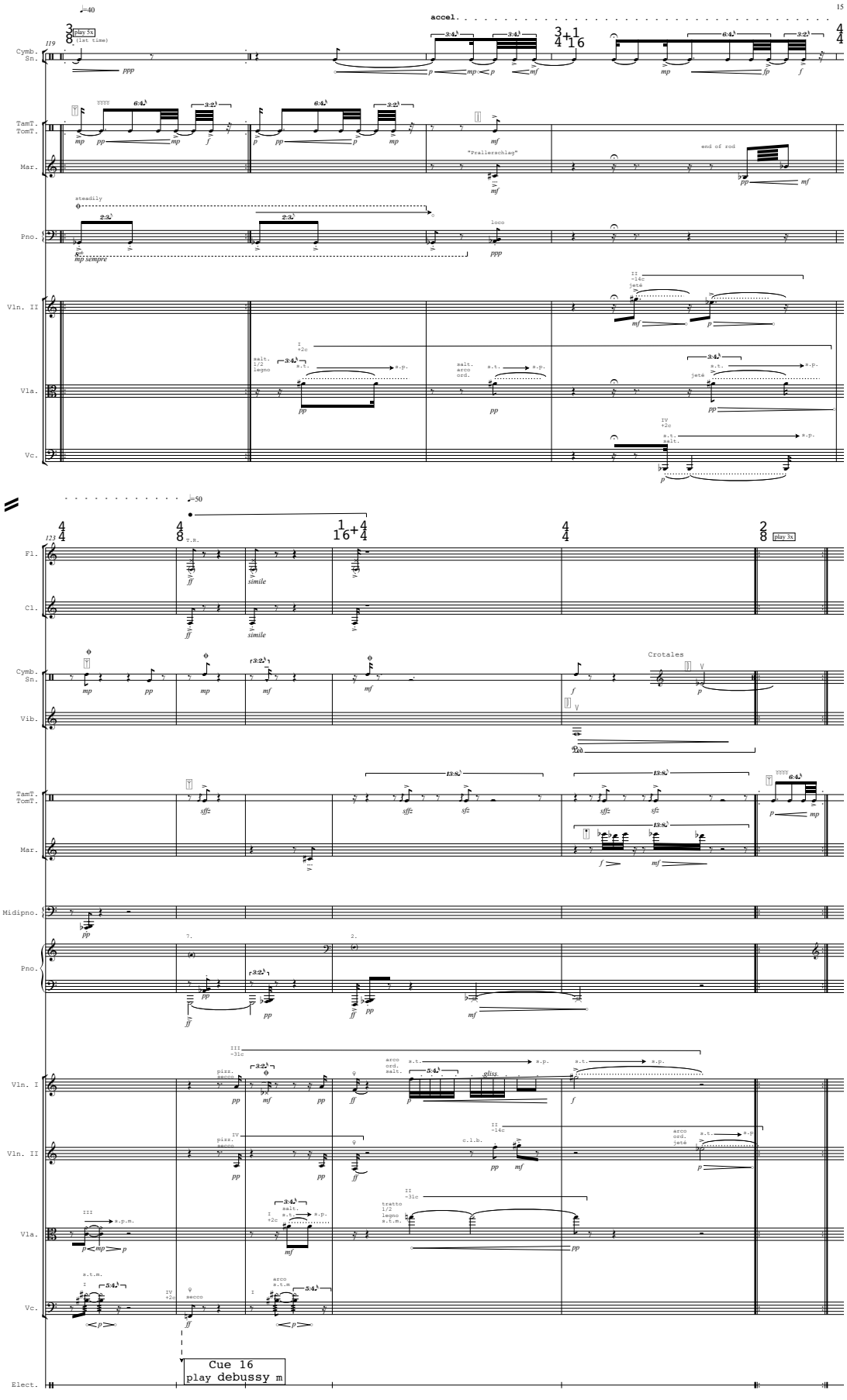

accel.
Cl.
Vib.
Crot.
pp
pp sempre
(one-handed)

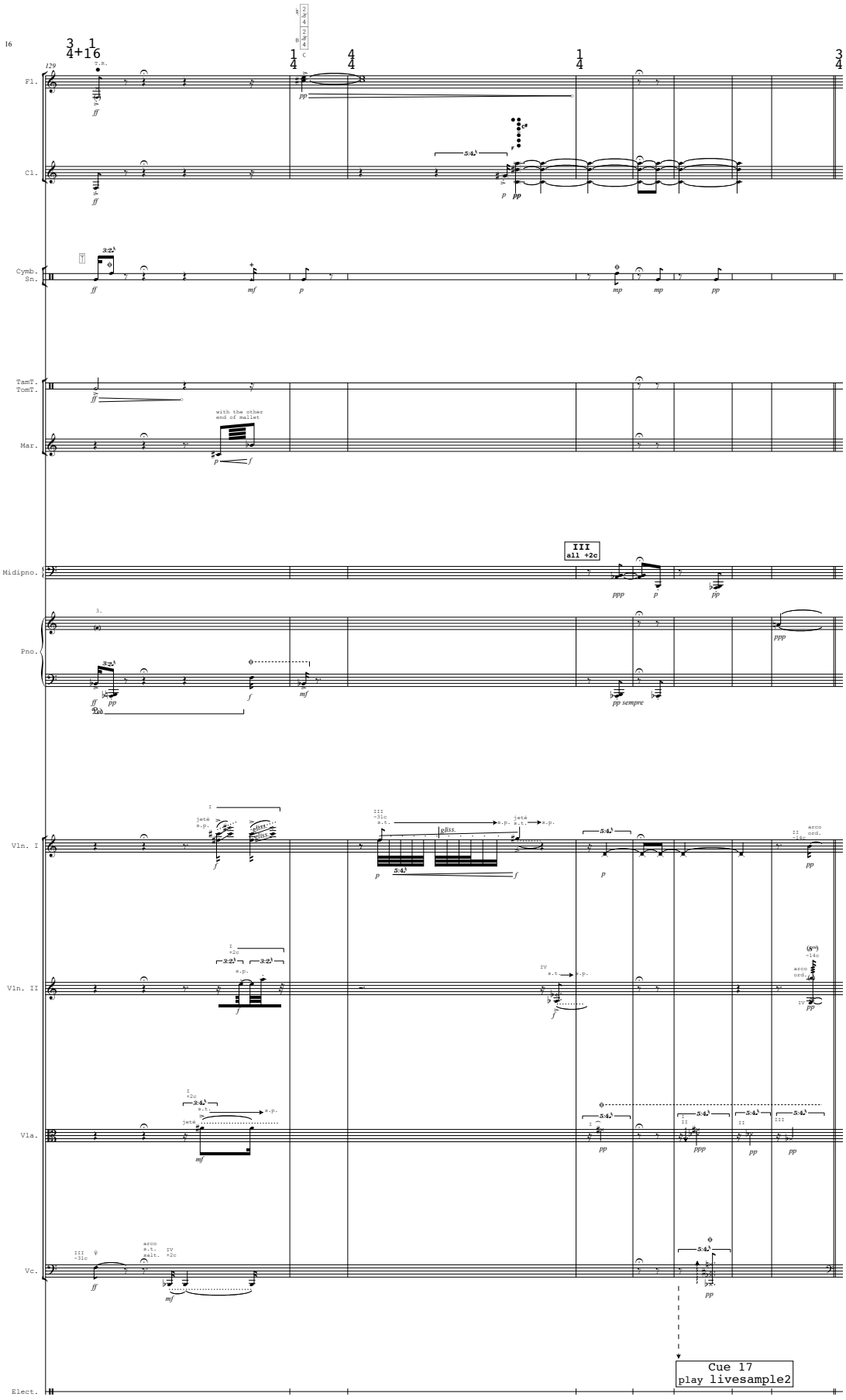

rit.
Vib.
TamT.
TomT.
Pno.
mp
ff
Sost.Ped.
Vln. I
Vln. II
Vla.
Vc.
increase bow pressure
s.t.
s.p.
ord.
mute off
Elect.
Cue 13
play beethoven m
and berg m

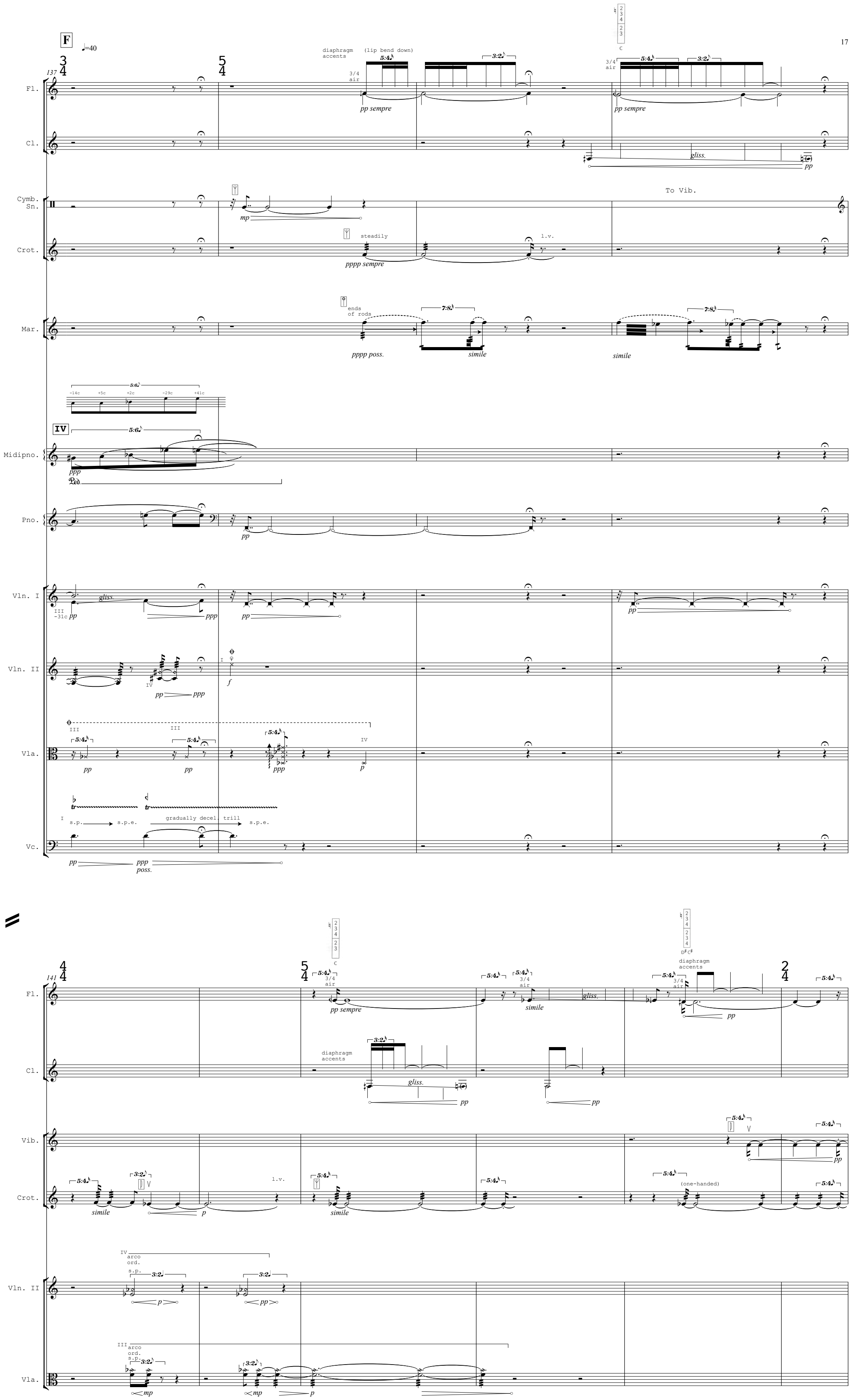

D
Fl.
Cl.
Cymb.
Sn.
TamT.
TomT.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
ord.
flt.
1/2 air
frull.
Cue 14
play debussy m
full pitch
(lip bend down)
gliss.
k.c.
loco
tratto
pizz.
(alla
chitarra)
s.t.
c.l.b.
1/2
legno
1/2 legno
salt.
pizz.
secco
s.t.m.

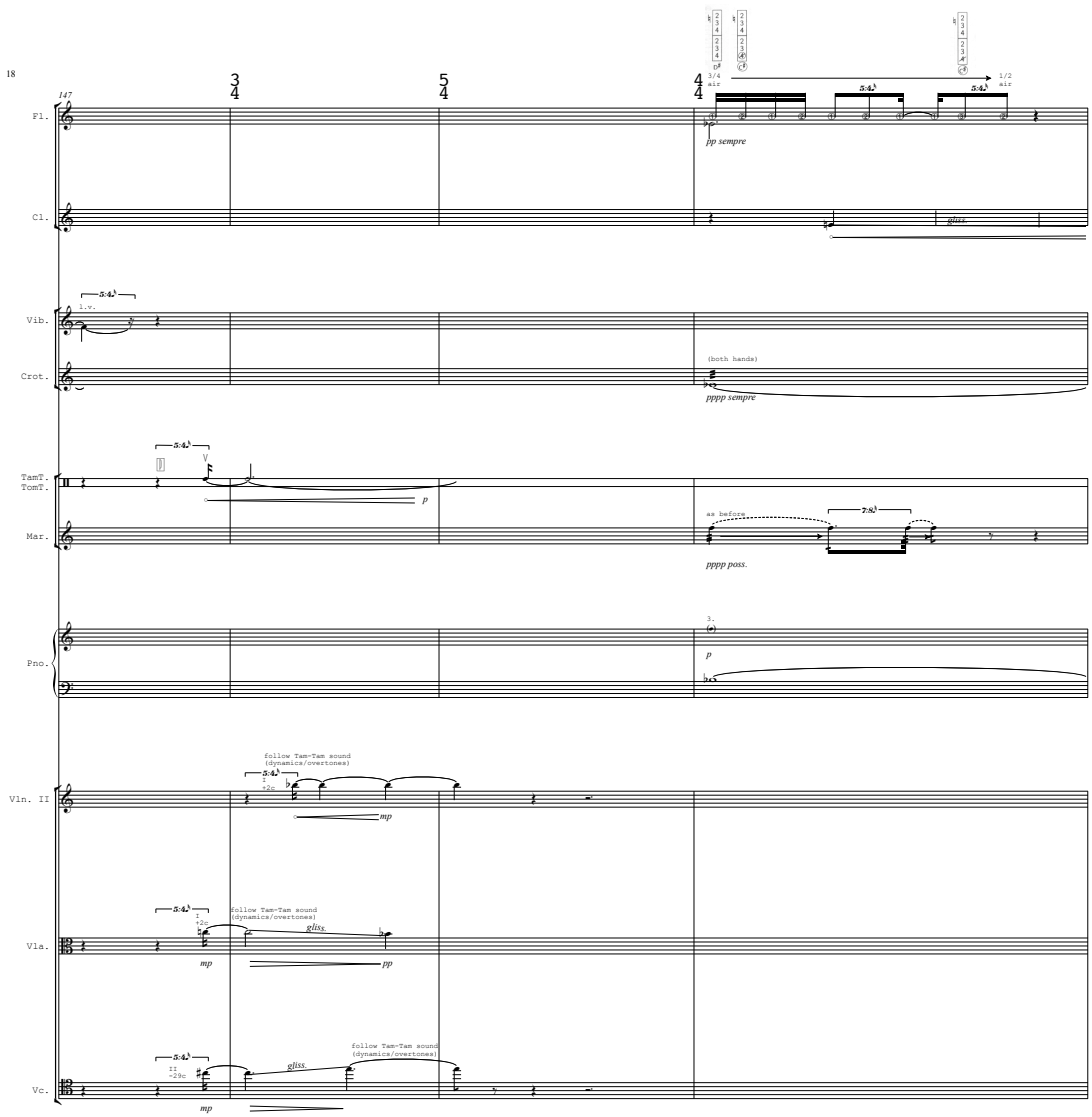

14
Fl.
Cl.
Cymb.
Sn.
Crot.
TamT.
TomT.
Mar.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
Cue 15
play schumann m

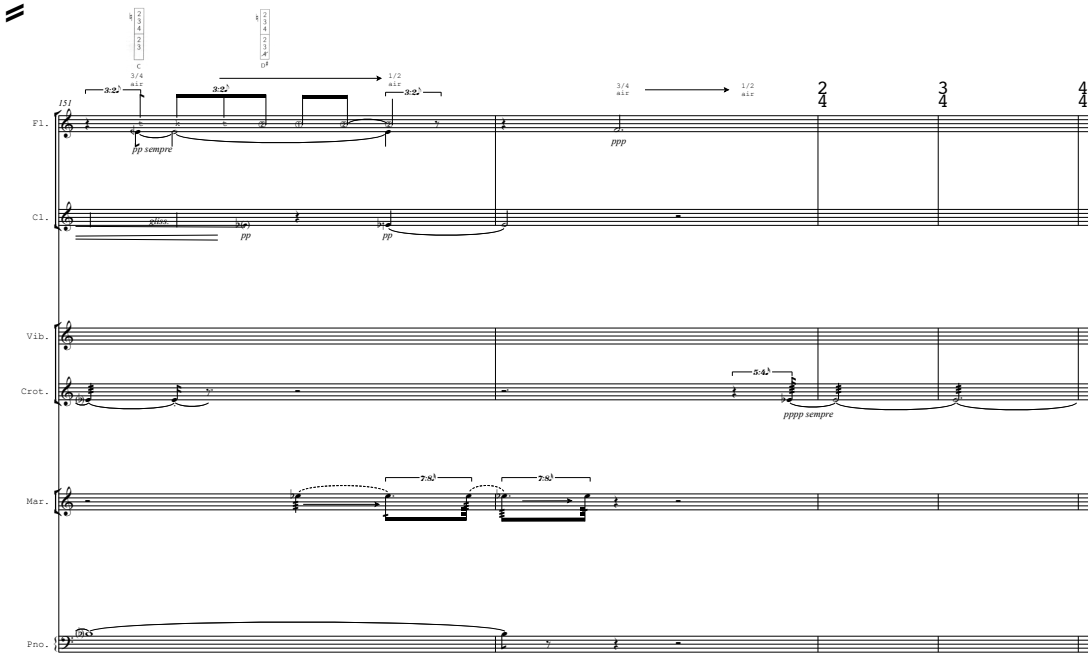

E
play 3x
decel.
115
Cymb.
Sn.
TamT.
TomT.
(1st time)
"Prallerschlag"
Mar.
(only 1st time)
Pno.
Vla.
Vc.
simile

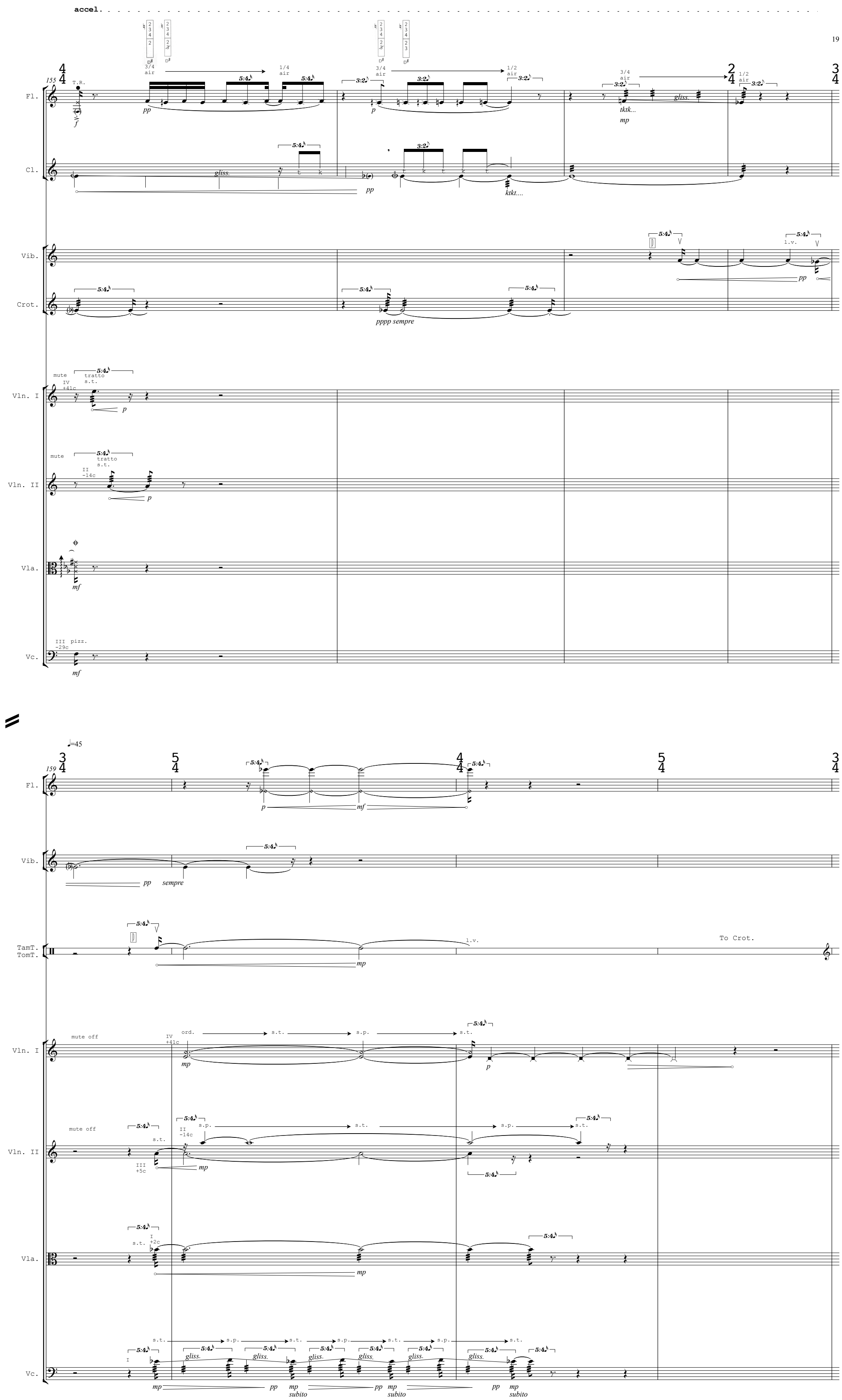

♩=40
accel.
play 5x
(1st time)
119
Cymb.
Sn.
TamT.
TomT.
Mar.
"Prallerschlag"
end of rod
steadily
Pno.
loco
Vln. II
Vla.
Vc.
♩=50
123
play 3x
Fl.
Cl.
T.R.
simile
Crotales
Vib.
Midipno.
Vln. I
s.p.m.
s.t.m.
Cue 16
play debussy m
Elect.

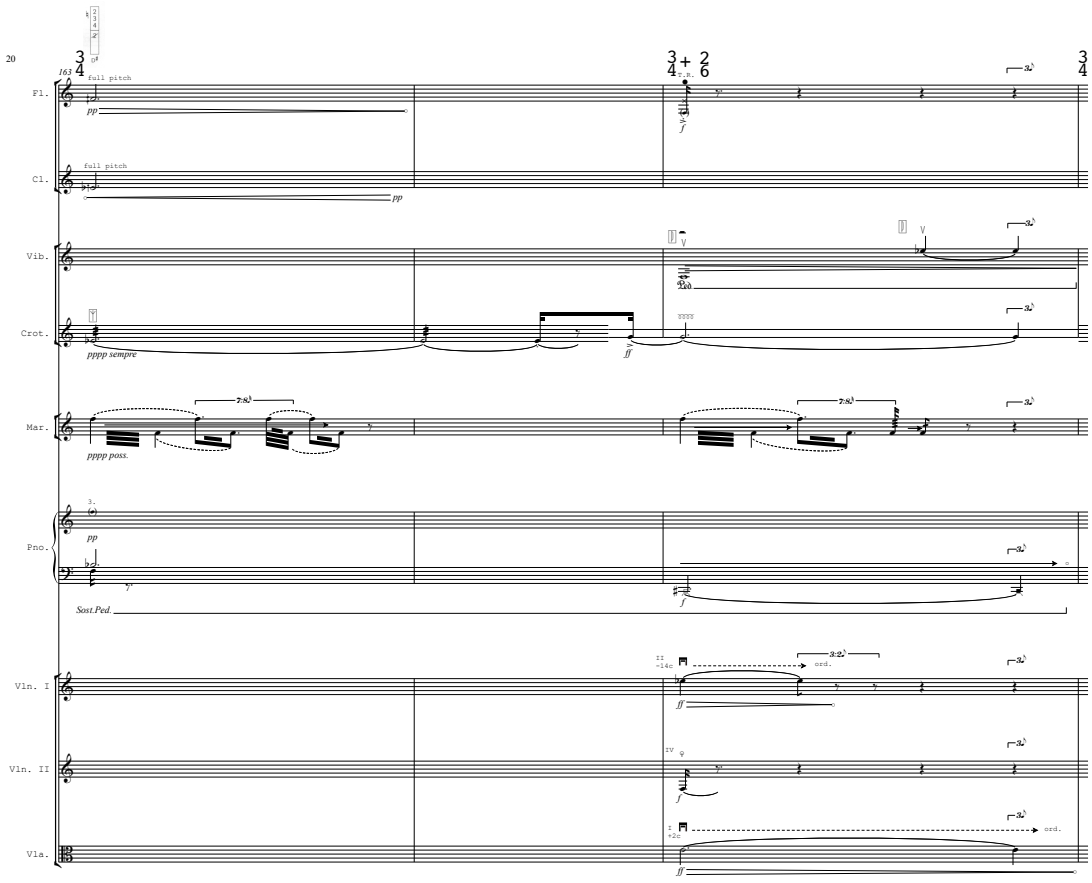

3 1
4+16
1
4
4
4
1
4
3
4
129
Fl.
Cl.
Cymb.
Sn.
TamT.
TomT.
Mar.
with the other end of mallet
Midipno.
III
all +2c
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
Cue 17
play livesample2

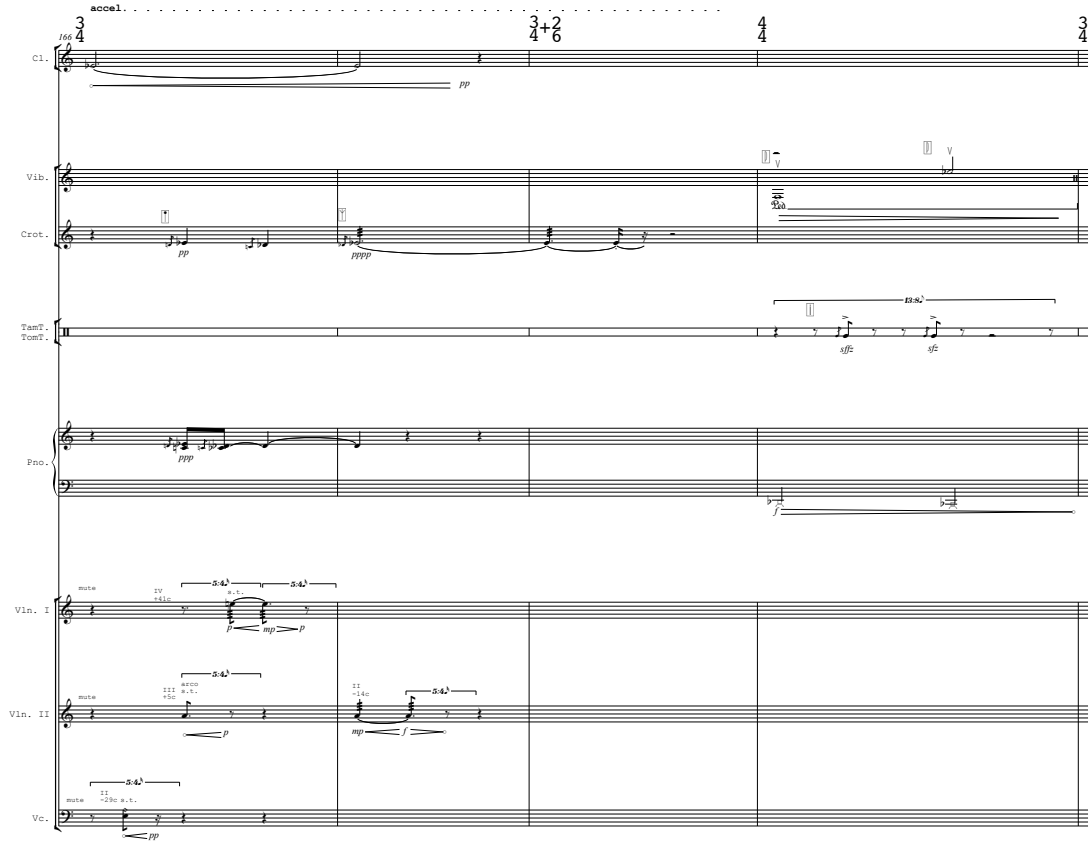

F
♩=40
137
Fl.
Cl.
Cymb. Sn.
Crot.
Mar.
Midipno.
Pno.
Vln. I
Vln. II
Vla.
Vc.
diaphragm accents
(lip bend down)
3/4 air
pp sempre
gliss.
To Vib.
steadily
pppp sempre
l.v.
ends of rods
pppp poss.
simile
IV
ppp
gliss.
III -31c
ppp
pp
f
ppp
s.p.
s.p.e.
gradually decel. trill
pp
ppp poss.
141
Vib.
simile
p
(one-handed)
arco ord. s.p.
mp
pp
p

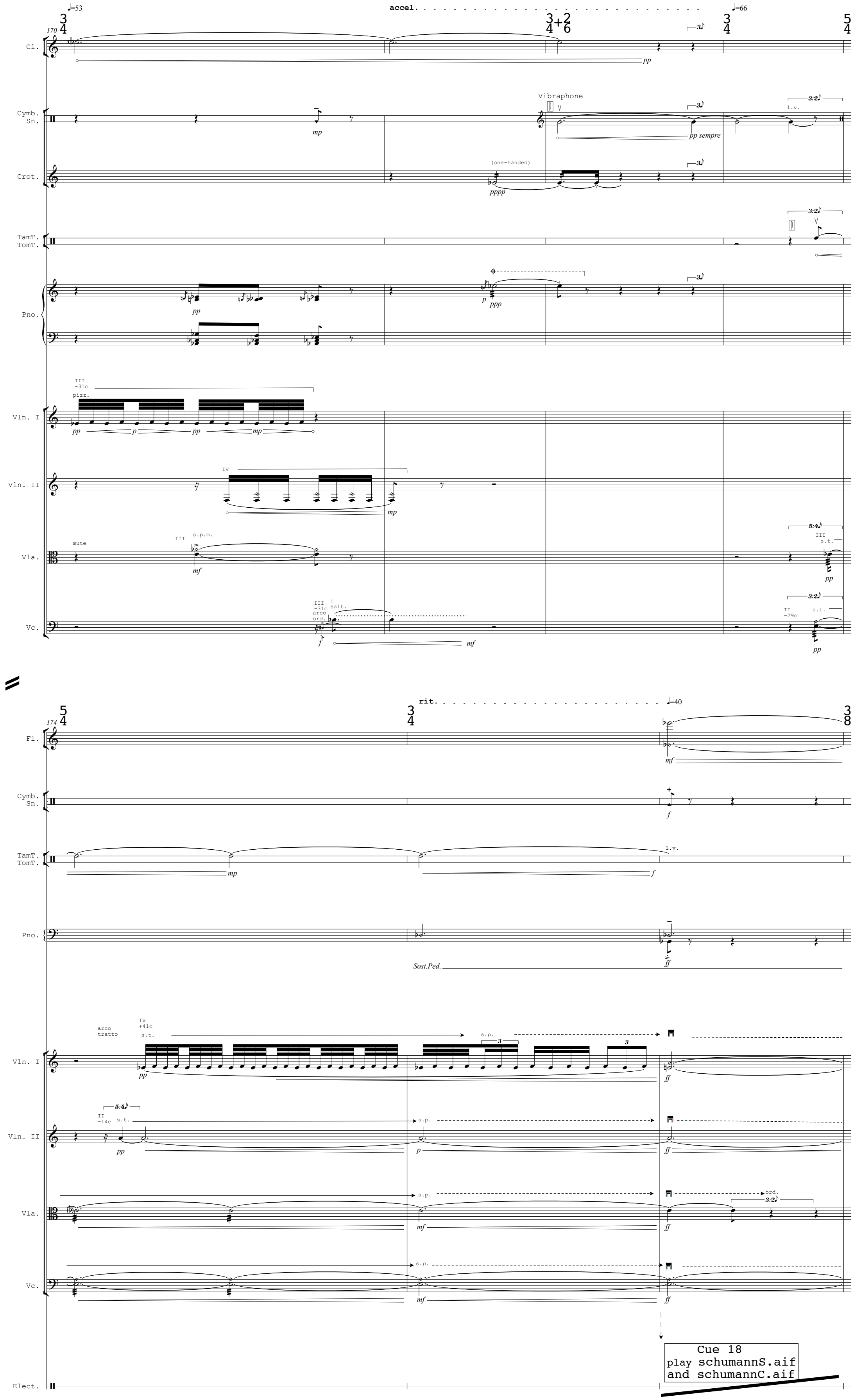

147
Fl.
Cl.
Vib.
Crot.
TamT.
TomT.
Mar.
Pno.
Vln. II
Vla.
Vc.
pp sempre
gliss.
(both hands)
pppp sempre
as before
pppp poss.
p
mp
pp
follow Tam-Tam sound (dynamics/overtones)

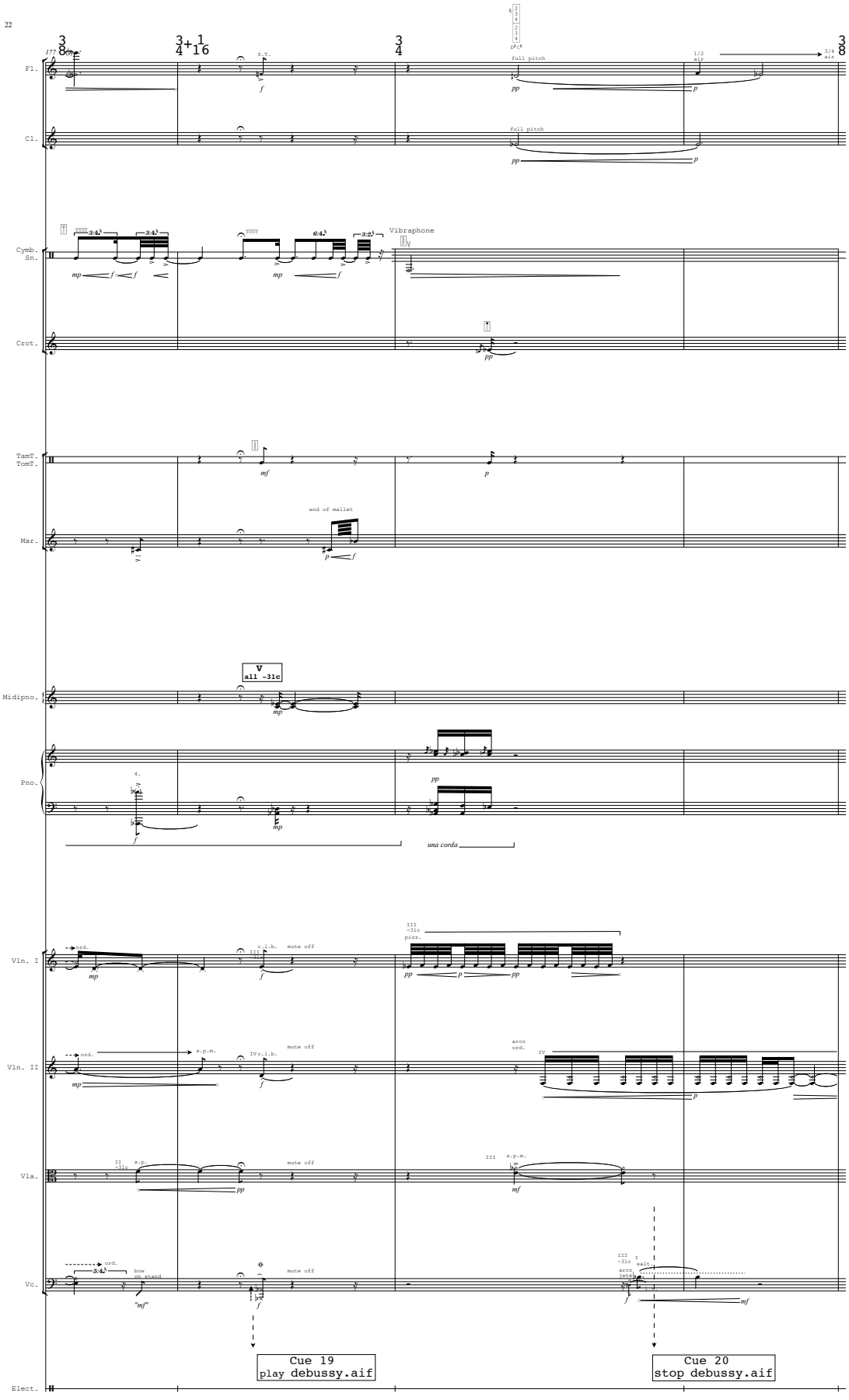

151
Fl.
Cl.
Vib.
Crot.
Mar.
Pno.
pp sempre
ppp
gliss.
pppp sempre

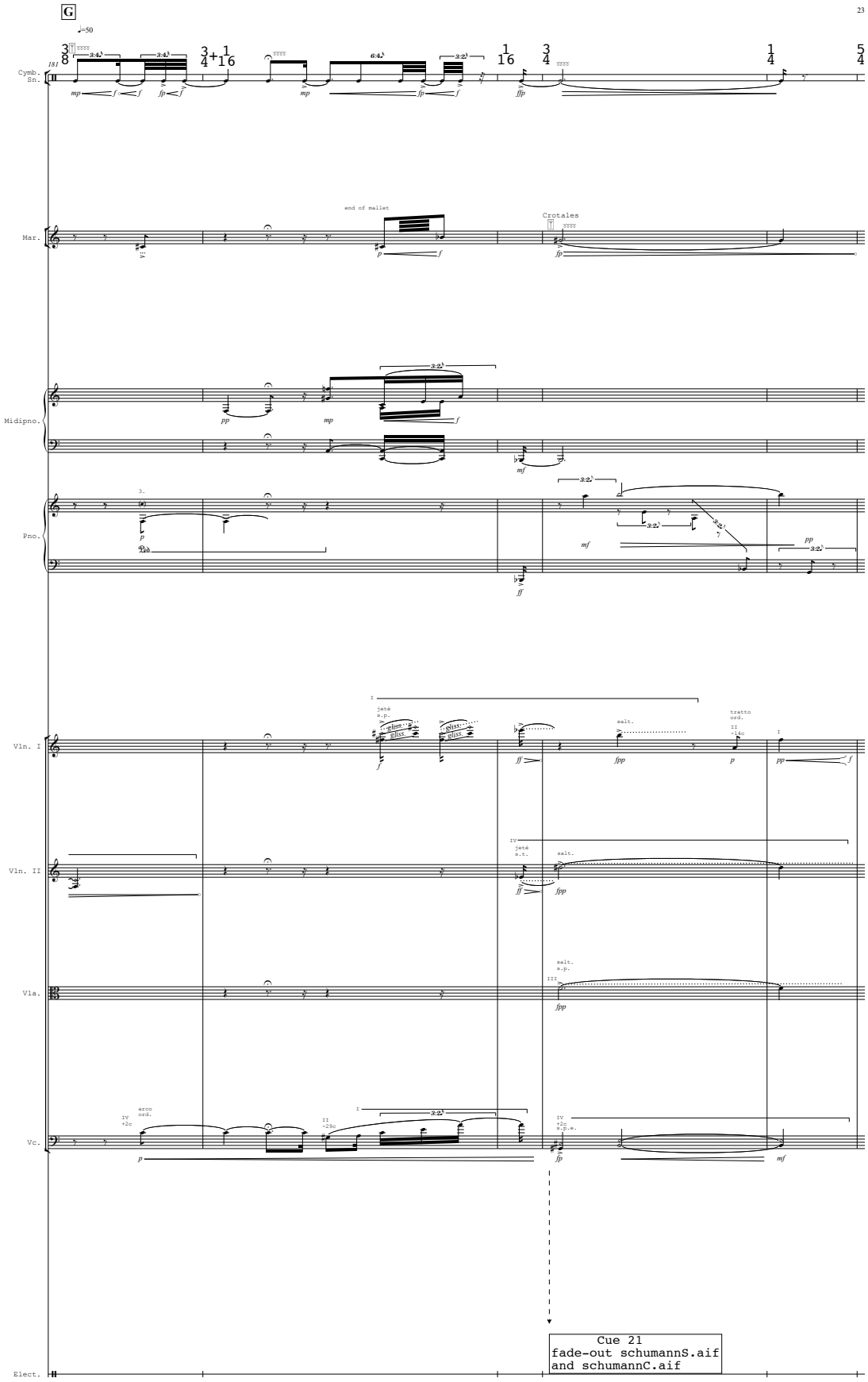

accel.
Fl.
Cl.
Vib.
Crot.
Vln. I
Vln. II
Vla.
Vc.
T.R.
air
gliss.
tktk...
ktkt....
pppp sempre
l.v.
mute
tratto
s.t.
pizz.
♩=45
TamT.
TomT.
To Crot.
mute off
ord.
s.p.
pp
sempre
mp
subito
mf

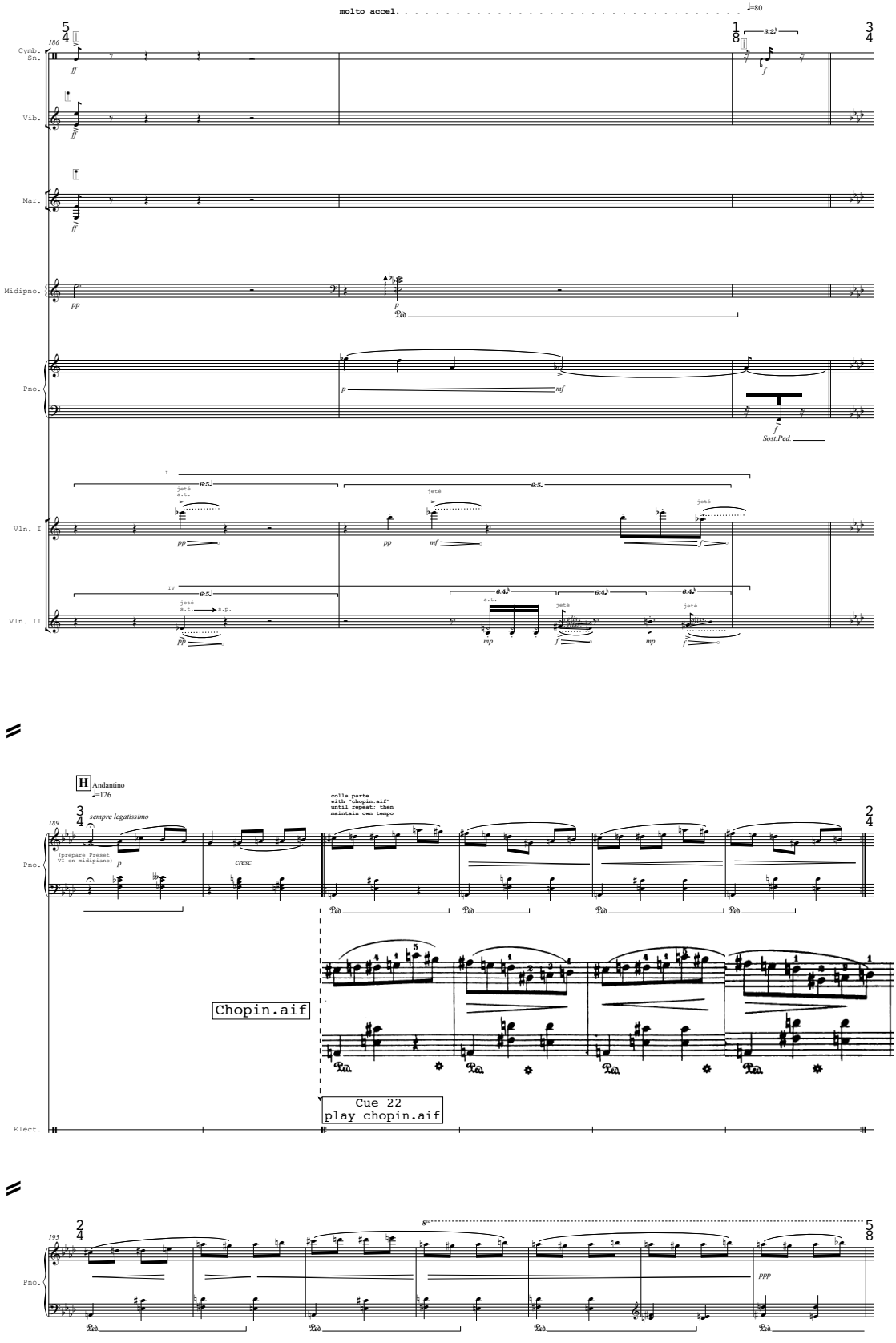

163
Fl.
Cl.
Vib.
Crot.
Mar.
Pno.
Vln. I
Vln. II
Vla.
full pitch
pp
pppp sempre
pppp poss.
Sost.Ped.
ff
f
ord.

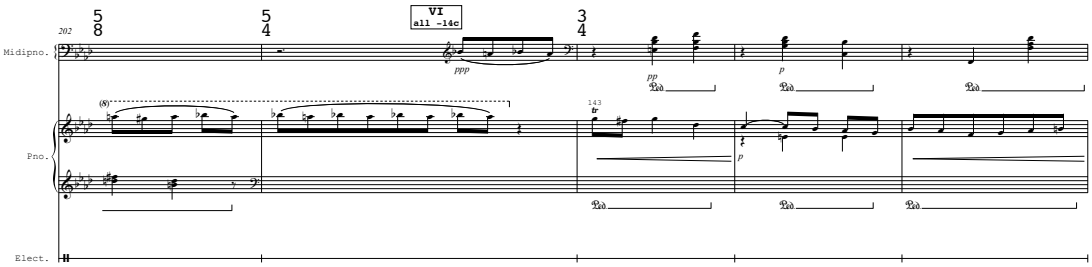

accel.
166
Cl.
Vib.
Crot.
TamT.
TomT.
Pno.
Vln. I
Vln. II
Vc.
mute
pp
ppp
pppp
sffz
sfz
mp
arco

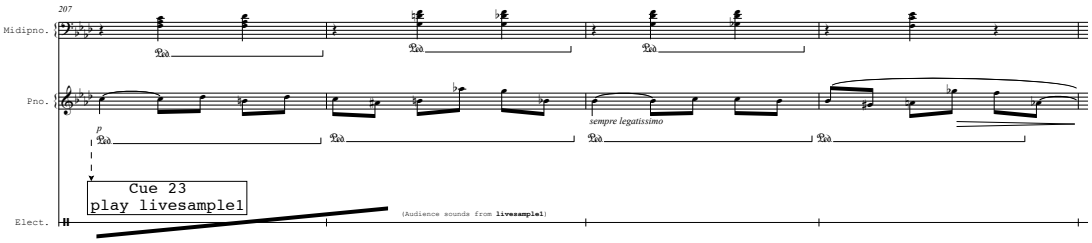

♩=53
accel.
♩=66
Cl.
pp
Cymb.
Sn.
Vibraphone
pp sempre
l.v.
Crot.
(one-handed)
pppp
TamT.
TomT.
Pno.
Vln. I
pizz.
Vln. II
Vla.
mute
s.p.m.
Vc.
salt.
arco
ord.
rit.
♩=40
Fl.
Sost.Ped.
arco
tratto
s.t.
s.p.
Elect.
Cue 18
play schumannS.aif
and schumannC.aif

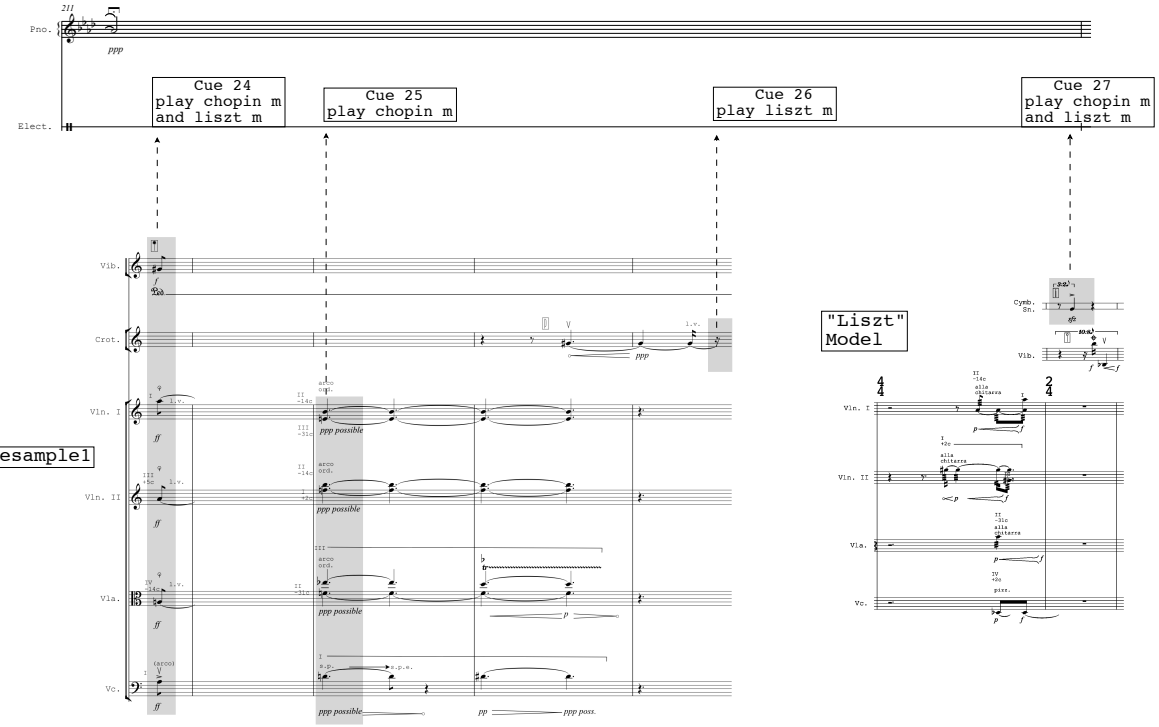

Fl.
Cl.
Cymb.
Sn.
Crot.
TamT.
TomT.
Mar.
Midipno.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
Vibraphone
full pitch
end of mallet
una corda
mute off
bow on stand
Cue 19
play debussy.aif
Cue 20
stop debussy.aif

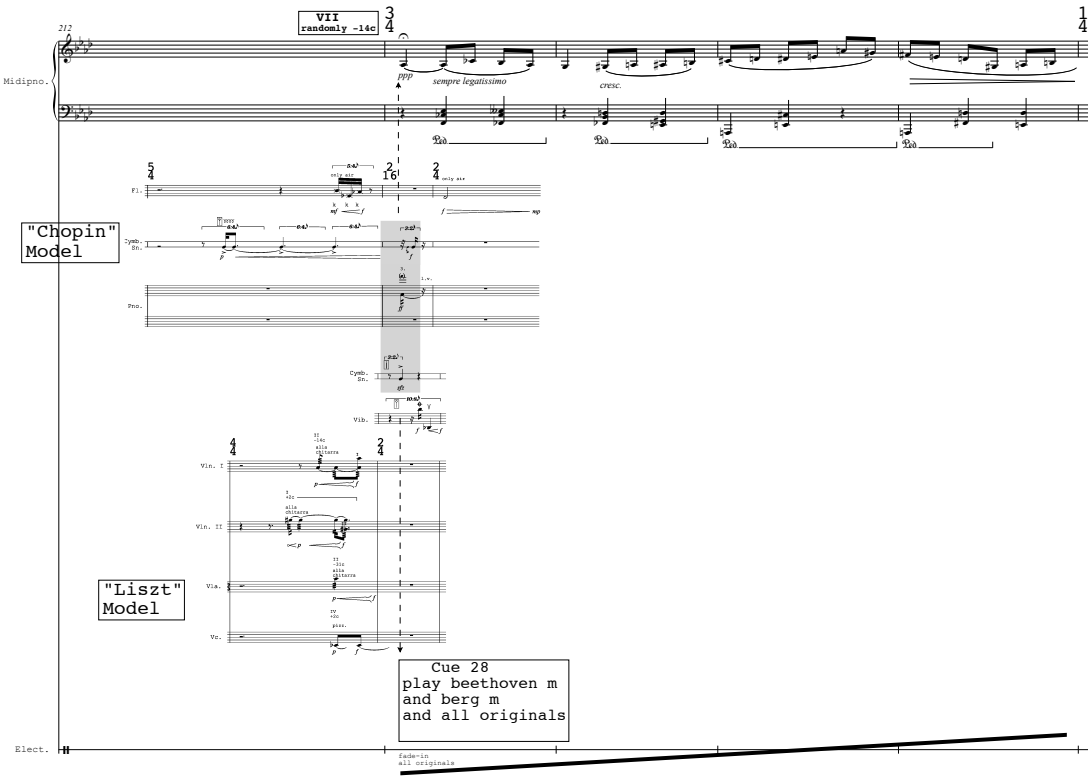

G
♩=50
Cymb.
Sn.
Mar.
end of mallet
Crotales
Midipno.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
jeté
s.p.
salt.
tratto
ord.
jeté
s.t.
salt.
s.p.
arco
ord.
Cue 21
fade-out schumannS.aif
and schumannC.aif

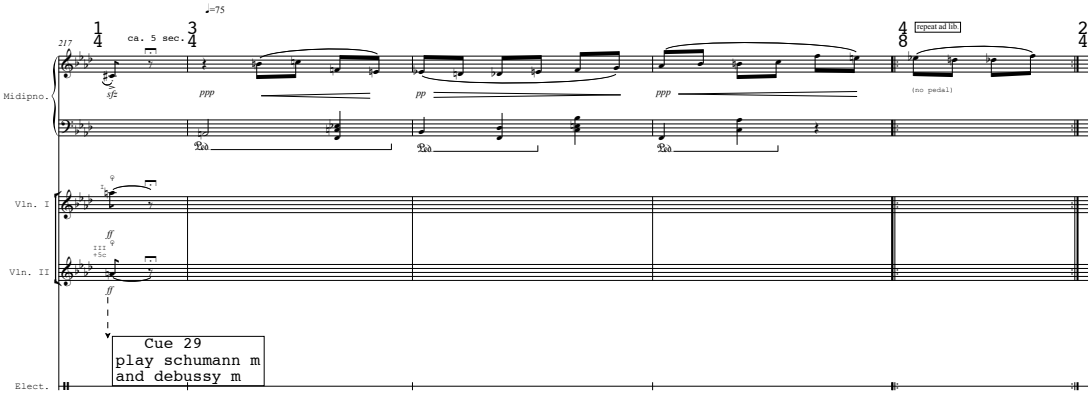

molto accel.
♩=80
186
Cymb.
Sn.
Vib.
Mar.
Midipno.
Pno.
Sost.Ped.
Vln. I
Vln. II
jeté
s.t.
s.p.
189
H
Andantino
♩=126
sempre legatissimo
(prepare Preset
VI on midipiano)
cresc.
colla parte
with "chopin.aif"
until repeat; then
maintain own tempo
Chopin.aif
Cue 22
play chopin.aif
Elect.
195
ppp

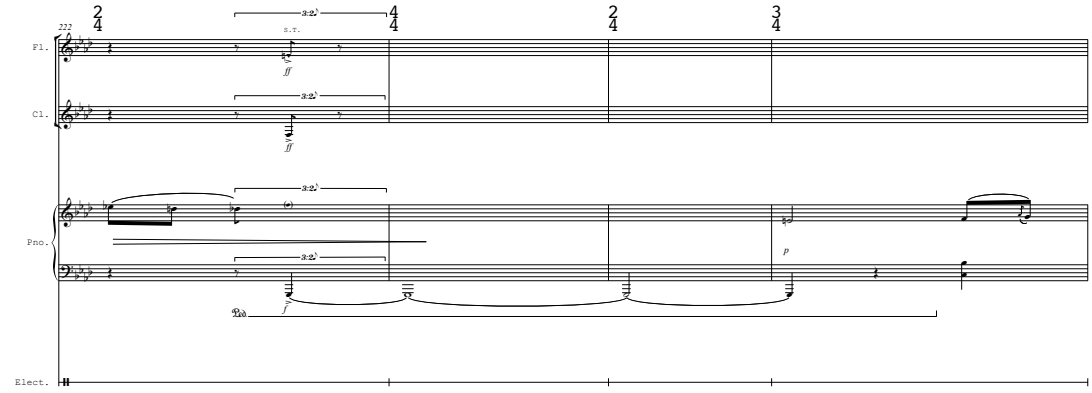

202
VI
all -14c
Midipno.
Pno.
Elect.
ppp
pp
p
143
br

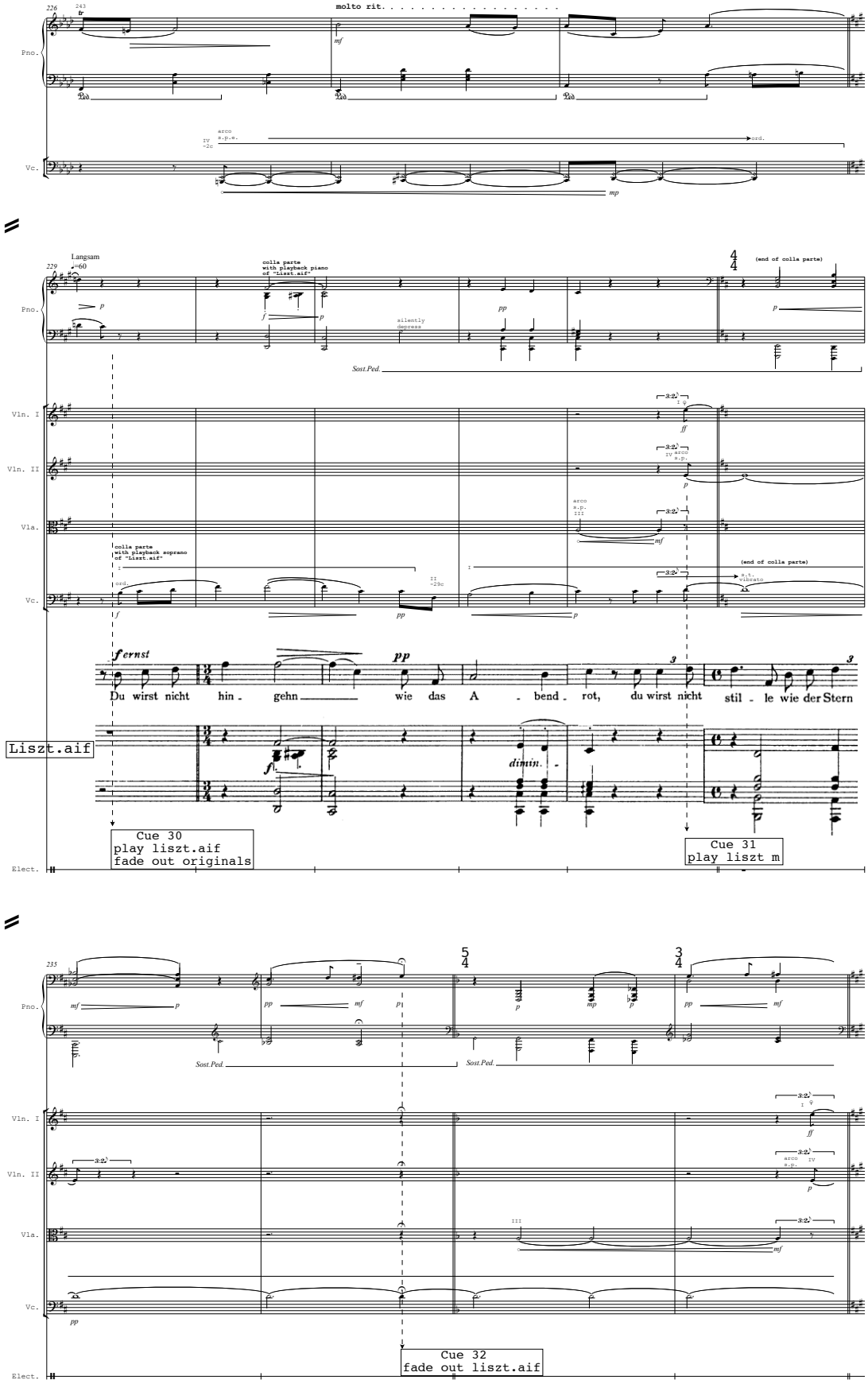

207
Midipno.
Pno.
Elect.
p
sempre legatissimo
Cue 23
play livesample1
(Audience sounds from livesample1)

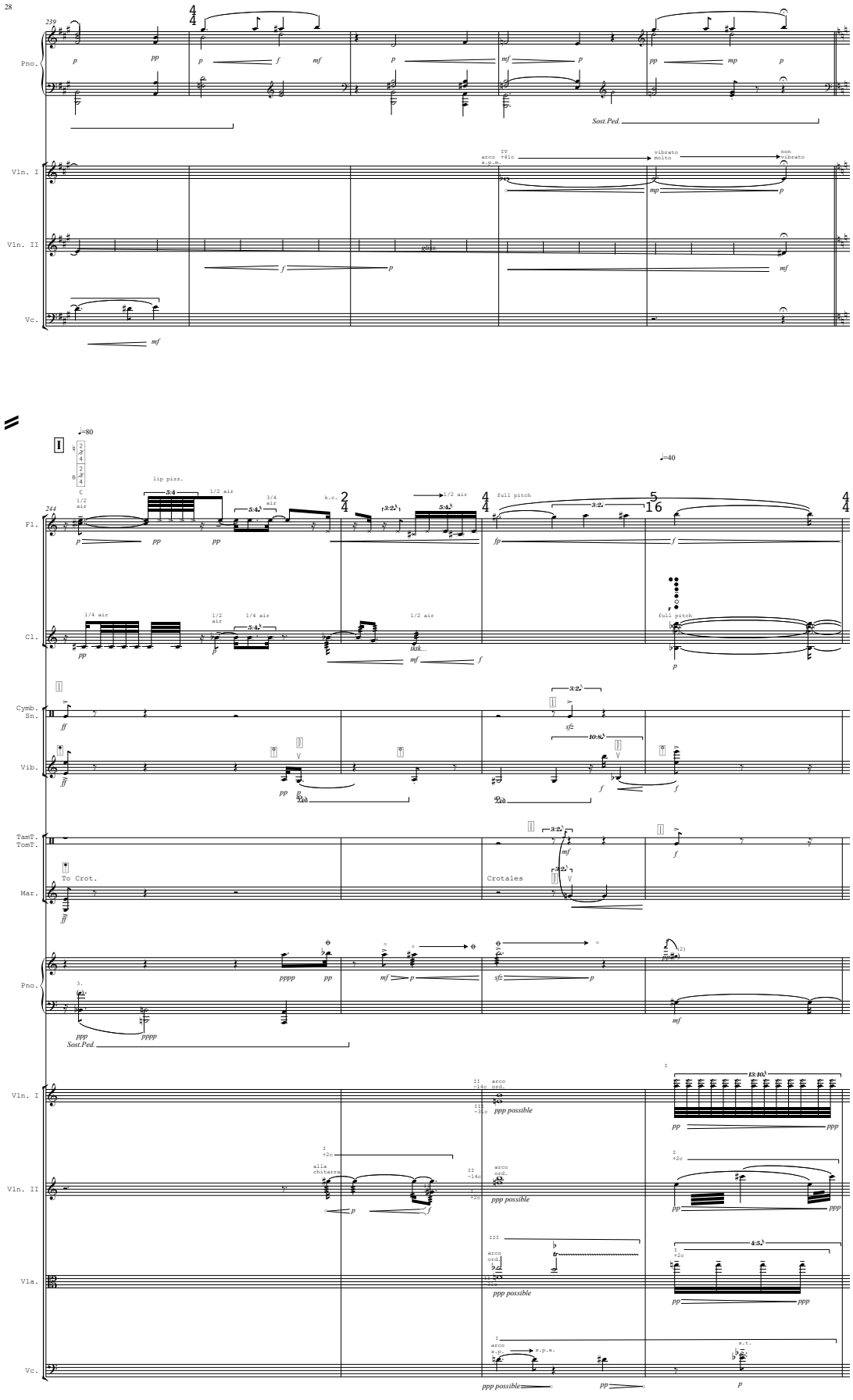

211
Pno.
Elect.
ppp
Cue 24
play chopin m
and liszt m
Cue 25
play chopin m
Cue 26
play liszt m
Cue 27
play chopin m
and liszt m
livesample1
"Liszt"
Model
Vib.
Crot.
Vln. I
Vln. II
Vla.
Vc.
Cymb.
Bn.
ppp possible
pp
ppp poss.

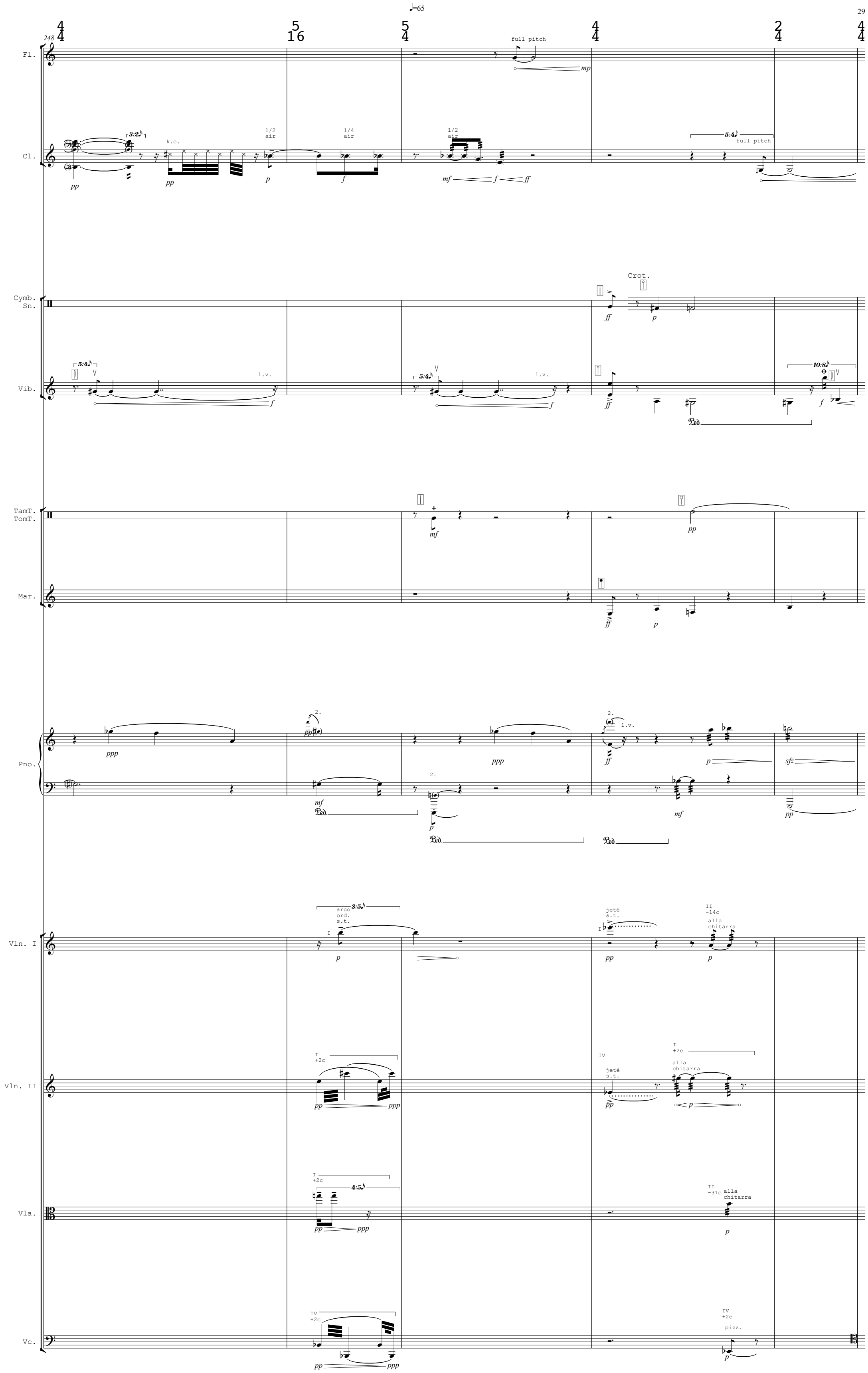

VII
randomly -14c
"Chopin"
Model
"Liszt"
Model
Cue 28
play beethoven m
and berg m
and all originals
Midipno.
Elect.
fade-in
all originals

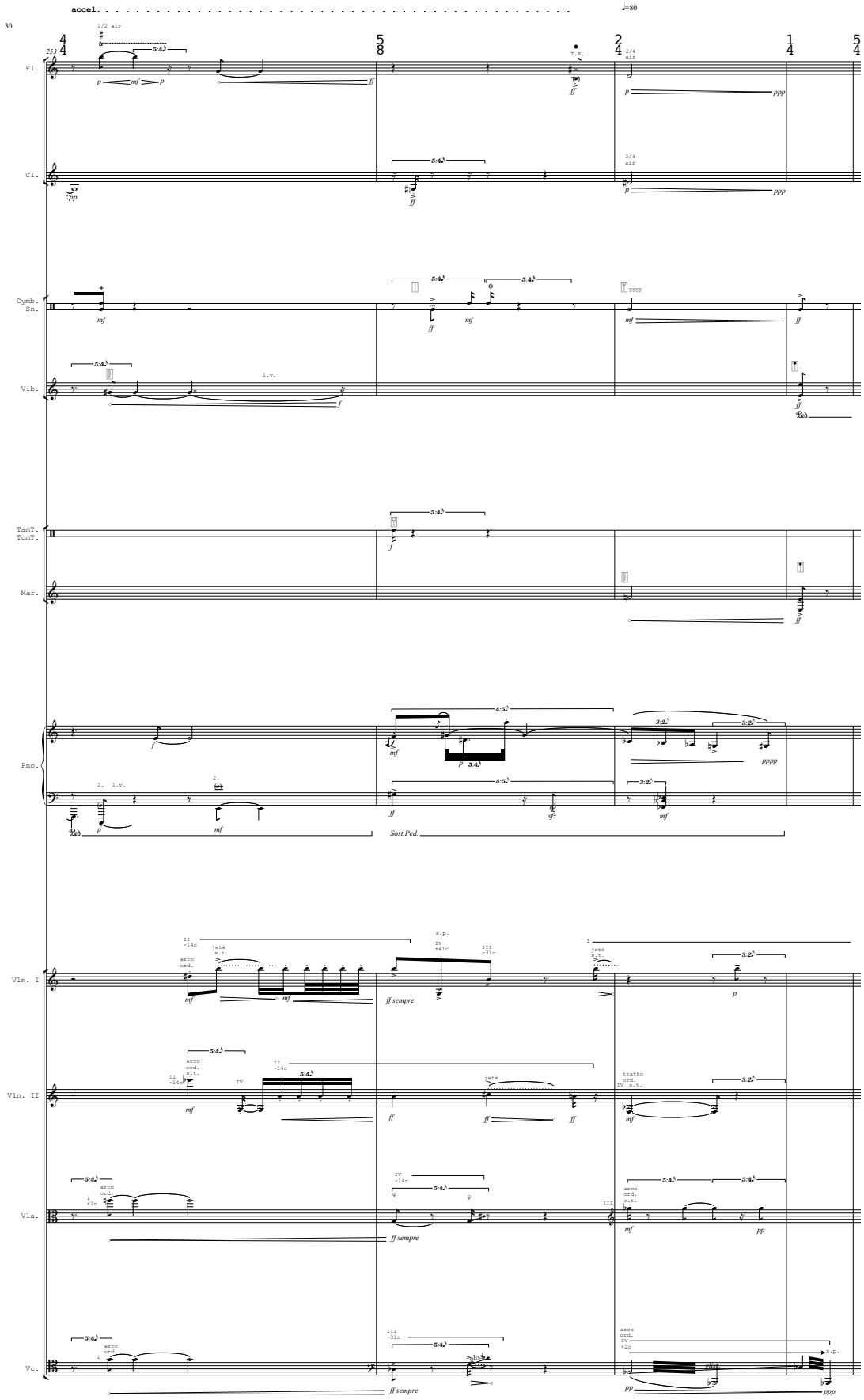

ca. 5 sec.
repeat ad lib
(no pedal)
Cue 29
play schumann m
and debussy m
Midipno.
Vln. I
Vln. II
Elect.

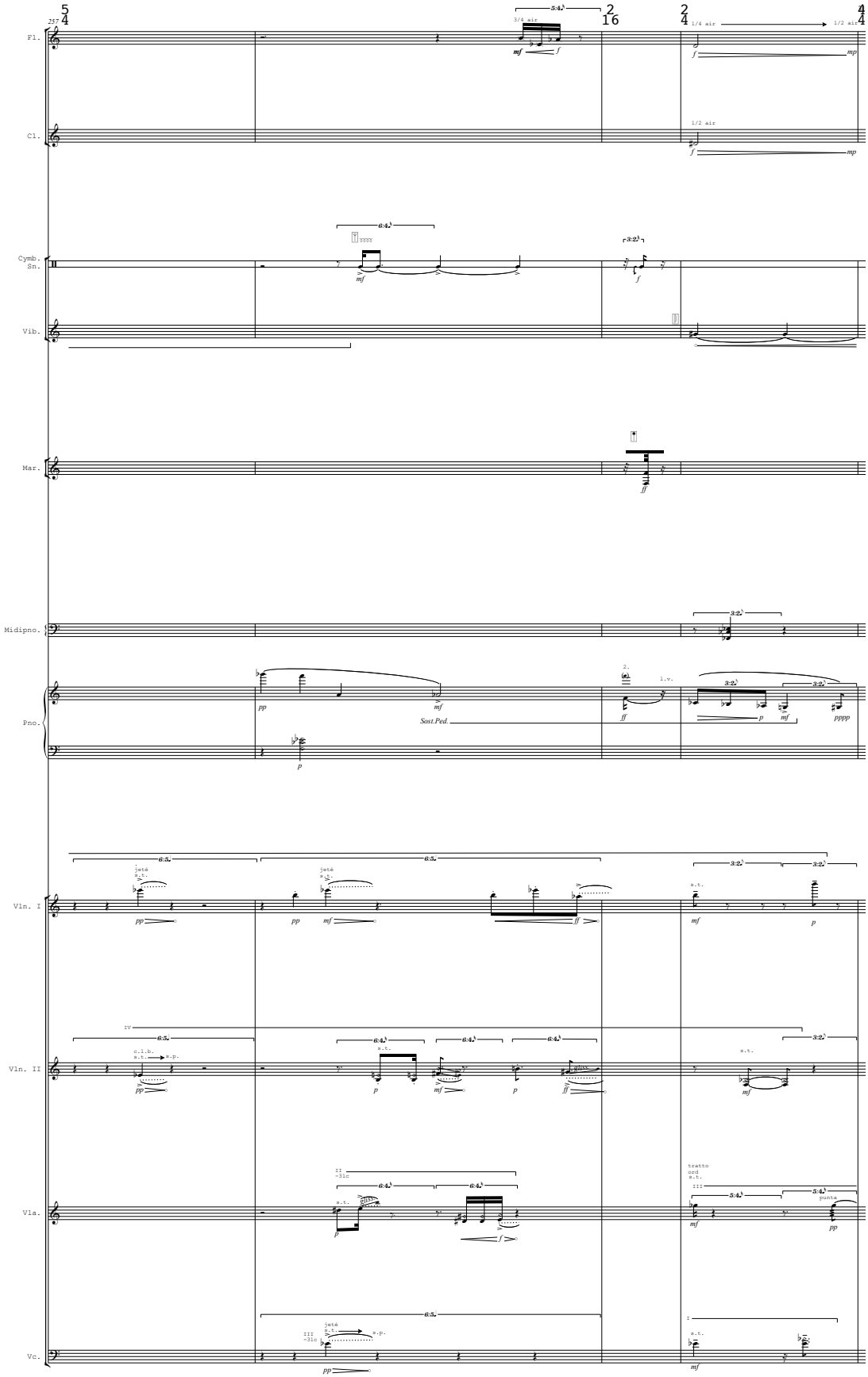

Fl.
Cl.
Pno.
Elect.

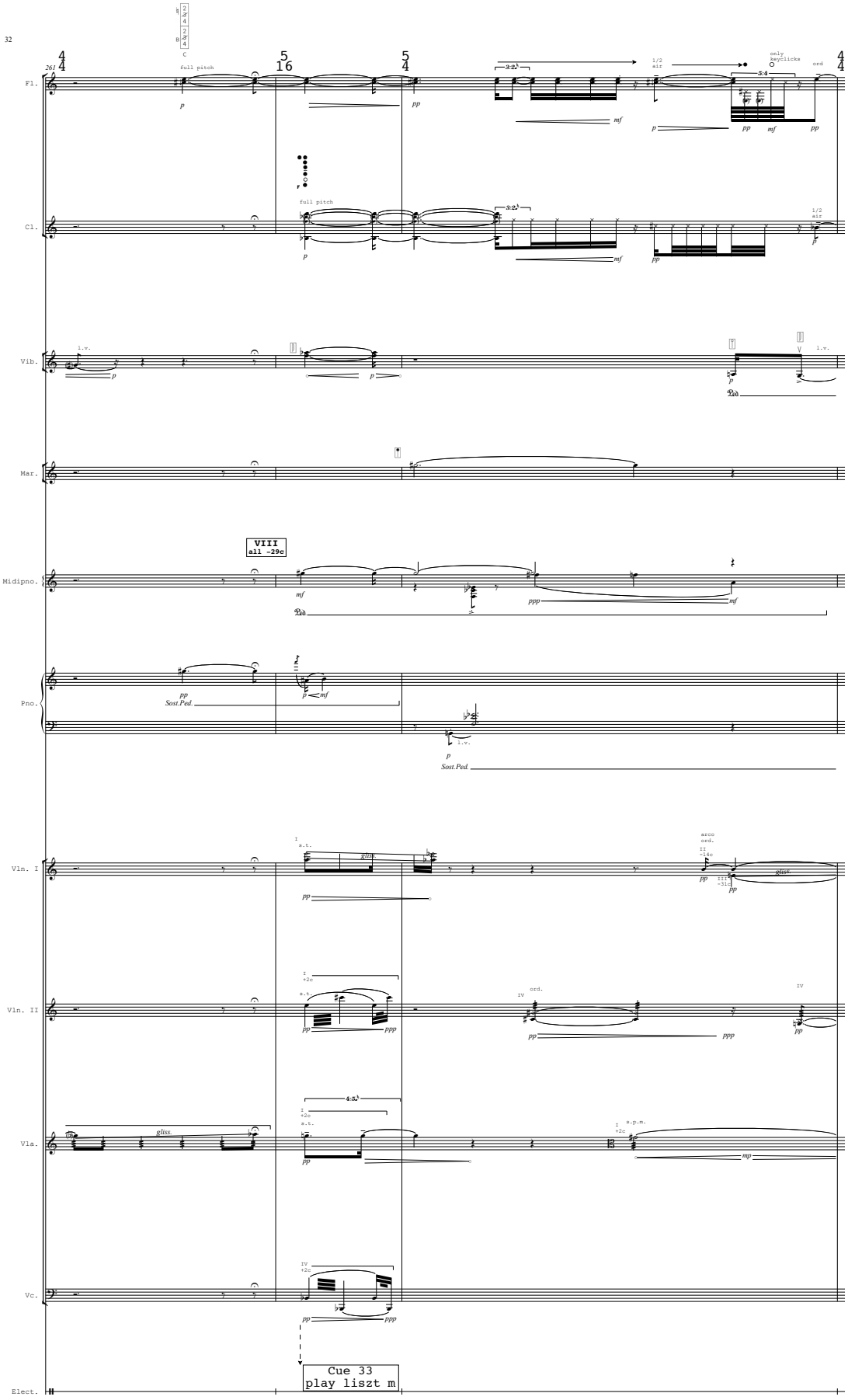

molto rit.
Pno.
Vc.
Langsam
colla parte with playback piano of "Liszt.aif"
(end of colla parte)
Vln. I
Vln. II
Vla.
colla parte with playback soprano of "Liszt.aif"
ernst
Du wirst nicht hin - gehn wie das A - bend - rot, du wirst nicht stil - le wie der Stern
Liszt.aif
Cue 30
play liszt.aif
fade out originals
Cue 31
play liszt m
Elect.
Cue 32
fade out liszt.aif

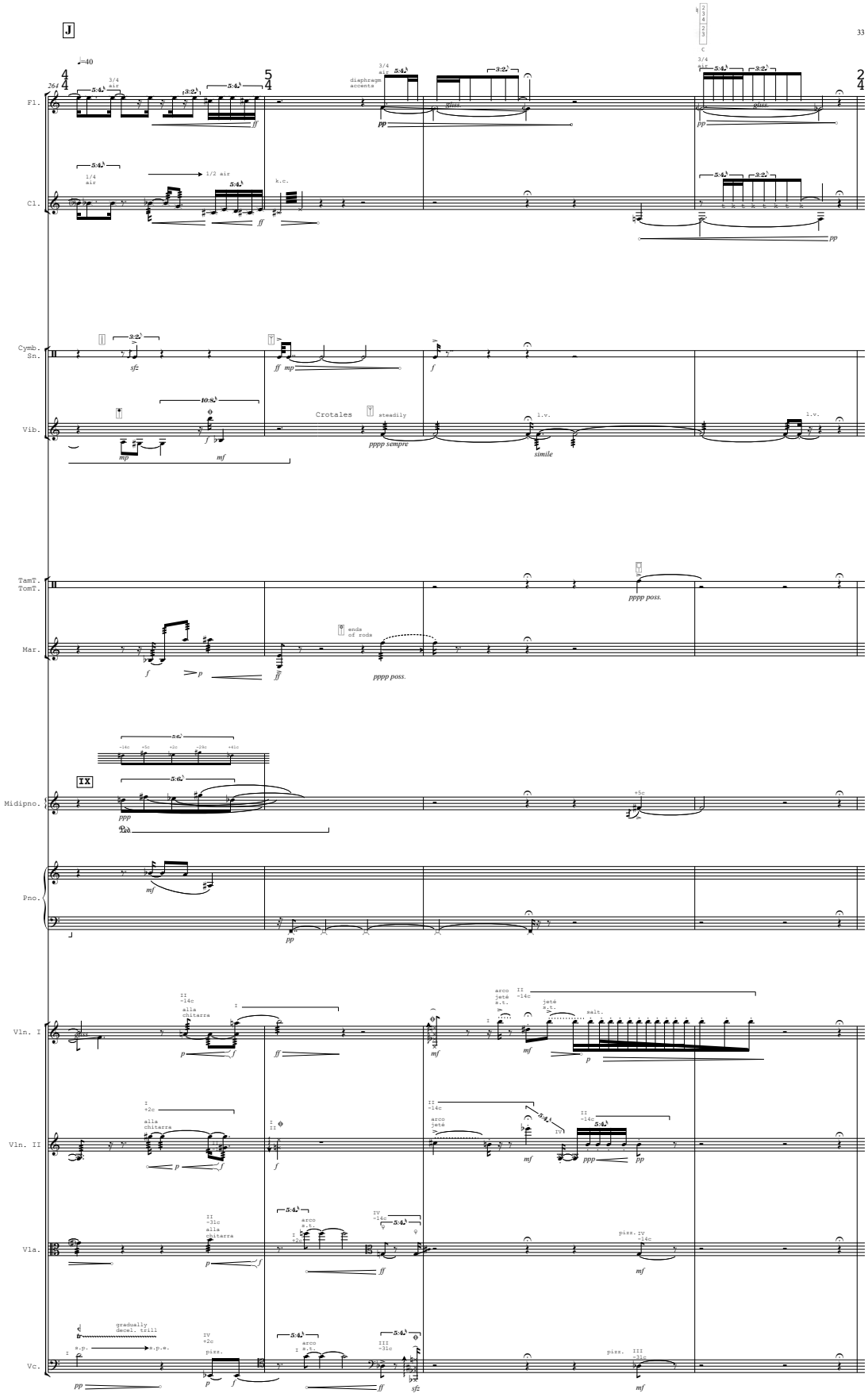

239
Pno.
Vln. I
Vln. II
Vc.
Sost.Ped.
arco
vibrato molto
non vibrato
244
I
♩=80
♩=40
lip pizz.
1/2 air
1/4 air
3/4 air
k.c.
full pitch
Fl.
Cl.
Cymb.
Sn.
Vib.
TamT.
TomT.
Mar.
To Crot.
Crotales
Sost.Ped.
Vln. I
Vln. II
Vla.
Vc.
ppp possible

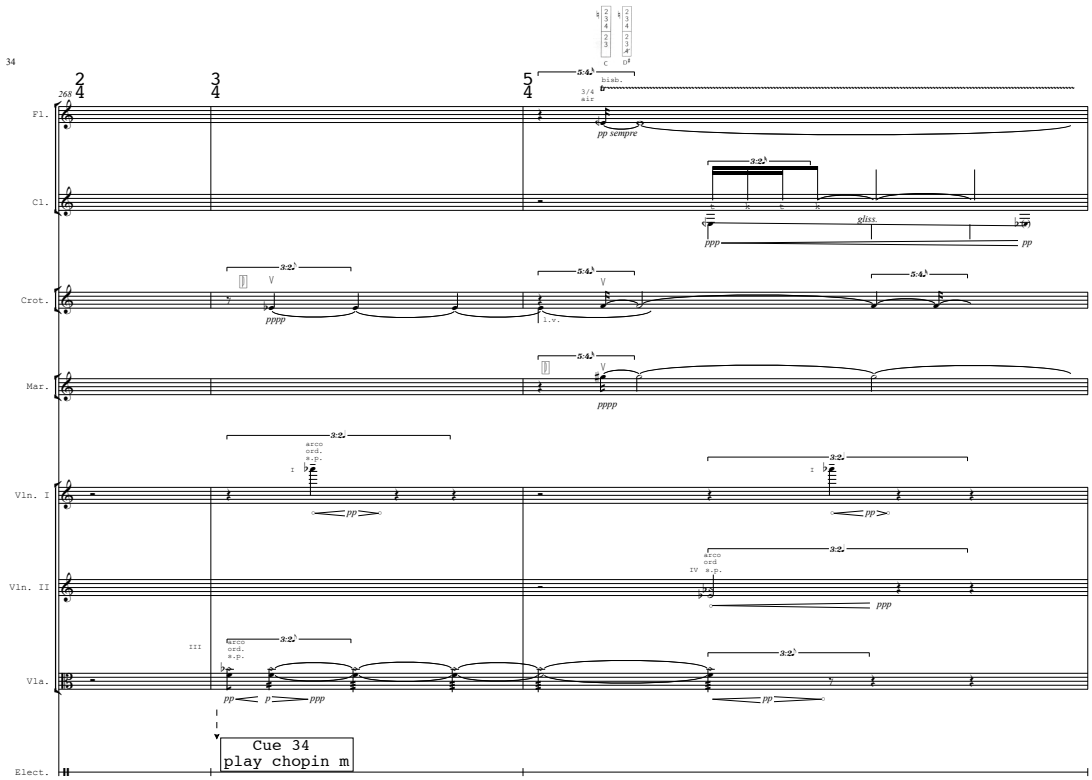

♩=65
248
Fl.
full pitch
Cl.
k.c.
1/2 air
1/4 air
full pitch
Cymb.
Sn.
Crot.
Vib.
l.v.
TamT.
TomT.
Mar.
Pno.
Vln. I
arco ord. s.t.
jetè s.t.
alla chitarra
Vln. II
jetè s.t.
alla chitarra
Vla.
alla chitarra
Vc.
pizz.

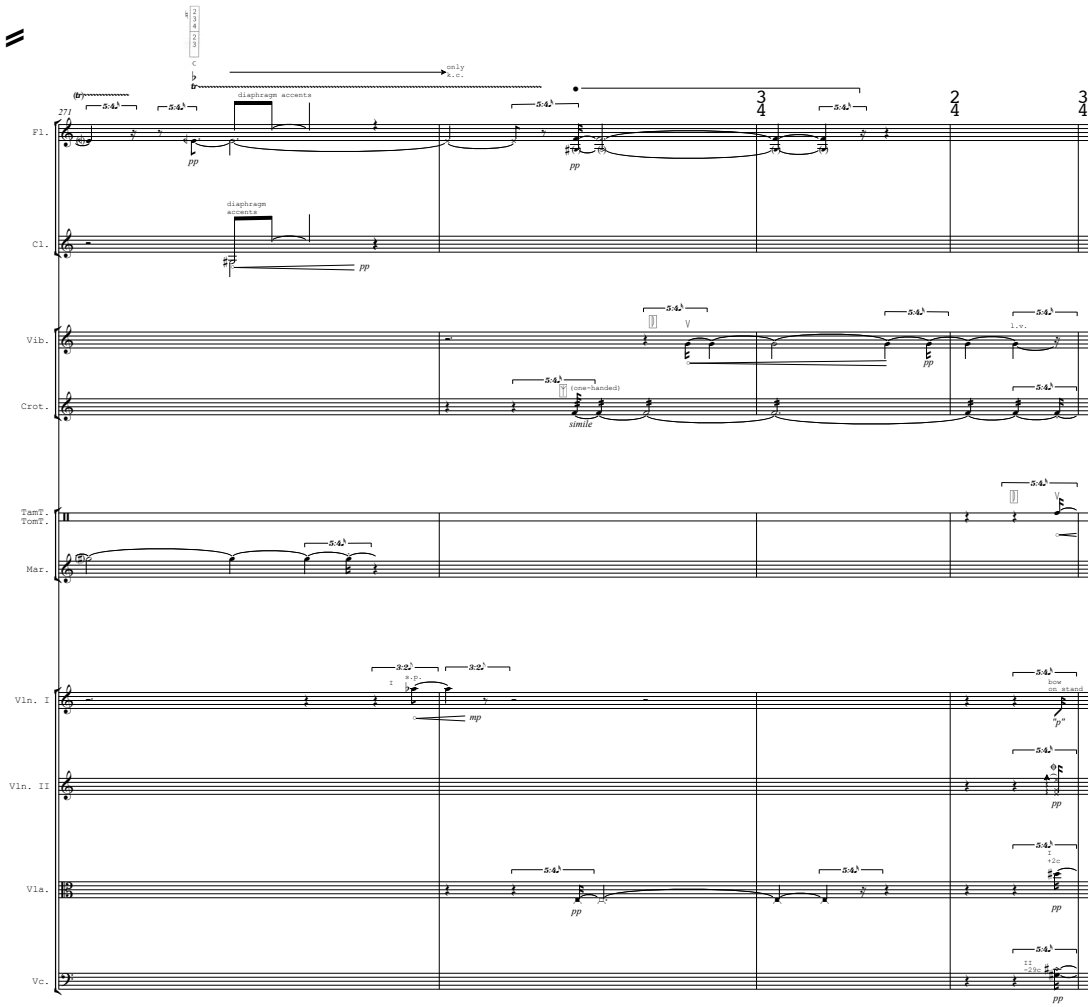

accel.
♩=80
30
Fl.
Cl.
Cymb.
Sn.
Vib.
TamT.
TomT.
Mar.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Sost.Ped.

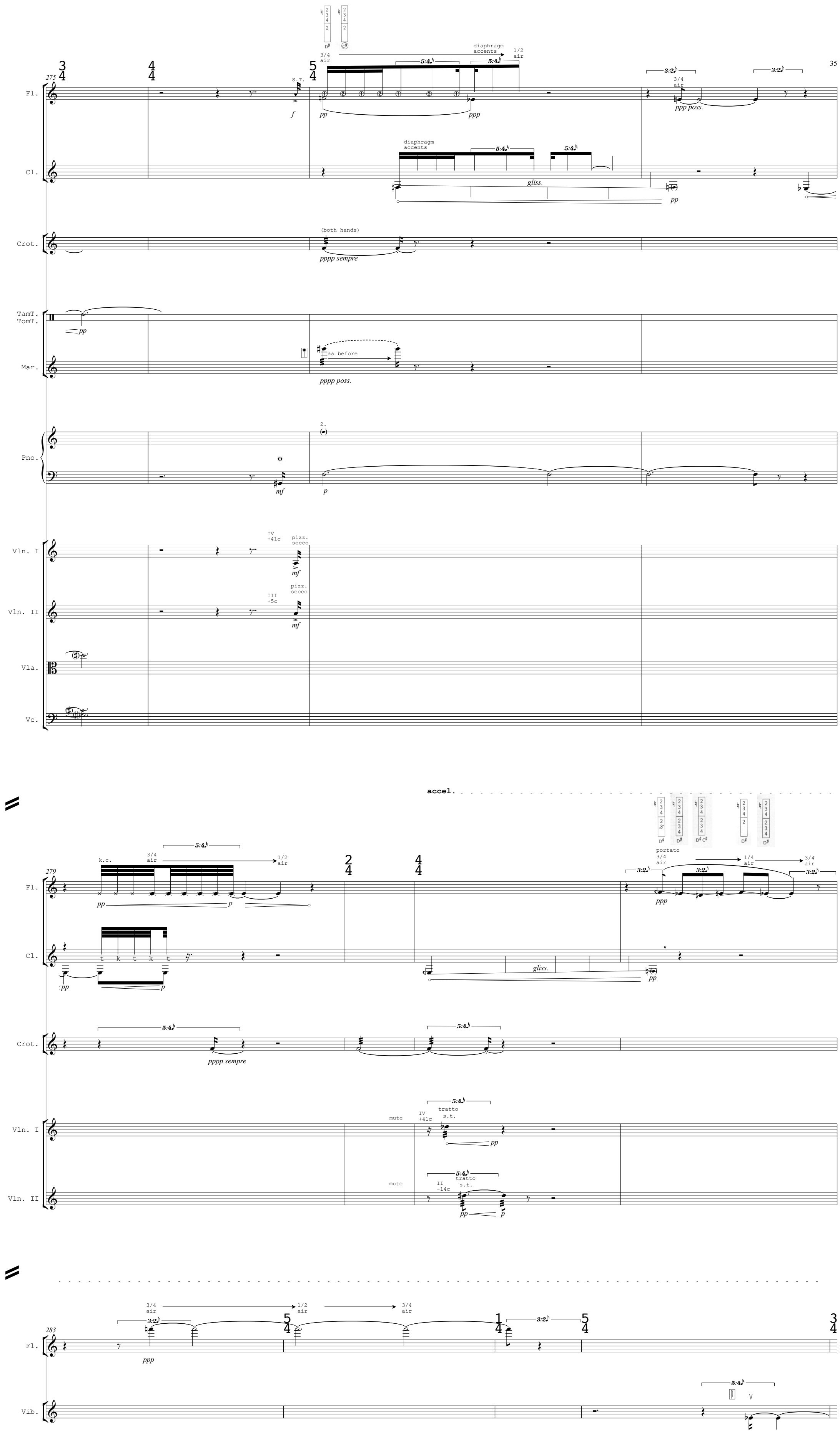

257
5/4
2/16
2/4
4/4
Fl.
Cl.
Cymb.
Sn.
Vib.
Mar.
Midipno.
Pno.
Vln. I
Vln. II
Vla.
Vc.
3/4 alr
1/4 alr
1/2 alr
Sost.Ped
jeté
s.t.
c.l.b.
s.p.
tratto
ord
punta

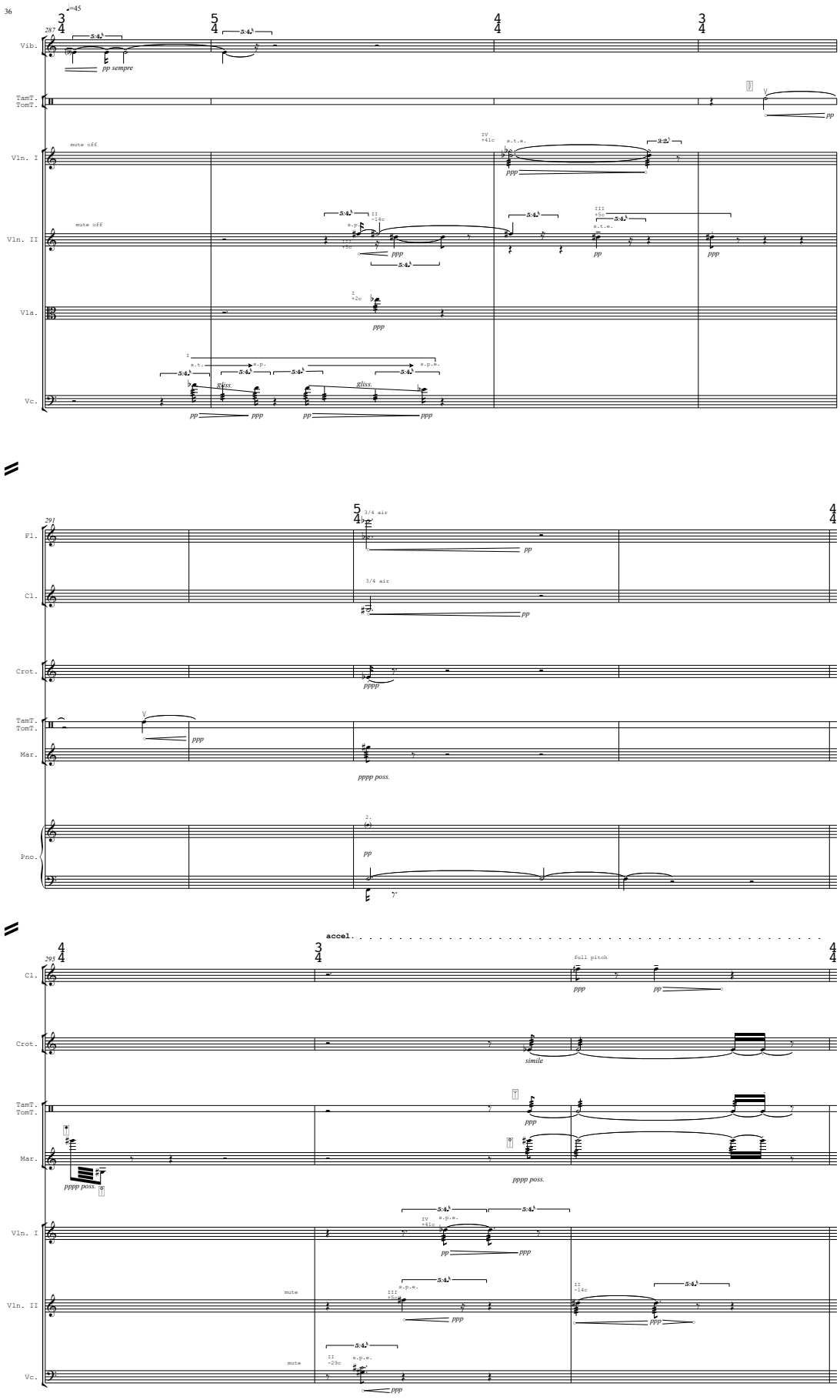

261
Fl.
C1.
Vib.
Mar.
Midipno.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
full pitch
only keyclicks
ord
1/2 air
l.v.
VIII
all -29c
Sost.Ped.
gliss.
arco
ord.
s.t.
s.p.m.
Cue 33
play liszt m

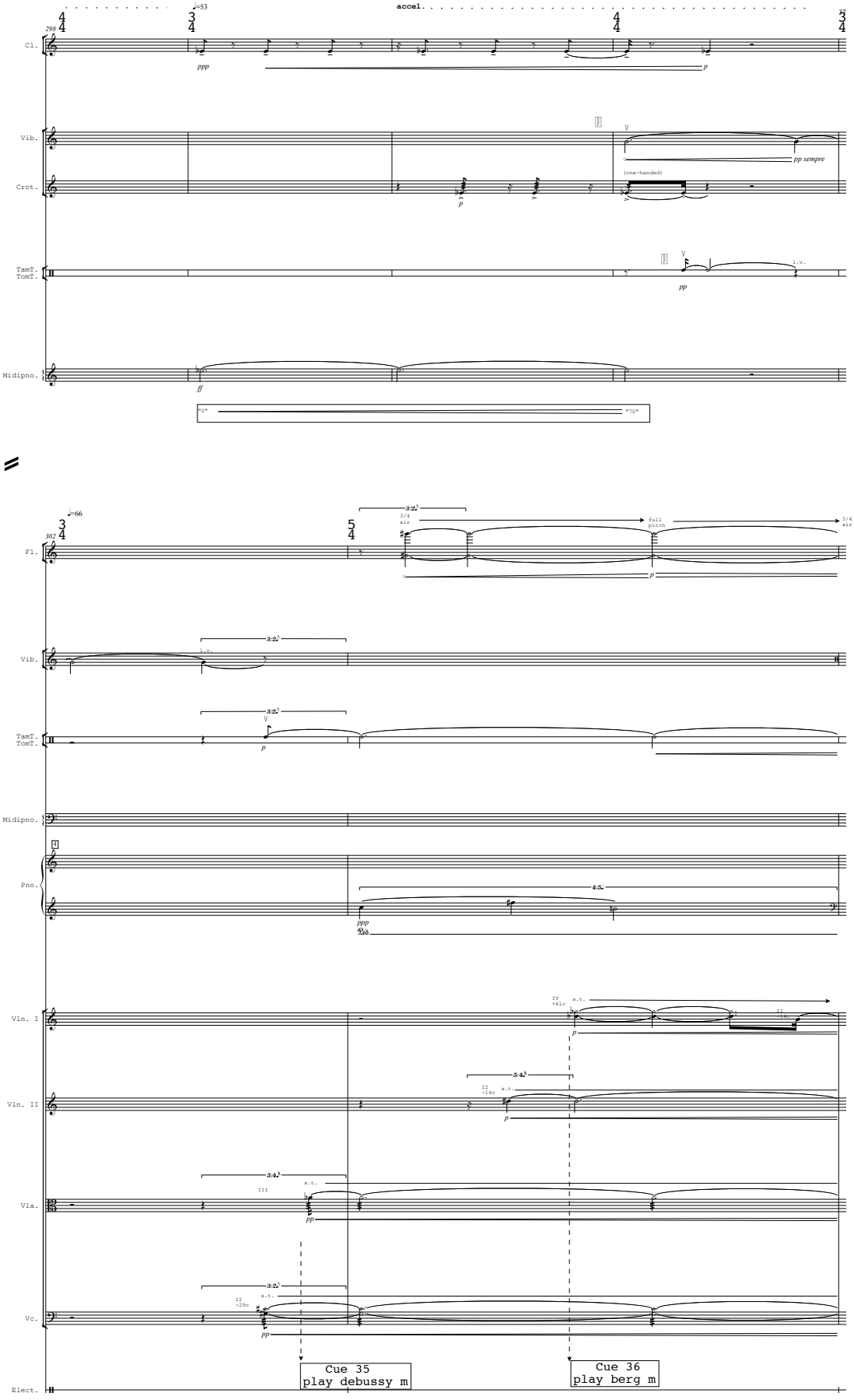

J
♩=40
Fl.
Cl.
Cymb.
Sn.
Vib.
Crotales
steadily
l.v.
simile
TamT.
TomT.
pppp poss.
Mar.
ends
of rods
Midipno.
IX
Pno.
Vln. I
Vln. II
Vla.
Vc.
alla chitarra
arco
jeté
salt.
pizz.
gradually
decel. trill
s.p.
s.p.e.
k.c.
diaphragm
accents

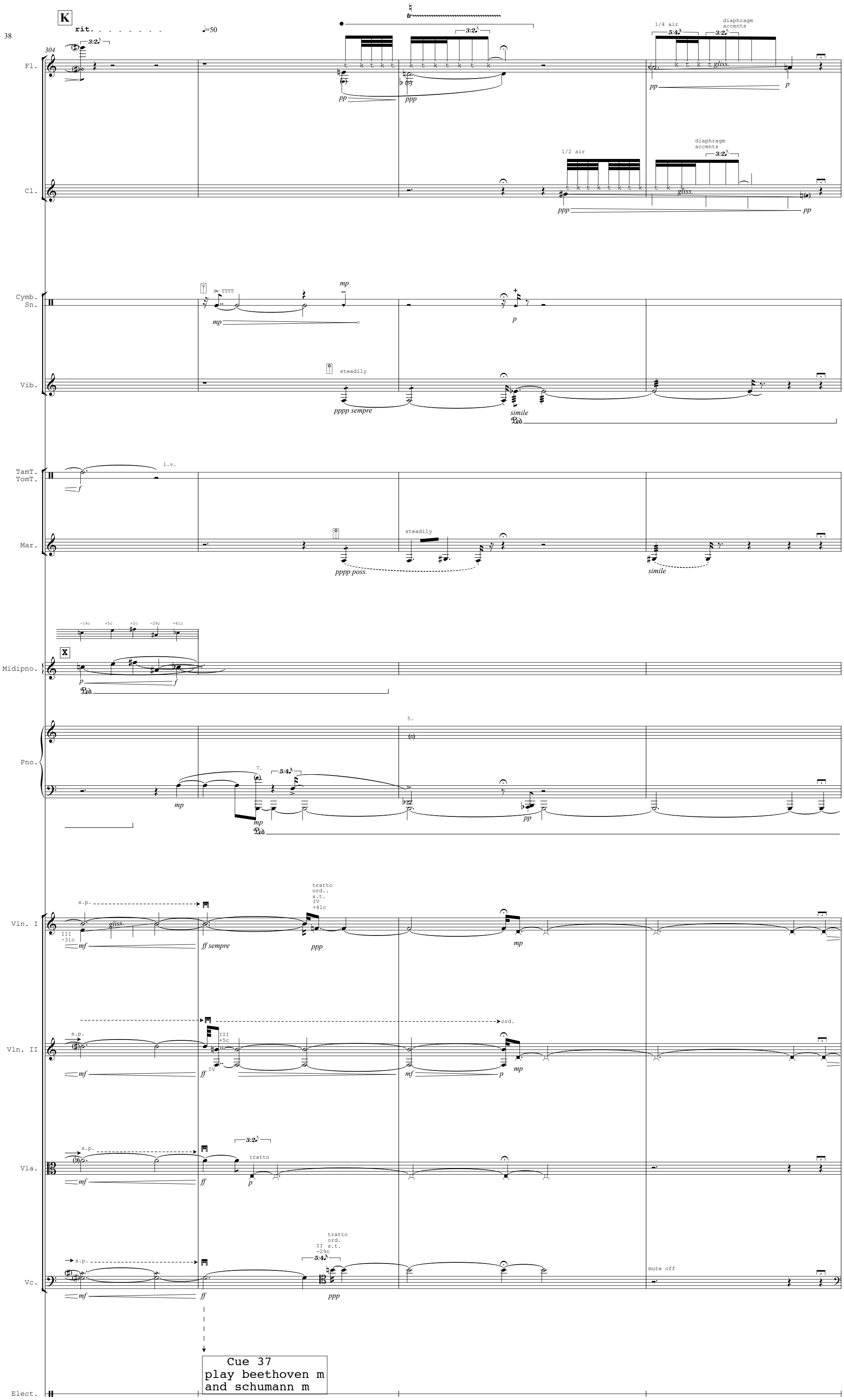

268
Fl.
Cl.
Crot.
Mar.
Vln. I
Vln. II
Vla.
Elect.
bisb.
3/4 air
pp sempre
gliss.
ppp
pp
pppp
arco ord. s.p.
Cue 34
play chopin m

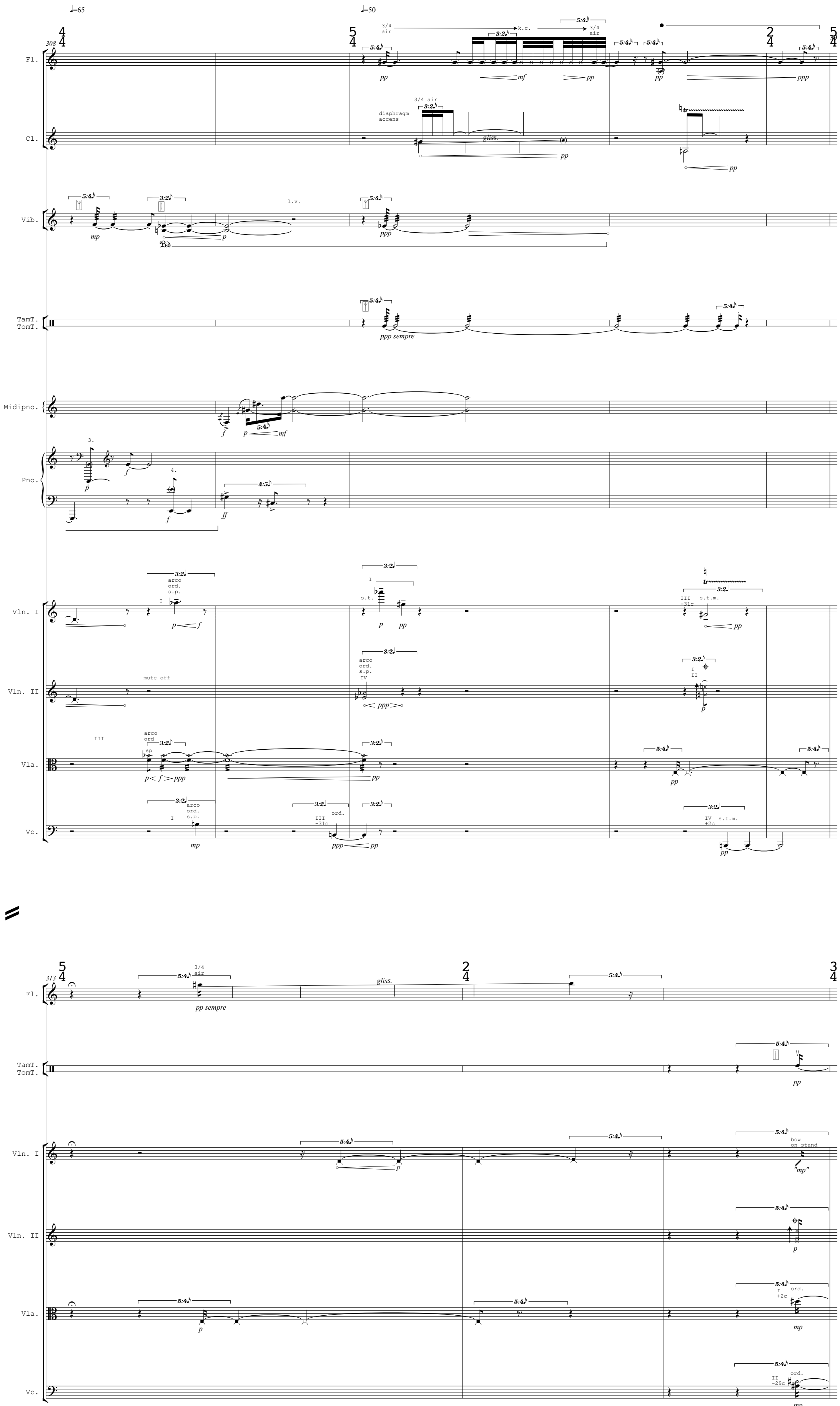

271
only s.c.
diaphragm accents
Fl.
Cl.
Vib.
Crot.
TamT.
TomT.
Mar.
Vln. I
Vln. II
Vla.
Vc.
(one-handed)
simile
how am stand
"p"
mp


Fl.
Cl.
Crot.
TamT.
TomT.
Mar.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Vib.
diaphragm accents
3/4 air
1/2 air
s.t.
gliss.
(both hands)
pppp sempre
as before
pppp poss.
ppp poss.
pizz. secco
IV +41c
III +5c
accel.
k.c.
portato
1/4 air
mute
tratto s.t.
II +14c

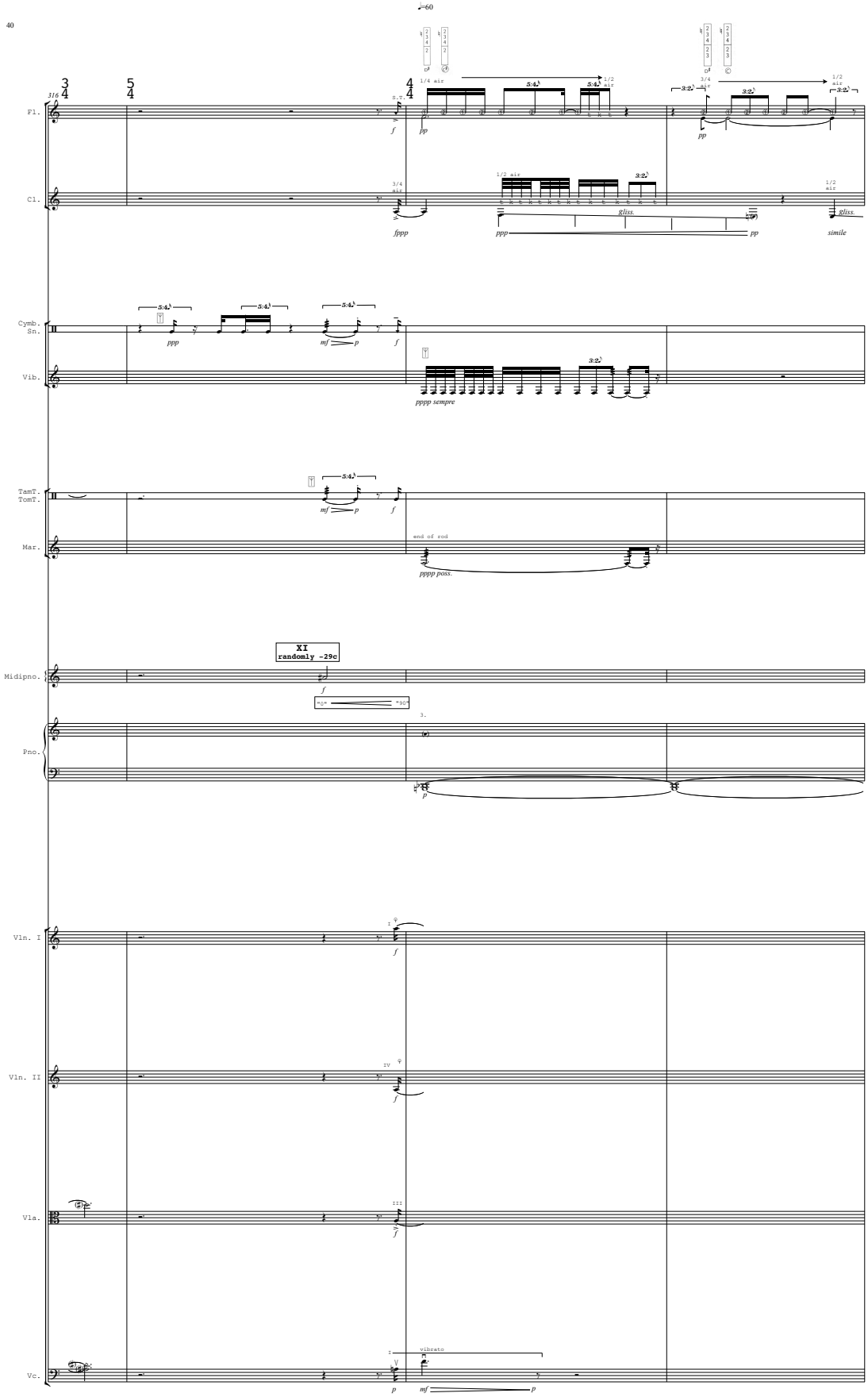

♩=45
287
Vib.
pp sempre
TamT.
TomT.
pp
Vln. I
mute off
ppp
Vln. II
mute off
ppp
Vla.
ppp
Vc.
gliss.
pp
ppp
291
Fl.
3/4 air
pp
Cl.
3/4 air
pp
Crot.
pppp
TamT.
TomT.
ppp
Mar.
pppp poss.
Pno.
pp
295
accel.
Cl.
full pitch
ppp
pp
Crot.
simile
TamT.
TomT.
ppp
Mar.
pppp poss.
pppp poss.
Vln. I
pp
ppp
Vln. II
mute
ppp
Vc.
mute
ppp

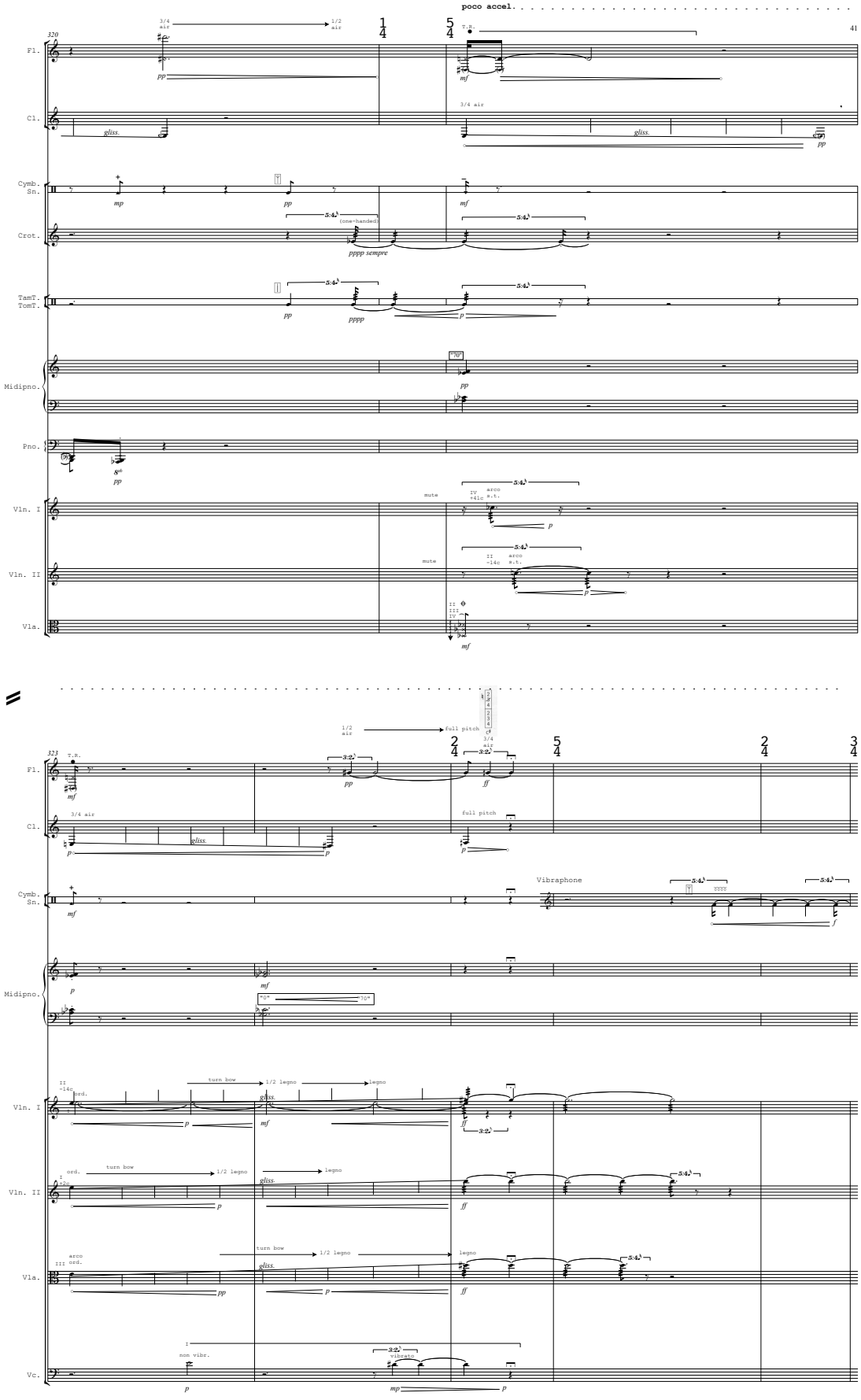

accel.
Cl.
Vib.
Crot.
TamT.
TomT.
Midipno.
Fl.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
pp sempre
(one-handed)
Cue 35
play debussy m
Cue 36
play berg m

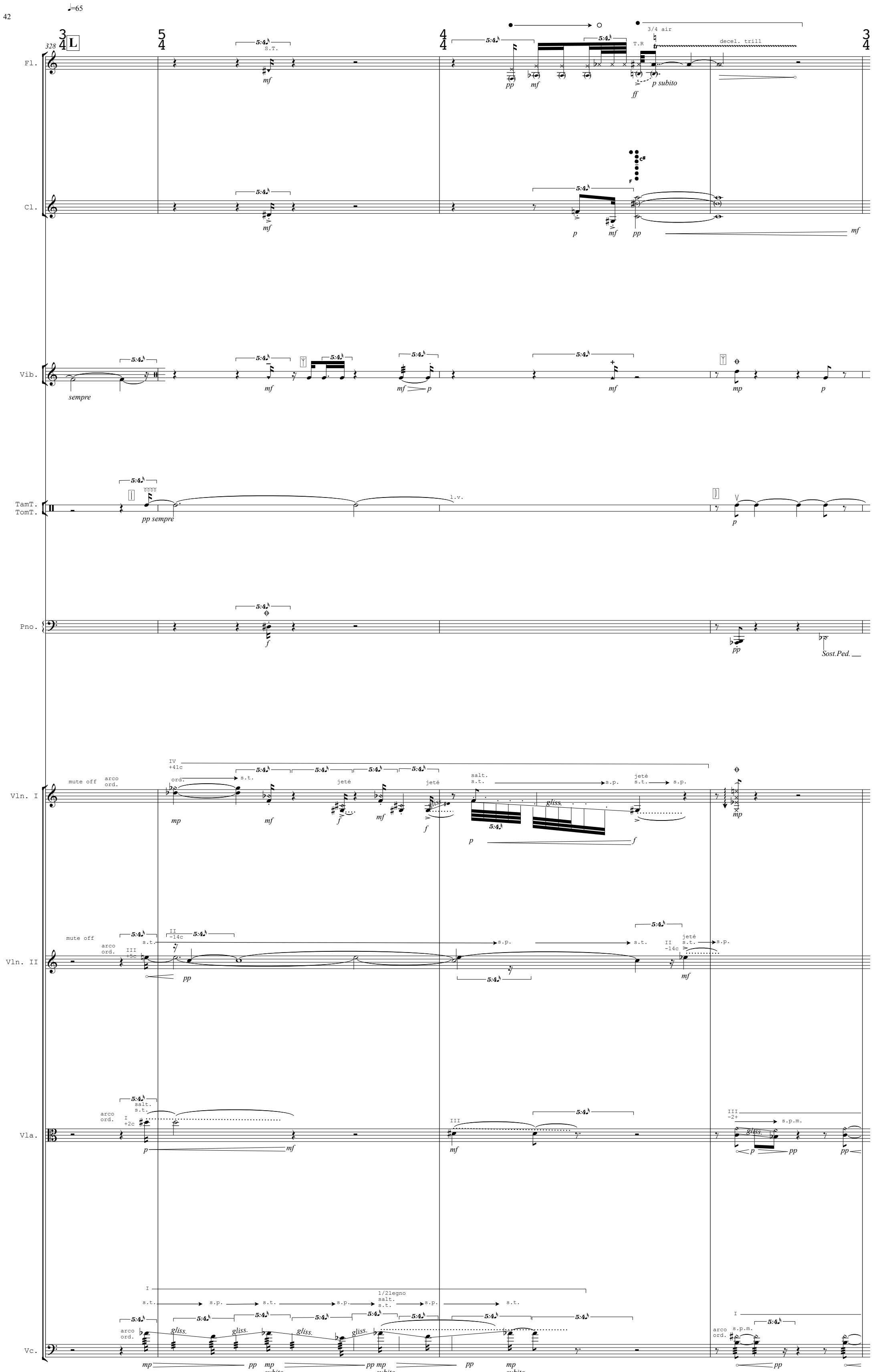

K
rit. . . . .
♩=50
304
Fl.
Cl.
Cymb.
Sn.
Vib.
TamT.
TomT.
Mar.
Midipno.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
1/4 air
diaphragm accents
1/2 air
gliss.
pppp sempre
steadily
simile
l.v.
pppp poss.
s.p.
ff sempre
tratto
ord..
s.t.
IV
+41c
ord.
mute off
Cue 37
play beethoven m
and schumann m

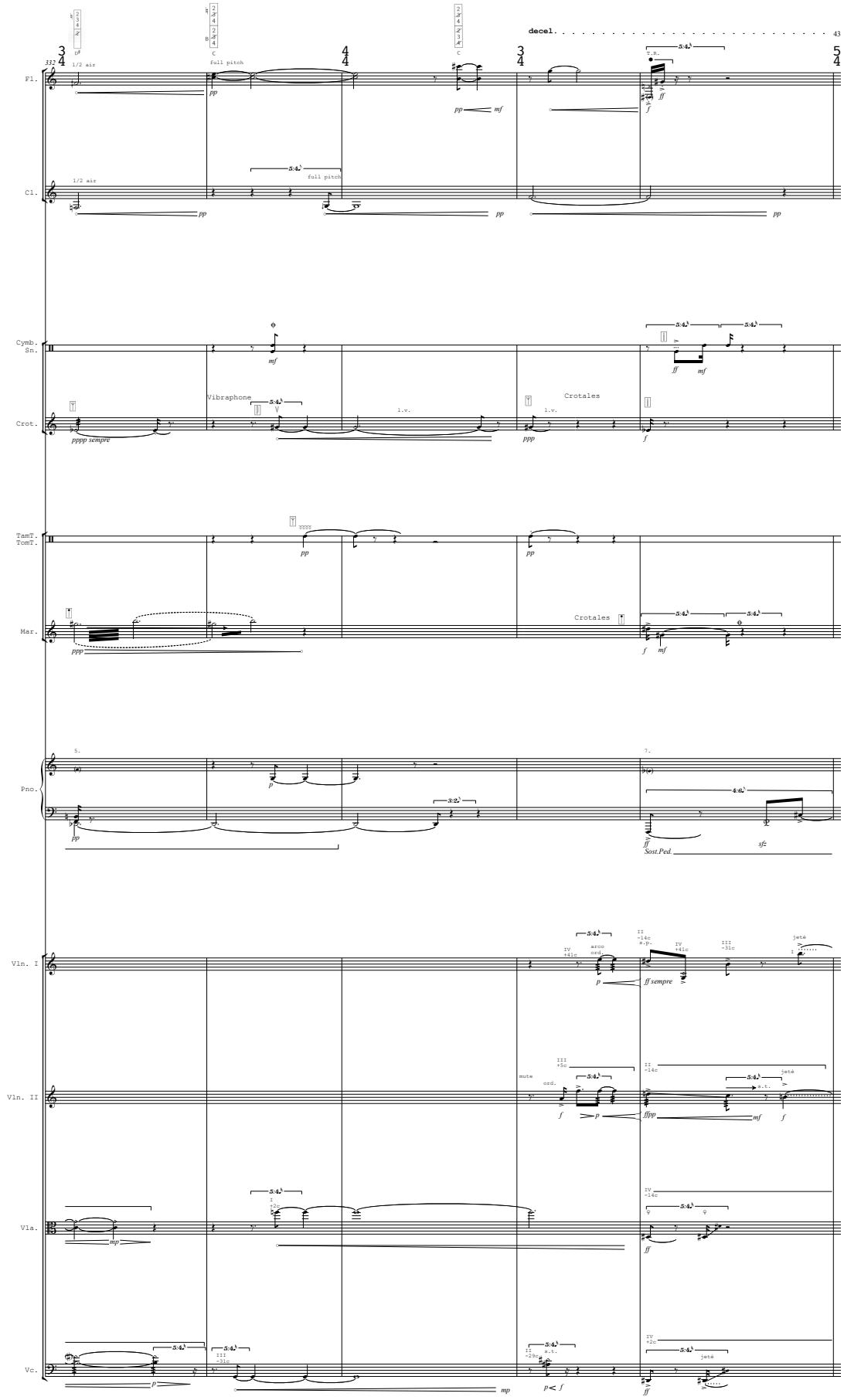


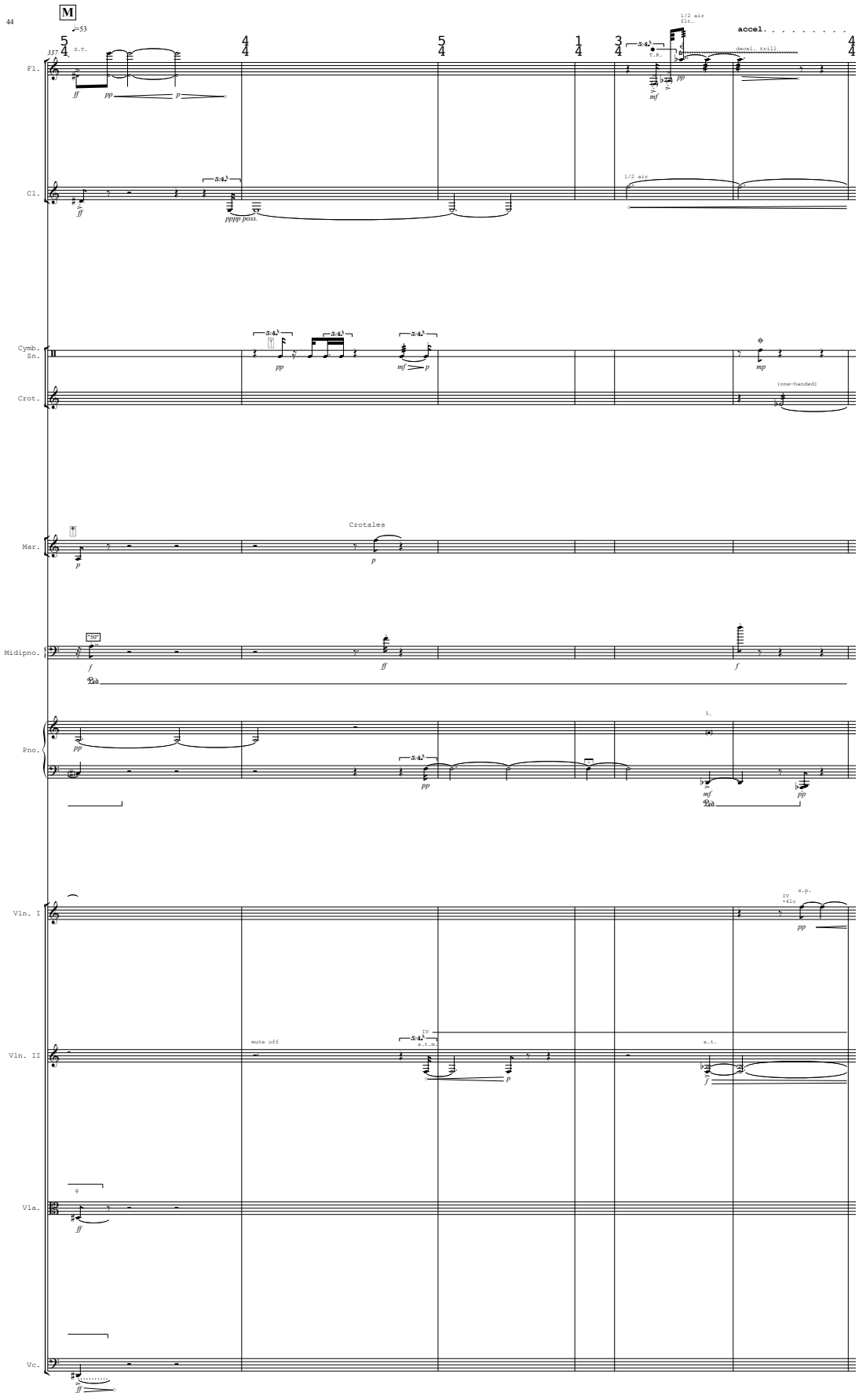
♩=65
♩=50
308
Fl.
Cl.
Vib.
TamT.
TomT.
Midipno.
Pno.
Vln. I
Vln. II
Vla.
Vc.
3/4 air
k.c.
3/4 air
diaphragm accens
3/4 air
gliss.
l.v.
ppp sempre
mute off
arco ord. s.p.
arco ord. s.p. IV
arco ord
arco ord. s.p.
s.t.
ord.
III -31c
III -31c s.t.m.
IV +2c s.t.m.
313
gliss.
pp sempre
bow on stand
"mp"
I +2c ord.
II -29c ord.

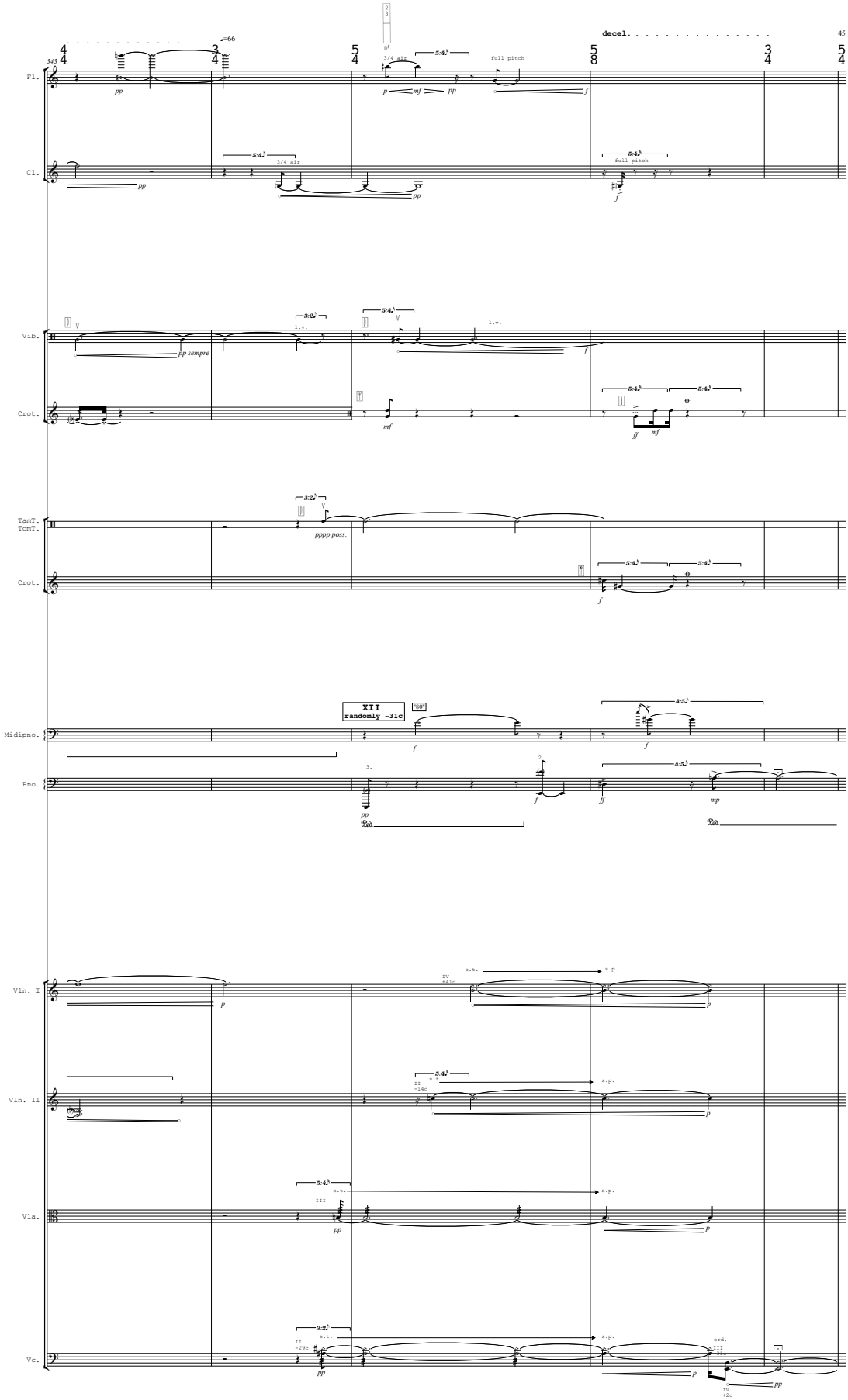

♩=60
Fl.
Cl.
Cymb.
Sn.
Vib.
TamT.
TomT.
Mar.
Midipno.
Pno.
Vln. I
Vln. II
Vla.
Vc.
XI
randomly -29c
pppp sempre
pppp poss.
end of rod
gliss.
simile
vibrato

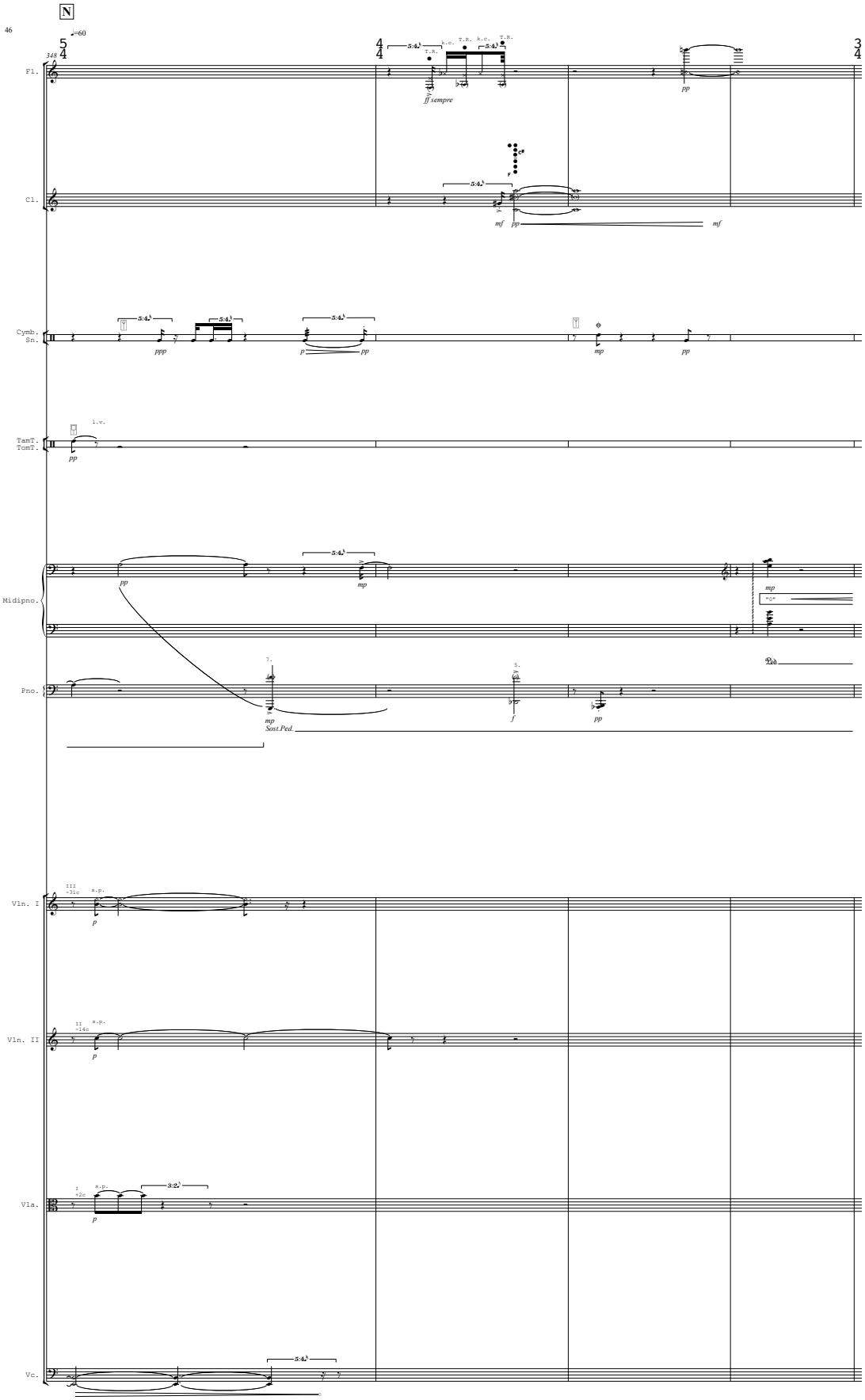

poco accel.
320
Fl.
Cl.
Cymb.
Sn.
Crot.
TamT.
TomT.
Midipno.
Pno.
Vln. I
Vln. II
Vla.
gliss.
mute
323
full pitch
Vibraphone
turn bow
1/2 legno
legno
ord.
arco
non vibr.
vibrato
Vc.

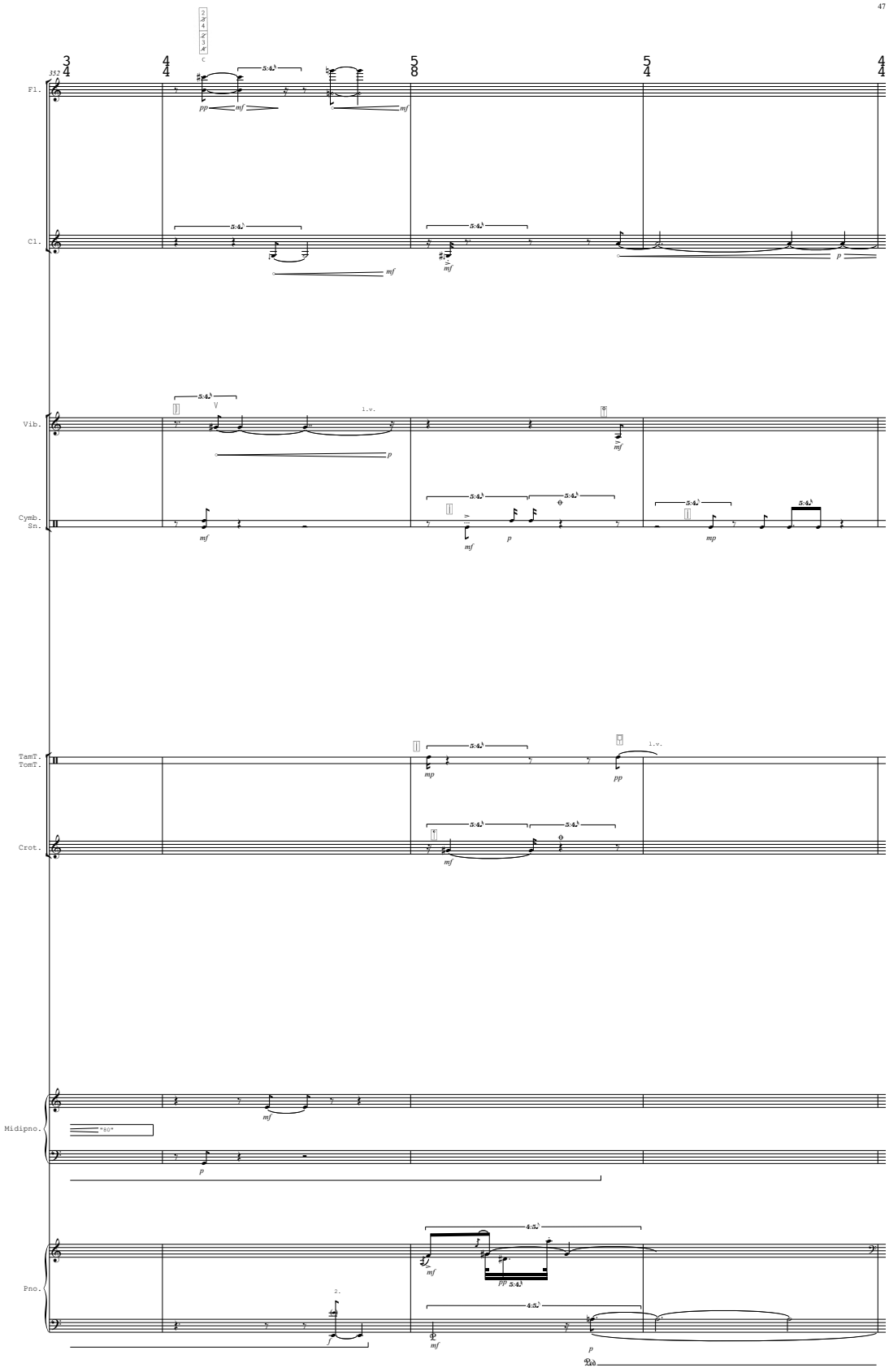

=65
328
L
Fl.
Cl.
Vib.
TamT.
TomT.
Pno.
Vln. I
Vln. II
Vla.
Vc.
s.T.
3/4 air
T.R
decel. trill
p subito
sempre
pp sempre
l.v.
Sost.Ped.
mute off
arco
ord.
IV
+41c
s.t.
jeté
salt.
s.p.
gliss.
II
-14c
III
+5c
I
+2c
-2+
s.p.m.
1/2legno
subito

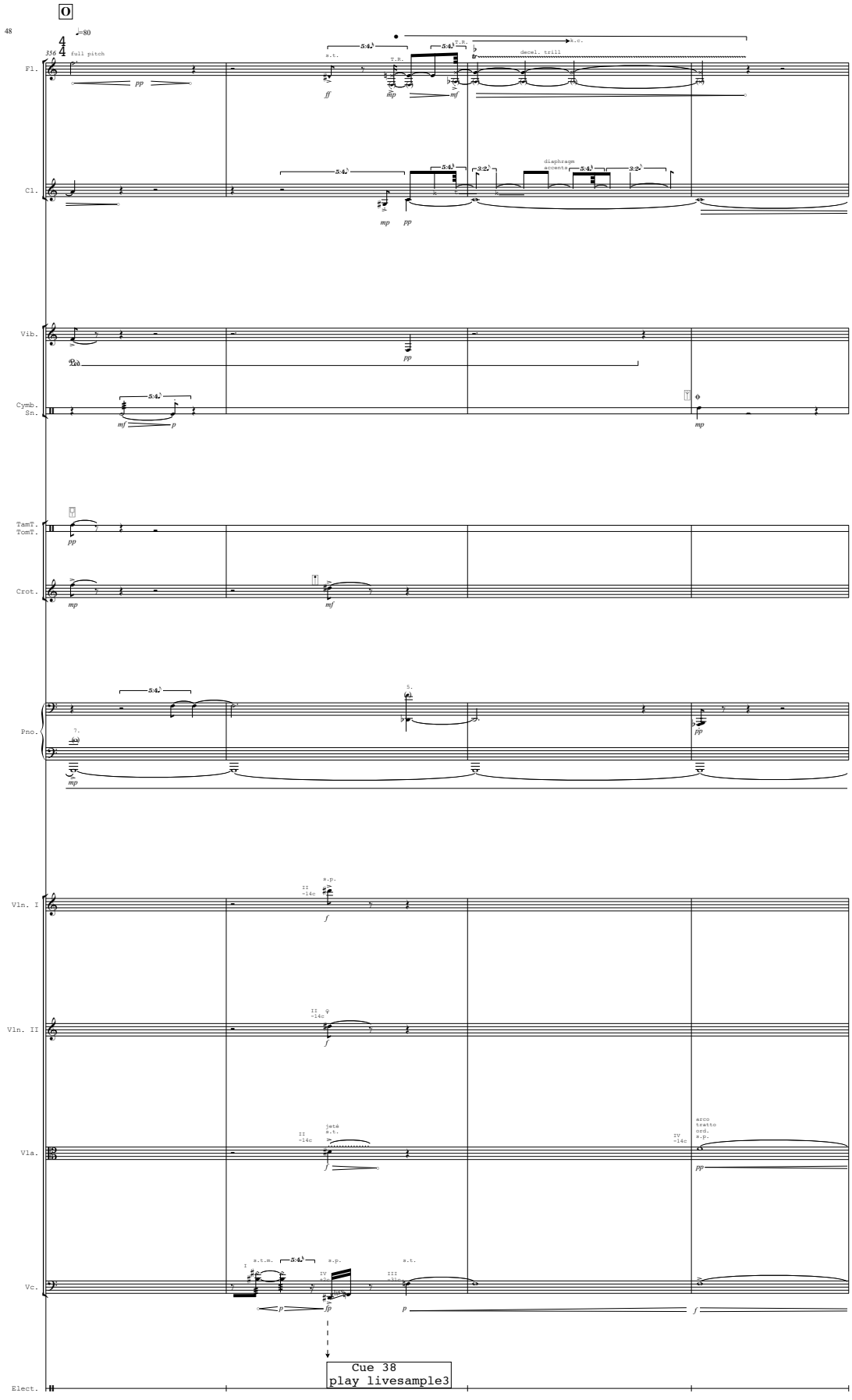

Fl.
1/2 air
full pitch
Cl.
1/2 air
full pitch
Cymb.
Sn.
Crot.
Vibraphone
Crotales
Crotales
TamT.
TomT.
Mar.
Crotales
Pno.
Sost.Ped
Vln. I
arco
ord.
jeté
Vln. II
mute
ord.
jeté
Vla.
Vc.

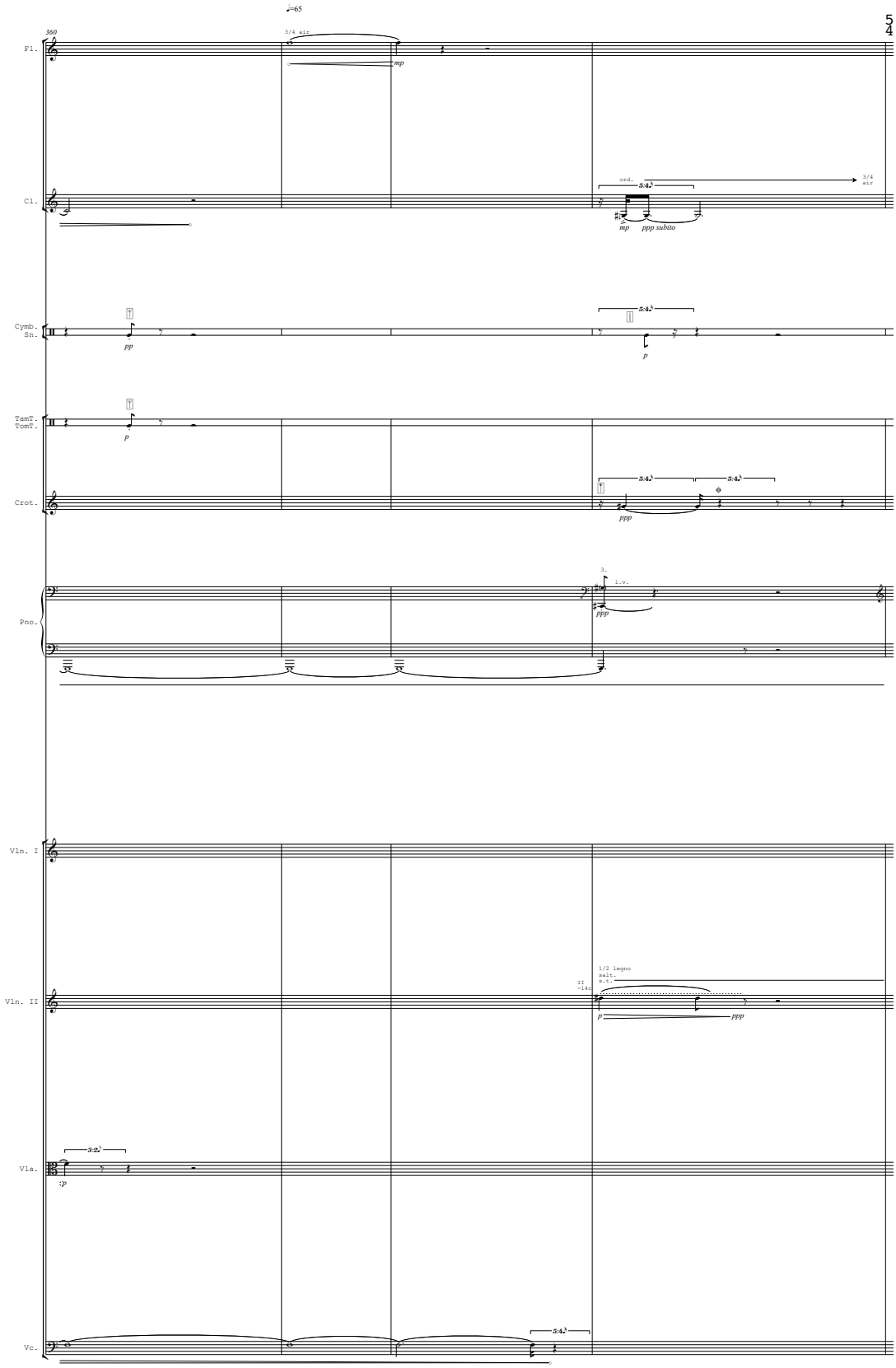

M
♩=53
337
s.t.
5/4
4/4
5/4
1/4
3/4
1/2 air flt.
accel.
decel. trill
T.R.
Fl.
1/2 air
Cl.
Cymb.
Sn.
(one-handed)
Crot.
Crotales
Mar.
Midipno.
Pno.
Vln. I
mute off
s.t.m.
s.t.
Vln. II
Vla.
Vc.

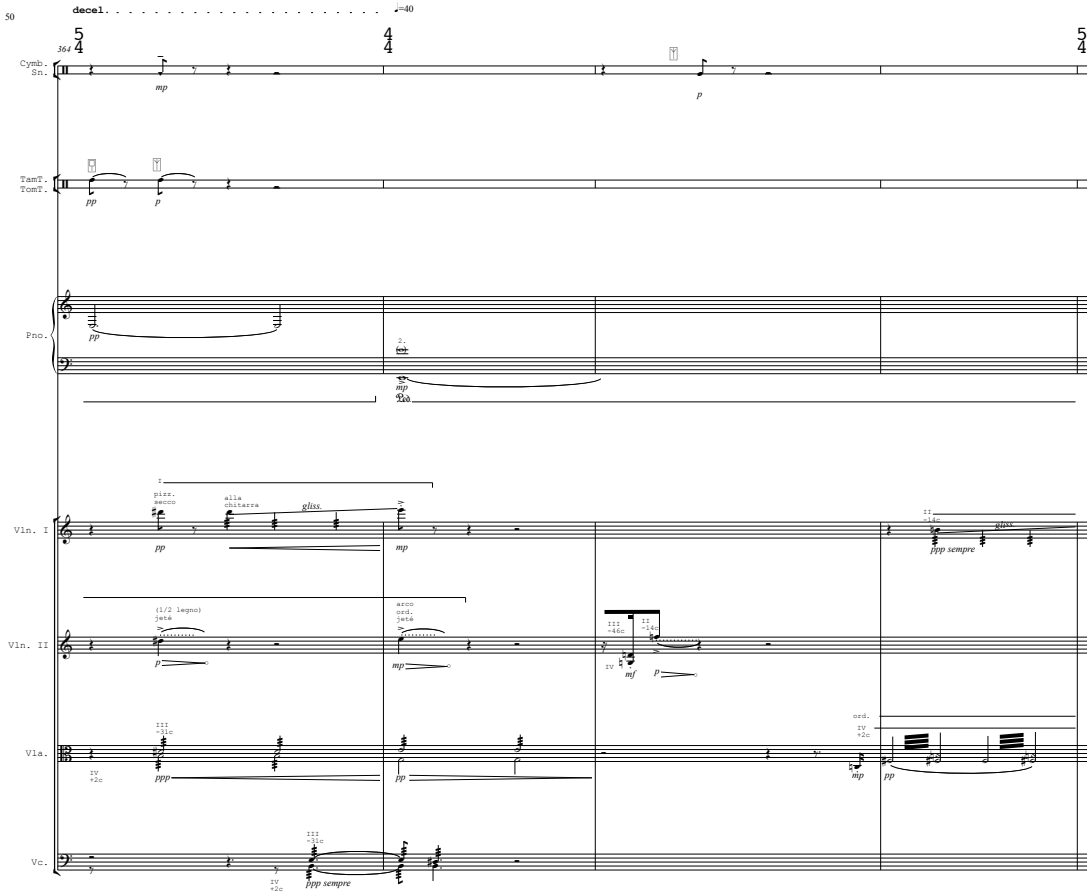

decel.
45
♩=66
Fl.
Cl.
Vib.
Crot.
TamT.
TomT.
Crot.
Midipno.
Pno.
XII
randomly -31c
Vln. I
Vln. II
Vla.
Vc.
3/4 air
full pitch
l.v.
pp sempre
pppp poss.
ord.

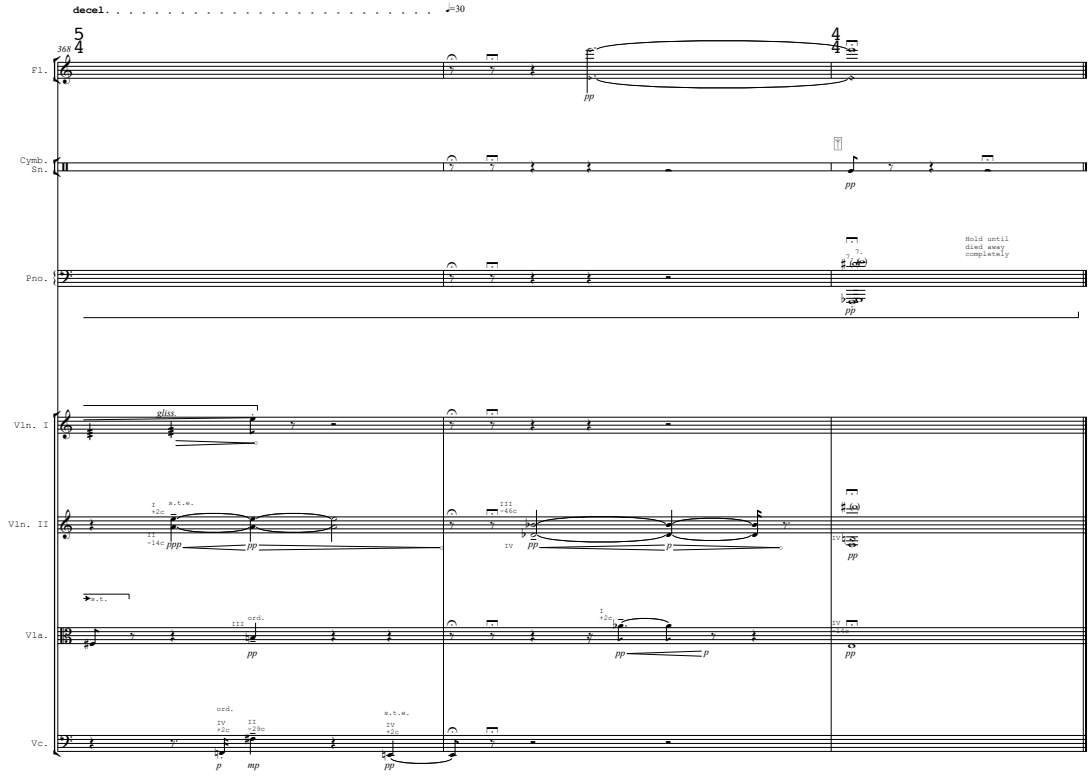

N
♩=60
5/4
4/4
3/4
Fl.
ff sempre
pp
Cl.
mf
pp
mf
Cymb.
Sn.
ppp
p
pp
mp
pp
TamT.
TomT.
l.v.
pp
Midipno.
pp
mp
mp
Pno.
mp
Sost.Ped.
f
pp
Vln. I
p
Vln. II
p
Vla.
p
Vc.


3/4
4/4
5/8
5/4
4/4
352
Fl.
Cl.
Vib.
Cymb.
Sn.
TamT.
TomT.
Crot.
Midipno.
Pno.
1.v.
"80"


48
O
♩=80
356
full pitch
Fl.
Cl.
Vib.
Cymb.
Sn.
TamT.
TomT.
Crot.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Elect.
diaphragm accents
decel. trill
jeté
arco
tratto
ord.
Cue 38
play livesample3


♩=65
360
3/4 air
5
4
Fl.
mp
Cl.
ord.
5:4♪
3/4 air
mp
ppp subito
Cymb.
Sn.
pp
5:4♪
p
TamT.
TomT.
p
Crot.
5:4♪
5:4♪
ppp
Pno.
3.
l.v.
ppp
Vln. I
Vln. II
II
-14c
1/2 legno
salt.
s.t.
p
ppp
Vla.
3:2♪
:p
Vc.
5:4♪


decel. . . . . ♩=40
364
Cymb.
Sn.
TamT.
TomT.
Pno.
Vln. I
Vln. II
Vla.
Vc.
pizz.
secco
alla
chitarra
gliss.
(1/2 legno)
jeté
arco
ord.
jeté
ppp sempre
gliss.
ppp sempre

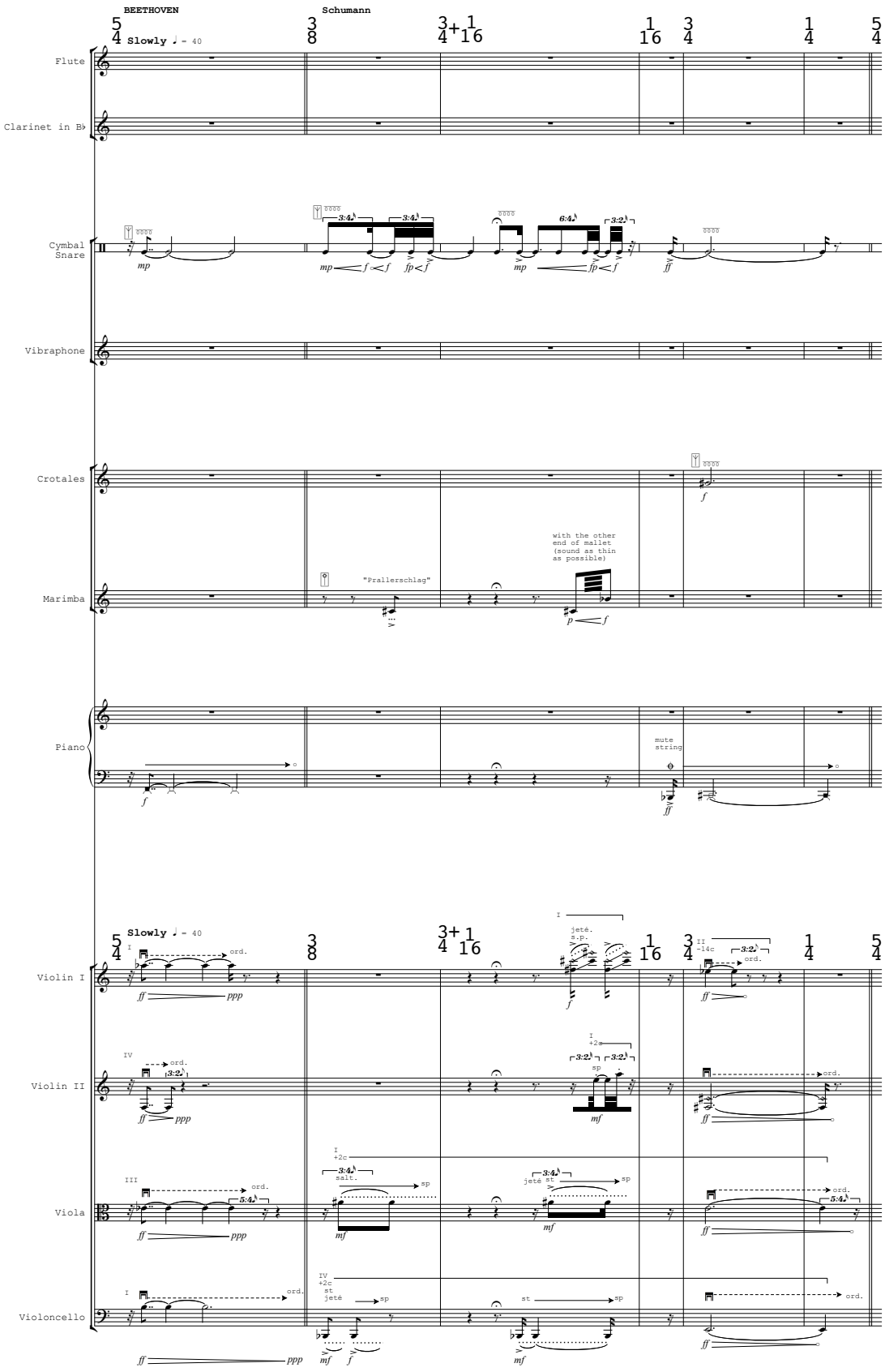

decel. . . . . ♩=30
368
Fl.
Cymb.
Sn.
Pno.
Vln. I
Vln. II
Vla.
Vc.
gliss.
s.t.
ord.
s.t.
Hold until
died away
completely

#ffffff

Models

#ffffff
Models

Annette Brosin



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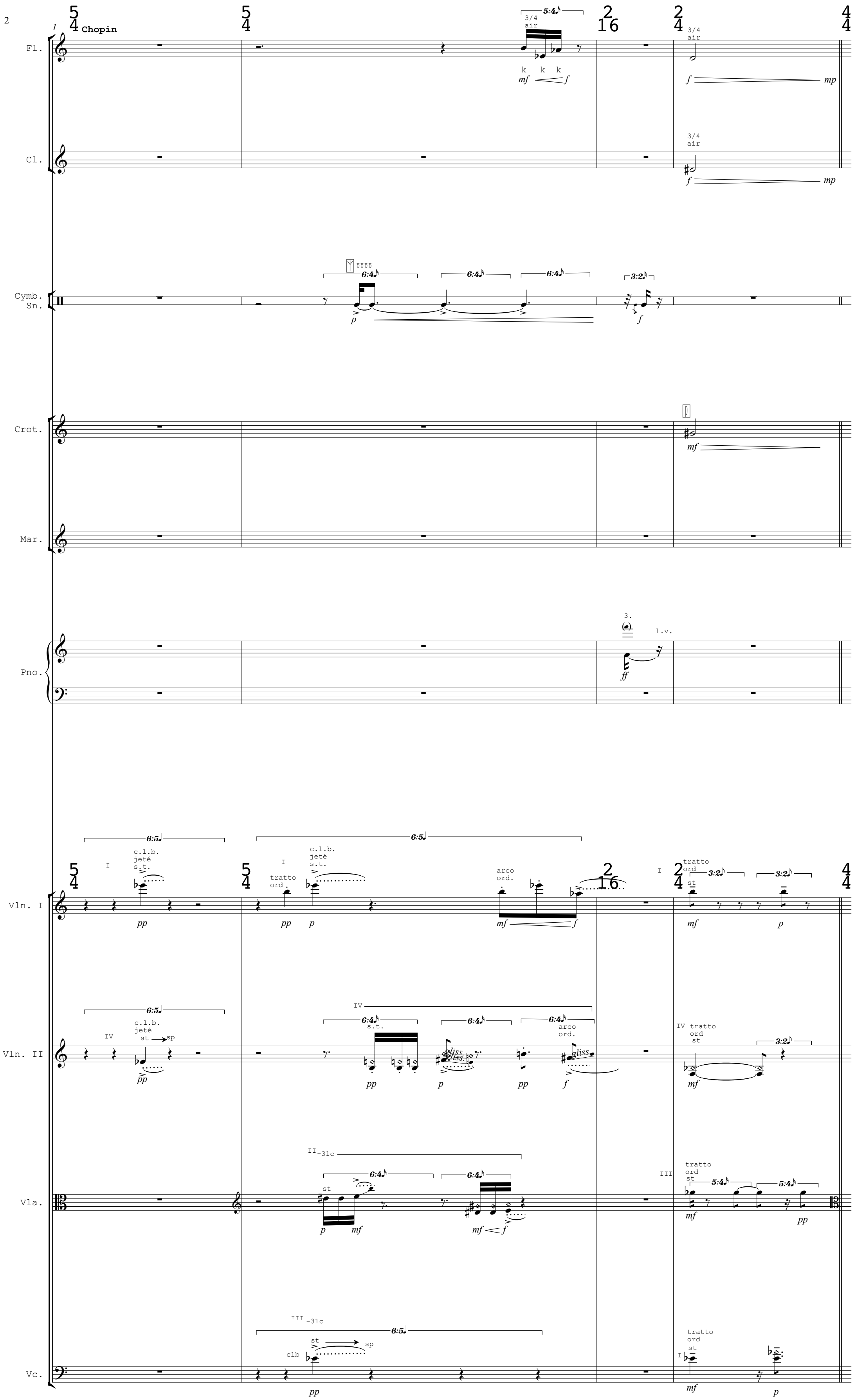
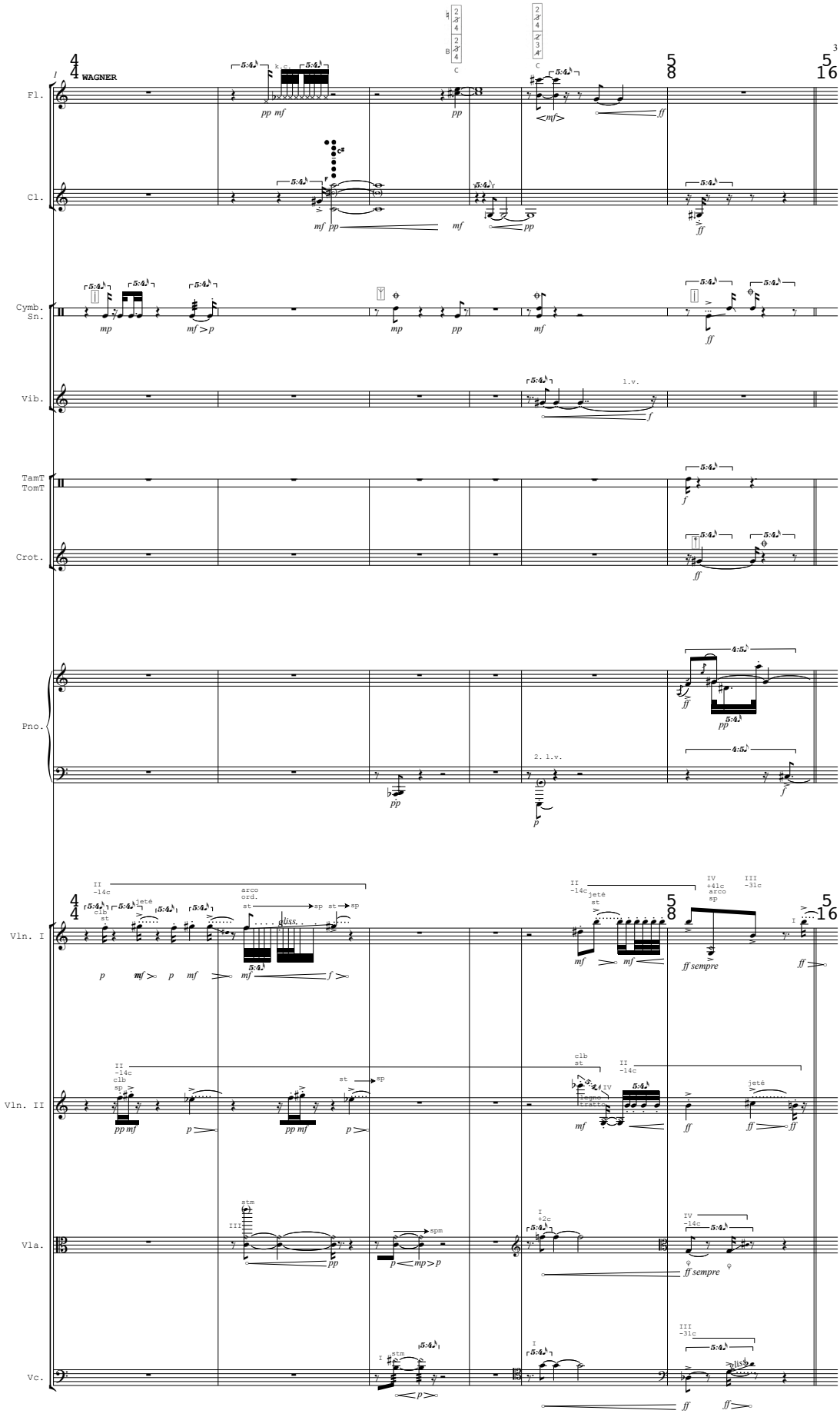
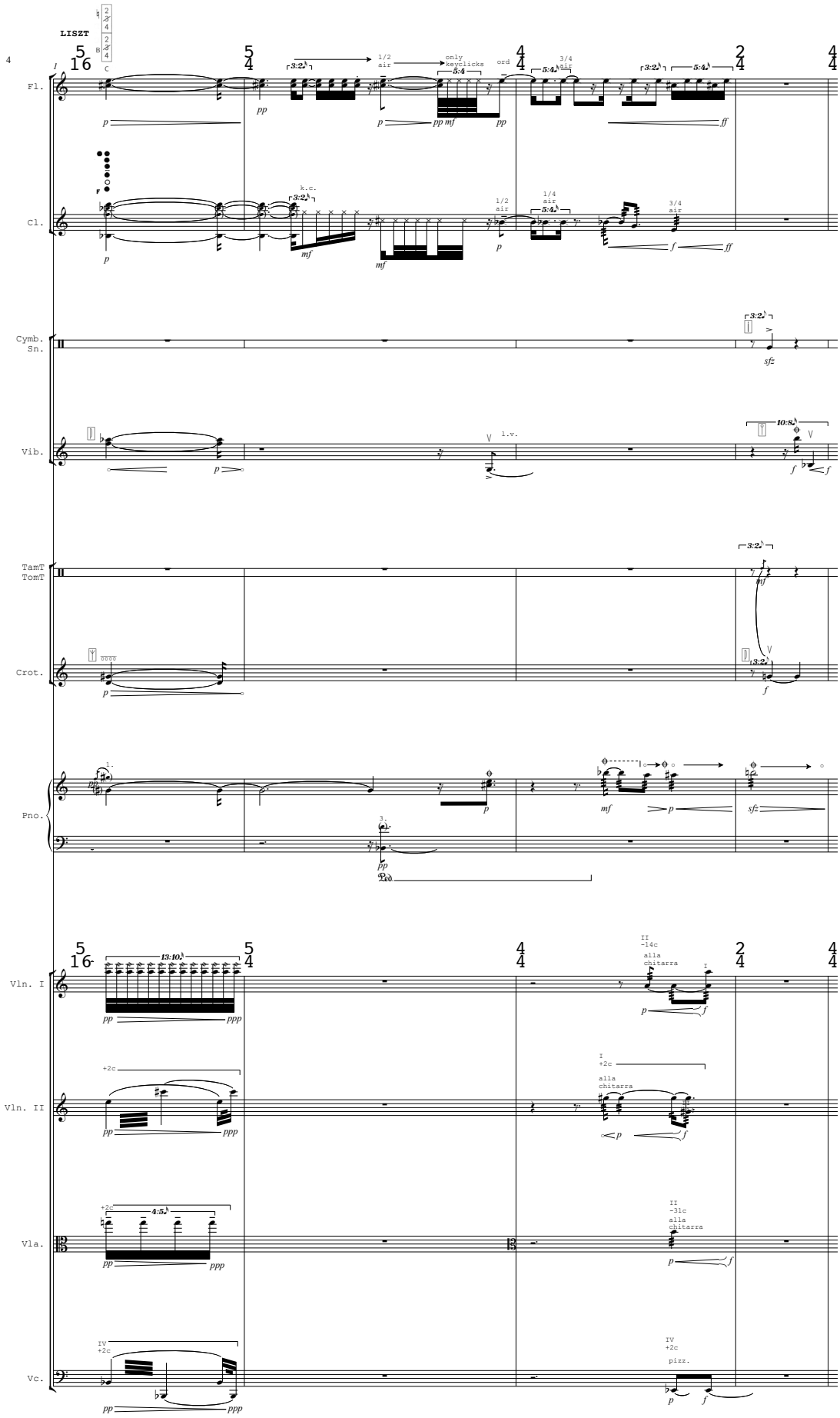
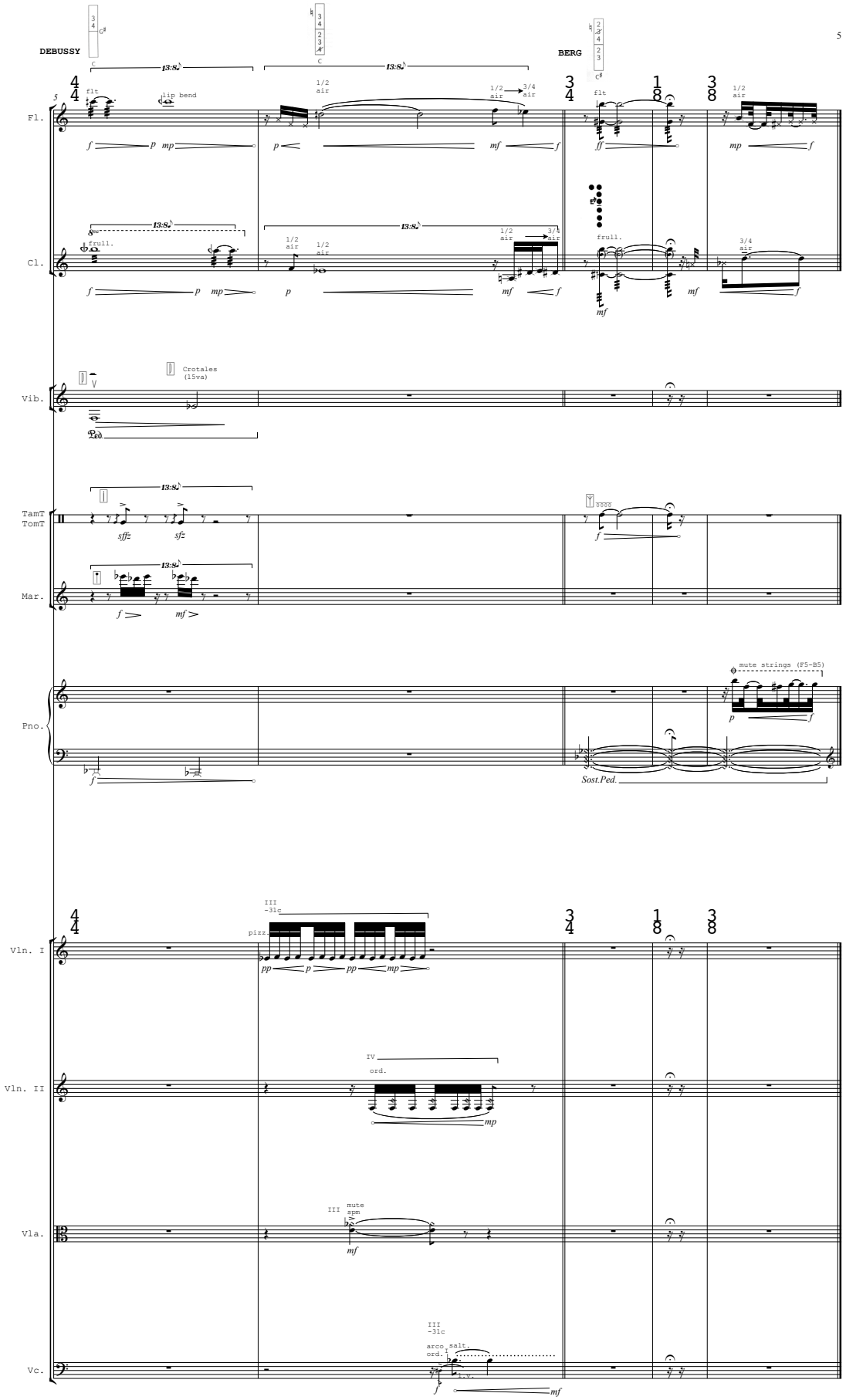

Chopin
Fl.
Cl.
Cymb.
Sn.
Crot.
Mar.
Pno.
Vln. I
Vln. II
Vla.
Vc.
3/4
air
c.l.b.
jeté
s.t.
tratto
ord.
arco
st
sp
clb
l.v.


WAGNER
Fl.
Cl.
Cymb.
Sn.
Vib.
TamT
TomT
Crot.
Pno.
Vln. I
Vln. II
Vla.
Vc.


LISZT
4
Fl.
Cl.
Cymb.
Sn.
Vib.
TamT
TomT
Crot.
Pno.
Vln. I
Vln. II
Vla.
Vc.
1/2 air
only keyclicks
ord
3/4 air
1/4 air
k.c.
1.v.
alla chitarra
pizz.


DEBUSSY
BERG
Fl.
Cl.
Vib.
TamT
TomT
Mar.
Pno.
Vln. I
Vln. II
Vla.
Vc.
flt
slip bend
frull.
1/2 air
3/4 air
Crotales (15va)
mute strings (F5-B5)
Sost.Ped.
pizz.
ord.
mute spm
arco
salt.
ord.