

UNIVERSITY OF CALIFORNIA SAN DIEGO

TIME BEING

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of
Doctor of Musical Arts

in

Contemporary Music Performance

by

Sean Dowgray

Committee in charge:

Professor Steven Schick, Chair
Professor Craig Callender
Professor Erik Carlson
Professor John Doller
Professor Aleck Karis

2022

Copyright
Sean Dowgray, 2022
All Rights Reserved

The dissertation of Sean Dowgray is approved, and it is acceptable in quality and form for publication on microfilm and electronically.

University of California San Diego

2022

iii

DEDICATION

This document is dedicated to my father who passed somewhat unexpectedly in the midst of my doctoral studies. He studied piano in his collegiate years and remained an avid player throughout his life. More importantly however, was his dedication as a listener in all senses of the word. He worked in audio stores in his early career, built his own record player, and refined his own home sound system over many years in his ongoing pursuit of sound and the experience of it. To him, sound and listening were important practices of life. Anyone who has conversed with him has surely taken note of his uniquely slow, carefully traced, and distinctly aware manner of speaking, as if carefully listening to the passage of time within each given moment. It is in memory of him that I have managed my pursuit of this strange and rigorous path in the creative practice of sound-making and sound-receiving. It is thanks to his unwavering support during his life that this was even possible.

EPIGRAPH

to listen is to move

through

sound is time

travel

WHEN is

our vessel

whether there

or somewhere

time is

weather

Sean Dowgray, *WHEN* (2020)

TABLE OF CONTENTS

Dissertation Approval Page.....	iii
Dedication.....	iv
Epigraph.....	v
Table of Contents.....	vi
List of Figures.....	vii
List of Tables.....	iv
Acknowledgments.....	x
Vita.....	xi
Abstract of the Dissertation.....	xii
Introduction: An Overview of My Creative Work.....	1
Chapter 1: Establishing A Time Based Performance Practice.....	18
Chapter 2: Percussionists Are Time Beings.....	34
Chapter 3: Studying Musical Time and Other Considerations.....	39
Chapter 4: Temporal Processes and Their Qualities, Works by Josh Levine.....	56
Chapter 5: The Performative Limits of Time, Jason Eckardt's <i>Transience</i>	68
Chapter 6: Layering Time, Daniel Tacke's <i>einsamkeit</i>	79
Chapter 7: Performing the World, Music, Time, and Cosmos in Richard Barrett's <i>Urlicht</i> and Justin Murphy-Mancini's <i>Sic Itur ad Astra</i>	86
Chapter 8: Returning to Where We Began, Jürg Frey's <i>Metal, Stone, Skin, Foliage, Air</i> for percussion quartet.....	109
Chapter 9: Exploring Time, <i>WHEN</i>	116
Bibliography.....	122

LIST OF FIGURES

Figure 1.1: <i>Arci</i> , layout of various percussion instruments.....	2
Figure 1.2: <i>Strata</i> , layers of material over a static “basement”.....	3
Figure 1.3: <i>Transparency (Part I)</i> , multiple layers of activation on the bass drum.....	7
Figure 1.4: <i>Vorrücken</i> , illustrating the outset of “unnaturally long” sustain.....	15
Figure 2.1: Edward T. Hall’s Mandala.....	26
Figure 3.1: <i>Intermediate Studies for Snare Drum</i> , rhythmic examples.....	40
Figure 3.2: <i>Advanced Studies for Snare Drum</i> , rhythmic examples.....	41
Figure 3.3: <i>Hard Times</i> , rhythmic examples.....	43
Figure 3.4: <i>Abglanzbeladen/auseinandergeschrieben</i> , example of vertical activations.....	49
Figure 4.1: <i>Shrinking world/expanding</i> , example of contrapuntal material of woods.....	59
Figure 4.2: <i>Shrinking world/expanding</i> , example of polyrhythmic material of stones.....	59
Figure 4.3: <i>Shrinking world/expanding</i> , example of rarefaction in almglocken.....	61
Figure 4.4: <i>Shrinking world/expanding</i> , alternate notation of succeeding section.....	64
Figure 5.1: <i>Transience</i> , example of general notational scheme.....	68
Figure 6.1: <i>Einsamkeit</i> , example of general notational scheme.....	79
Figure 6.2: <i>Einsamkeit</i> , draft score with conventional temporal parameters.....	81
Figure 7.1: <i>Urlicht</i> , first measure of the work.....	91
Figure 7.2: <i>Urlicht</i> , introduction of waterphone.....	93

Figure 7.3: <i>Urlicht</i> , example of polyrhythmic complexity amongst three parts.....	96
Figure 7.4: <i>Sic itur ad astra</i> , opening measures of the prelude.....	104
Figure 7.5: <i>Sic itur ad astra</i> , opening measures of the courante.....	106
Figure 8.1: <i>Metal, Stone, Skin Foliage, Air</i> , opening section written by hand.....	110

LIST OF TABLES

Table 1.1: Outlining the means by which time is described.....	24
Table 2.1: Illustrating the means by which handedness can be applied to a rhythmic sequence.....	46
Table 2.2: Illustrating how handedness and number in time generate temporal feeling.....	47
Table 3.1: The various rhythmic values found in Eckardt's <i>Transcience</i>	70

ACKNOWLEDGMENTS

Thank you chiefly to my committee: Steven Schick, Erik Carlson, Aleck Karis, Craig Callendar, and Ben Doller for their committed guidance and expertise. To my colleagues, mentors, and friends: Ryan Nestor, Dustin Donahue, Justin Murphy-Mancini, Josh Levine, Daniel Tacke, and Lewis Nielson for their collaborations and conversations. To my percussion teachers: Keith Larson, John Alfieri, Michael Rosen, and Morris Palter to whom artistry and pedagogy are inseparable. To my family: my mother Debi and father Laird, my sisters Erin and Stacey, and my partner Ida who have supported me unconditionally. Lastly, to the many that I have met along the way who have inspired, challenged, and enlightened me.

VITA

2013	Bachelor of Music, Oberlin College & Conservatory
2013-2015	Teaching Assistant, University of Alaska Fairbanks
2015	Masters of Music, University of Alaska Fairbanks
2015-2019	Teaching Assistant, University of California San Diego
2020	Term Instructor of Percussion, University of Alaska Fairbanks
2022	Doctor of Musical Arts, University of California San Diego

PUBLICATIONS

2015

Extended Methods of Notation in Josh Levine's *Les yeux ouverts* and Daniel Tacke's *einsamkeit*

ABSTRACT OF THE DISSERTATION

Time Being: Percussion as a Study of Time

by

Sean Dowgray

Doctor of Musical Arts in Music Performance

University of San Diego California, 2022

Professor Steven Schick, Chair

Early studies in percussion often begin with the development of pulse, rhythm, meter, and tempo. These components are commonly considered to be the immediate aspects of musical time. As an individual develops their playing, pulse, rhythm, meter, and tempo evolve into broader notions of time; quantities of time develop qualities of time, and various kinds of musical time emerge. It is in this consideration that I locate the identity of the 21st century percussionist. Percussion is the study of time, and percussionists are time beings. This document serves as an exploration of time as it is understood, experienced, and realized through the framework of percussion. Initial chapters probe time broadly, examining some ways in which it can be mapped. Later chapters focus on specific works for and with percussion as a means of illustrating distinct features of time.

Introduction: An Overview of My Creative and Performative Work

The musical performance is a special site of action. It incites a heightened sense of engagement in body and mind so that one may witness and contemplate the ways in which sound—a fascinating property of our physical environment—moves and dissipates through space and time. Sound transforms in our minds, transduced to individual and collective memory. This is my departure point as a musician and performer. Specifically, I have pursued the development of new works for and with percussion while also rediscovering works not included in current historical counts of percussion and re-transmitting them. New works that I developed or contributed to most notably include Justin Murphy-Mancini's *Sic itur ad Astra* for percussion and harpsichord and *A Song of Grecis* for percussion quartet, Ioannis Mitsialis' *Machine Mode* for percussion and piano, Lydia Winsor-Brindamour's *As if, Sand* for percussion quartet, Annie Hui-Hsin Hsieh's *Six Legs and and Amphibious State of Mind* for percussion sextet, Daniel Tacke's *Vorrücken* for solo percussion, and Josh Levine's *Shrinking world/expanding* for solo percussion. There are other pieces where I did not contribute to the commissioning process or early collaborative stages of the work but uncovered them later, resuscitating them from a period of performative dormancy within the musical field. Such examples include Josh Levine's *Les yeux ouverts* (2009-2010) which received an initial reading at the Oberlin Conservatory in 2011 by the commissioner David Shively but did not receive another performance until 2015 when I performed the work for the first time as part of my degree efforts at the University of Alaska Fairbanks. I am the only instrumentalist to date to have performed the piece since. Daniel Tacke's *einsamkeit* for solo percussion was originally written for percussionist Matthew Jenkins, however, only received a partial reading in a closed setting in 2009. I premiered the work in 2014 and am the only performer of the work to date. Hanna Kulenty's *Arci* (1986) for solo percussion

is an ambitious work for an all-encompassing percussion setup consisting of almost forty percussion instruments. The visual nature of the setup and the manner in which the performer must navigate it (often playing in sweeping circles) is certainly a part of the work's experience that cannot go unnoticed. However, the setup as well as the performer's traversal of it is the result of Kulenty's interest in developing "three sonoristic layers, each shaped in the form of an arch."¹ Kulenty also adds that each layer should be "maintained in different climates, so, the change of an arch will bring a new mood."² *Arci* is an early example of Kulenty's broader compositional impetus, which is that of time itself. As she states:

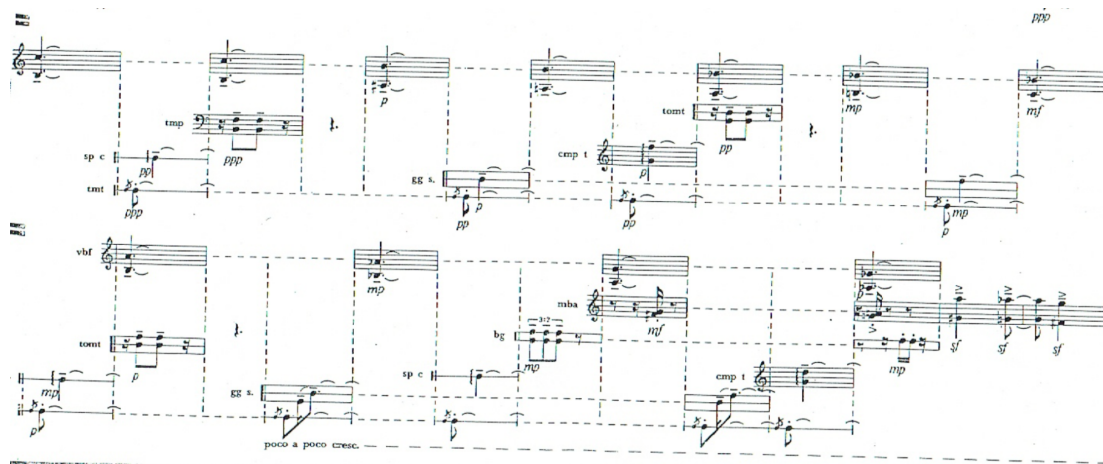


Figure 1.1: *Arci*, layout of various percussion instruments

I have been exploring the phenomenon of time in music for many years. Why in music? Because I've been educated as a musician, but also because, in my opinion, music is the most perfect language of expressing time, the so-called "time" – expressing it in the most appropriate way.

Let me put it this way: The art that I'm engaged in is a search for the metaphysical. Through controlling and taming the phenomenon of time I seek to purify both the soul – through catharsis, and the body – through emotions.³

¹ Kulenty, Hanna. *Arci*. Amsterdam: Stichting Donemus Beheer, 2017.

² Ibid.

³ Kulenty, Hanna. "Musique Surrealistique." Hanna Kulenty Composer, 2016, https://www.hannakulenty.com/06.1_texts.html.

Arci received its premiere by Stanisław Skoczylński in 1986 and a studio recording was released by German percussionist Edith Salmen in 2015. My first performance at UC San Diego in 2016, 35 years after its inception, was the North American premiere.

Christopher Adler’s *Strata* for solo extended-range glockenspiel received its premiere by Trevor Saint shortly after its completion in 2011, however, did not receive further performance until I performed the piece in 2016. Adler’s *Strata* is an homage to the creative work of land artist Robert Smithson. Exploring the conceptual and physical boundaries of landscapes, his work considers time at the geologic dimension, where rates of change, development, and transformation occur at vexingly large temporal swathes.

The image displays three systems of musical notation for the piece *Strata*. Each system consists of a grand staff with a treble and bass clef. The first system, starting at measure 61, features a melodic line in the treble clef with the annotation "a more distant echo" above it. Dynamics include *pp* and *ppp*. The second system, starting at measure 65, includes a time signature change to $\frac{5}{4}$ and $\frac{7}{4}$ indicated by a bracketed symbol. Dynamics range from *p* to *f* and *[f, mf]*. The third system, starting at measure 70, is marked "gradually slowing" and includes dynamic markings such as *mp*, *f*, and *mf*. It also features performance instructions like "7-8" and "3-4" with arrows indicating specific rhythmic or phrasing changes.

Figure 1.2: *Strata*, layers of material over a static “basement”

As Adler states, “here I have attempted musical composition as a geologic ‘sedimentation of the mind.’ Structures arrayed in crystalline perfection comprise an inclined basement overlaid by layers of derived materials.”⁴ The performer must execute various layerings of material above an underlying chord stratum. Time operates in multiple ways: as something that is strictly measured, spatially represented on the page, or understood through a particular process such as gradually slowing down. Furthermore, the performer chooses the precise rhythm of the underlying chord stratum from a selection of rhythmic and metric values which change depending on the section. I have given the only performances of *Strata* since Saint’s premiere.

Generally speaking, most solo works that I have performed (as well as a significant number of chamber works) have received the attention of less than five performers since their inception. I do not believe this to be an indication of their artistic and musical value (or seemingly implied lack thereof) but as a testament to their artistic novelty and technical difficulty in tandem with many factors and frameworks in the professional musical world that either propel musical works into the public and performative spotlight or do not. This is an especially prominent situation in the field of percussion, new, and experimental music more broadly, as their establishment as professional fields continues to solidify and grow, comprising many types of professional skills, institutions, audiences, and universities or academies. The professional structures of new music have developed significantly over the past half century and the establishment of new music ensembles in universities and in the professional world (including the partnerships between the two) have drastically changed the means by which new works are initiated, created, performed, and cared for. While this has resulted in tremendous benefit for these fields including a growing awareness of such creative activities, it can also mean that

⁴ Adler, Christopher. *Strata*. San Diego, CA: Christopher Adler, 2010, preface

various compositions can slide into periods of performative dormancy rather easily. In the current climate of the percussive field, this is a particularly interesting situation given that the bodies of repertoire are young, fragmented, and that the core of the percussive artform's identity is still very much up for debate. Therefore, I feel strongly that efforts of rediscovery is an important and necessary contribution to the percussive field and music at large. In the pieces I will mention, it is also worth noting that my motivation in such a pursuit does not hinge solely on the lack of performative activity and recognition. It is often the case that these pieces are novel in their materials. For example, the manner in which Adler utilizes the extended-range glockenspiel is unprecedented in *Strata* given works prior to its conception. By pursuing geologic time scales within an instrument whose sound world is relatively constrained, Adler both expands the potentiality of the glockenspiel and brings a subject of temporal immensity to an immediate level of experience. Other works that fall into the same category are Lewis Nielson's *Lengua Encubierto* for percussion and voice, David Lang's *String of Pearls* for marimba, and Rudolph Rojahn's *Deus ex Machina* for solo percussion. In each case, unique performative challenges are located in the materials of each work. It is between these two pursuits—the creation of the new and the rediscovery of the past—that I have cultivated an artistic identity as a performer/musician and investigated percussion as a discipline, profession, craft, and human activity.

My recitals at UC San Diego were the primary performative engagements in which I developed this artistic impetus. In addition to the compositions themselves, each recital took on a specific theme that was in search of something greater than its immediate materials, although not necessarily defined at the outset. The compositions performed provided the pathway in which to investigate the overarching theme which I find I have ultimately arrived at with this paper. My first recital, “These Machines... These Mechanisms...” presented four works for solo

percussion: Josh Levine's *Transparency (Part I)*, Richard Barrett's *Abglanzebeladen/auseinandergeschrrieben*, Daniel Tacke's *einsamkeit*, and Jason Eckardt's *Transience*. Each piece seeks to transcend its immediate materials in some way, although taking considerably differing modes of approach in concept, material, and instrumentation. Levine's work employs one large concert bass drum, four triangles, and a piece of sandpaper. Barrett's work features a collection of resonant metals: vibraphone, crotales, soprano steel pan, low thai gong (B-natural), and flexatone in tandem with an extensive array of implements. Tacke's *einsamkeit* situates one small bass drum resting horizontally within a circular table. Resting on it are twenty-four small instruments designated by either their sonic profile (dry or resonant) or the means of activation (struck, scraped, rubbed). Lastly, Eckardt's *Transience* is a technical and physical tour de force for solo marimba. As Eckardt describes, "I push performers to their physical and mental limits, forcing them into expressive realms that are achieved in no other way."⁵ Levine's *Transparency (Part I)* (2004, rev. 2010) pursues a similar approach of transcending physical limitations. However, where Eckardt focuses on overcoming the limitations of the interaction between the performer and compositional material via the marimba, Levine seeks to overcome the sonic limitations of the instruments themselves. Levine describes:

The focal point of the cycle is the bass drum. It serves as a site for musical action that often seems to want to transcend the instrument's typical character and limitations. Increasingly the player strives to delineate multiple timbres and musical layers, as if trying to teach the instrument to transform its body, to speak or even sing. The triangles, though at the other end of the piece's timbral spectrum, share the bass drum's persistent sustain and comparatively limited expressive possibilities. They, too, are eventually called on to engage in a more nuanced and "expressive" discourse than their ostensible nature might imply. They can be understood not just as the separate, strongly contrasting voice they appear to be, but also as another facet in the journey of a complex and evolving musical personality.⁶

⁵ Email correspondence received by Jason Eckardt, *Transience*, 2017.

⁶ Josh Levine, *Transparency (Part I)*, Pacifica, CA 2004 rev. 2010, preface

Levine pursues this through the implementation of different modes of attack on both the bass drum and triangles. The opening of the piece consists only of single *fff* activations. Other modes of activation gradually appear: dead strokes, rubbing, scraping, the use of fingers and the fist, alongside the gradual implementation of different expressive devices: accents, crescendo and decrescendo, grace notes, and the indication of gesture via the use of dotted phrase markings.

Figure 1.2: *Transparency (Part I)*, multiple layers of activation on the bass drum

In Barrett's *Abglanzbeladen/auseinandergeschrieben* (1992-96, rev. 1998), the initial section is played solely on vibraphone. Barrett varies the vibraphone's expressive capabilities through the use of different implements: soft, medium, and hard mallets (often using multiple hardnesses simultaneously in different hands) as well as wooden sticks. However, in the latter half of the piece Barrett introduces additional metallic instruments in order to transform the overall sonic profile of the work, as if emanating from the vibraphone. Crotales, soprano steel pan, flexatone, and thai gong are all activated in tandem with the vibraphone, transcending the limitations of the initial metallic instrument.

In Daniel Tacke's *einsamkeit* (2009), the score presents rhythms alone across a series of otherwise blank pages. Meter is completely absent, tempo is approximated (roughly 12 seconds per page), and rhythm can be discerned only by the spatial representation of the notes themselves rather than discrete notational values. Moreover, Tacke created an elaborate layering of musical materials, each of which operates within its own tempo. Therefore, it can be said that Tacke seeks to overcome the limitations arising from the strict measurement of time. The performer must rely on other mechanisms in order to work out the time of the piece. Aspects such as gesture, physical motion, and intuited groupings of events direct the progress of the work rather than any firm system of counting pulses. This work is not the sole expedition in Tacke's investigation of such matters, as he describes more broadly in consideration of his creative practice:

[Notation] is also a process that is not without certain resistances, simultaneously freeing and limiting one's imaginative capacities. On the one hand, musical expression and meaning might be compromised by the visual concreteness that is necessarily a part of notational processes; on the other hand, notational images might carry the potential for previously unimaginable musical possibilities.⁷

In the case of *einsamkeit*, the concealment of the underlying systems of temporal measurement requires that the performer consider alternate ways of internalizing time. Suddenly, the performer is not fixed within the lanes of meter, pulse, and subdivision. A more immediate, less metronomic approach must be taken. The designation of numbers to the passing of beats no longer holds its effectiveness, rather, broader gestures and perceptions of motion must be pursued.

⁷Tacke, Daniel, et al. "Notation as a Compositional Tool: Three Exemplary Pieces." University of California, San Diego, 2012, pp 105.

Eckardt's *Transience* (1999) for solo marimba is in clear opposition to Tacke's approach. Eckardt deploys a complex and unwavering notational scheme of elemental extremes. With nested polyrhythms played at a quick pace, spread over the entire range of the instrument, and with constantly changing articulations and dynamics, Eckardt seeks to transcend the ostensible limits of the performer and instrument themselves and uses a increased degree of prescriptiveness in order to do so. As Eckardt himself describes:

I do not view virtuosity merely as an effect meant to dazzle or enchant. Rather, I push performers to their physical and mental limits, forcing them into expressive realms that are achieved in no other way. If there is an act of "transcendence" when performing my music, it is not towards the divine but instead celebrates the profoundly physical: moving to a psychological state completely lacking self-consciousness thus allowing the body to perform the balletic choreography essential to the execution of my music.⁸

A juxtaposition of Tacke's solo against Eckardt illustrates conflicting notions of transcendence. Where Tacke seeks expressive potential via the liberation from measuring time, Eckardt steps the performer so deeply and densely into measured time, pairing it with physical motion and gesture of extreme sophistication so that the performer is in essence absorbed in temporal measurement.

My second D.M.A. recital, entitled "Musica Mundana, Musica Humana, Musica Instrumentis" takes its title and inspiration from the threefold classification of music by the Roman philosopher, Boethius in his text, *De Institutione Musica*. In Boethius' time, the theory of music was an established scientific study in the curriculum known as the Quadrivium. Arithmetic (number), music (number in time), geometry (space), astronomy (space in time) comprised a study and a worldview that situated music, especially aspects such as harmony and concord, as components of the physical realm and the human experience of it. Richard Barrett's *Urlicht* for vibraphone trio with auxiliary percussion is perhaps a modern revisiting of such an orientation to

⁸ Email correspondence received by Jason Eckardt, *Transience*, 2017.

the world. Barrett's inspiration for *Urlicht* stems from Roger Penrose's work on the special conditions of the early universe (i.e. that the universe was unusually uniform and ordered in its early state). The trio begins similarly with symmetrical or "special" conditions via the unison playing of a 12-note chord which unravels over the course of the piece. Barrett's use of Penrose's scientific theories in *Urlicht* prompts the consideration of a modern rekindling between the astrophysical and musical, a relationship which has not been central to musical discourse since Kepler's *Harmonices Mundi*.

Justin Murphy-Mancini's *Sic itur ad astra* (Thus, one journeys to the stars) for percussion and harpsichord received its world premiere as part of this concert and takes its title from the Latin epic poem, *Aeneid* by Virgil. In *Sic itur ad Astra*, Murphy-Mancini deploys compositional elements that are indicative of specific eras of western music practice. Murphy-Mancini himself is both a composer specializing in contemporary, new, and experimental music but is also a trained historically informed practitioner, having focused extensively on the music of J.S. Bach and Dietrich Buxtehude. The materials of these baroque composers are prominent influences in *Sic itur ad astra*. The form of the piece resembles that of the baroque instrumental suite: Prelude, Allemande, Courante, Sarabande, Gigue, Chaconne, and Preludium. However, the musical vocabulary within each movement is more indicative of current musical practices, especially considering that the harpsichord and percussion alternate with each movement, only playing together in the sixth section, the chaconne. Take for example the courante for percussion only. Labeled with the expressive marking of "slow, but with nobility," it employs the use of microtonal limestone bars and a large bell plate activated with a foot pedal. The instrumentation is novel, and a primary motive of the courante consists of four microtones around the note E: (e-flat, e-half-flat, e-natural-and e-half sharp).

The final work of this recital was Luciano Berio's *Circles* for voice, harp, and two percussionists. Driving the impetus of this work was Berio's description of *Circles* as "a theater of over-abundant relationships," comprising what Berio outlines as the musical dimension, the phonetic-acoustical dimension, and the spatial dimension. While it is perhaps Barrett and Murphy-Mancini's works that appear to be immediate modern revisitings of Boethius' tripartite classification of music, it is Berio himself who comments directly on the prescience of Boethius' text, instilled in Berio's *Circles*, citing that:

Boethius' theoretical proposal did not attempt to formalize experiences that had already taken place or a practice under way, but instead he appropriated in advance the experience of sound, while conditioning its very formation and development.⁹

My third D.M.A. recital consisted of four works for solo percussion with a "space walk" occurring prior to the concert, a prelude entitled "The Grand Tour," and interludes interspersed between each work. The concert was performed without break—each segment eliding directly into the next—as a means of generating temporal phrases on various levels of experience and muddling the boundaries between moments of performance and moments of logistic transition. The space walk, which occurred for one hour prior to the concert performance, consisted of an environment which invited the audience to walk around the concert space to view the percussion setups in close detail. Hidden speakers within each setup projected audio consisting of the building blocks of each composition's finished materials. The materials were often slowed down, elongated, fractured, or irregular in order to give off an appearance of suspension; an audible realization of floating through cosmic space itself, waiting for the force of gravity (i.e. formal performance in this case) to assemble these sounds into cohesive structures. For example, the space walk materials of Lewis Nielson's *Lengua Encubierto* consisted of the chordal structure

⁹ Luciano Berio, *Remembering the Future*, pp. 127

found in the autoharp of the work, the harmonic series of F-natural. I recorded the harmonies via an ebow on a piano, each chord lasting many seconds if not minutes, thus elongated or “suspended” in relation to its regular form within the work itself. Furthermore, a book comprising all of the Apollo missions was stationed at the last setup (Daniel Tacke’s *Vorrücken*) of the concert program, allowing audience members to garner a closer look of images that foreshadowed the materials of the concert’s prelude and serving as a dedication to the furthest remote point in which a human has visited. The prelude of the concert itself entitled, “The Grand Tour” is a fixed media presentation that took video from NASA JPL, NASA SDO, Voyager Space Probes I and II, as well as videos of SpaceX satellites and various NASA shuttle and rocket launches against an audio composite of transduced electromagnetic emissions from each of the gaseous planets of our outer solar system. Over the course of twelve minutes, viewers move through the solar system both visually and aurally, moving outward from the sun. Between each planetary pass, a look “backwards” towards the sun is presented, each time filtering different wavelengths of light resulting in starkly different views of our host star. The prelude elided directly into the first performed work, *Shrinking world/expanding* by Josh Levine in which an overarching temporal form drives local material (discussed in greater depth later in chapter 4). The first interlude consists of a video showing a time lapse of the area traversed by NASA’s opportunity rover on Mars. A recording of Mars’ winds played against this video, the only aural feature of Mars available to us at the time. Immediately following, Christopher Adler’s *Strata* for extended range glockenspiel was performed. The work takes its inspiration from the concept of geological time, specifically through the work of land artist Robert Smithson, as Adler himself explains:

Strata is an homage to the artistic imagination of geological time and the inevitable accumulation of entropy and decay, inspired in part by the works of artist Robert Smithson. His materials were of the earth but his subject was the immensity of geologic

time. His works are a hallucinatory mediation on imagining the unimaginable. Here I have attempted musical composition as a geologic ‘sedimentation of the mind’. Structures arrayed in crystalline perfection comprise an inclined basement overlaid by layers of derived materials. Musical crystals erode, conglomerate and metamorphose under the pressure of surrounding materials and the relentless entropic forward progression of time.¹⁰

Following *Strata*, a second interlude was presented consisting of a composite recording of resonant metals activated via friction: tam-tams by rubbing a thin wooden dowel against its surface and bell plates with bass bows. No visual media accompanied this interlude. In a completely darkened space, the sustained tones of resonant metals disorient the experiential passage of time. From the sustained metals, the original recordings of the electromagnetic emissions of the gaseous planets reappear and subtly thread the practice of music with the concept of Musica Mundana. Lewis Nielson’s *Lengua Encubierto* was presented immediately following a sharp cutoff of the interlude. Nielson sets the poem “Sobre Nuestra Moral Poética” from *Poemas clandestinos* by Roque Dalton to a small arrangement of percussion instruments including an autoharp tuned to the harmonic series of F. The work’s early materials undergo a large scale transformation over the course of the piece. The setting of Dalton’s poem appears early on as a mash up of consonants and fricatives hocketing against the percussion instruments activated by striking, scraping, and rubbing. Altogether, Nielson creates a complex layer of percussive attacks and textures via both the hands and the mouth. Over time, individual words form, small melodies appear, and the text’s message is unveiled. By the end of the piece, the performer has relinquished their role as a conventional percussionist as they strum full chords repeatedly on the autoharp while singing Dalton’s poem to extended melodies in full blown song. It is in this piece that the temporal act of transformation occurs; literary meaning emerges from abstract percussive attacks and textures.

¹⁰ Adler, Christopher. *Strata*. San Diego, CA: Christopher Adler, 2010, preface

The final interlude of the program which began at the immediate conclusion of Nielson's *Lengua Encubierto* introduces another swell of the transduced electromagnetic emissions but is quickly cut off, resulting in silence. This was the first extended moment of silence in the entire program; no lingering resonances or ongoing sustain from instruments, only the sound of the performance space and the extraneous noises within it. In building a program without breaks, where interludes move directly into performed works, performative action was continuous. In arriving at a moment of performative silence in the final interlude, it was my intent to enhance a sense of *nowness*. Leading up to this point, the program had primarily directed the experience elsewhere, inviting audience members to think beyond their immediate environment, whether it be cosmically, geologically, transformationally, structurally, rhythmically, performatively, or otherwise. Such is a common feature of the musical experience, to be transported (in mind) elsewhere via the sounds activated and gestures executed. To suddenly cease such activity at such a late stage in the program amplifies the sense of inhabiting the space itself, including the extraneous, non-performed sounds of the space. It is in this moment of psychological shift that the experience of time becomes more prominent. The sudden lack of sounding material inverts the relationship that time has to music, however, for only a brief moment. Material slowly reemerges: a real time recording of the aurora borealis emerges and is accompanied by the brief emergence of audio recordings of the aurora by Stephen McGreevey using a VLF (very low frequency) recorder. It is here that our experience of the cosmic and planetary domains collide (quite literally), as super charged particles bombard the atmosphere, resulting in a display of motion—a representation of time—that is simultaneously of our world and otherworldly.

The final performed work on the program was the world premiere of Daniel Tacke's *Vorrücken* for vibraphone and phantom vibraphone built of plain steel flat bars tuned very

approximately (and intentionally so) to the vibraphone. An “unnaturally long sustain” as Tacke described it was the seed of the work. Tacke and I originally planned to install electromagnetic actuators beneath each vibraphone bar with magnets attached to each bar resulting in the ability to activate the vibraphone without the use of a percussion mallet. This technology was developed primarily by Cameron Britt with his creation of the EM vibraphone. This was ultimately rendered unfeasible given our circumstances, and the phantom instrument became the primary means of generating a sense of unnaturally long sustain. *Vorrücken* consists primarily of sustained tones activated by a bow as well as the scraping or rubbing of both the vibraphone and phantom instruments using thimbles. For Tacke, the title comes from:

"Vorrücken," however, captures the same sense of progressive *and* retrospective orientation, meaning "to move forward" but with chronological (and perhaps military) connotations as well, yet also connected to the idea of looking backward from old age, with all of the implications of wearing out that may come with this.

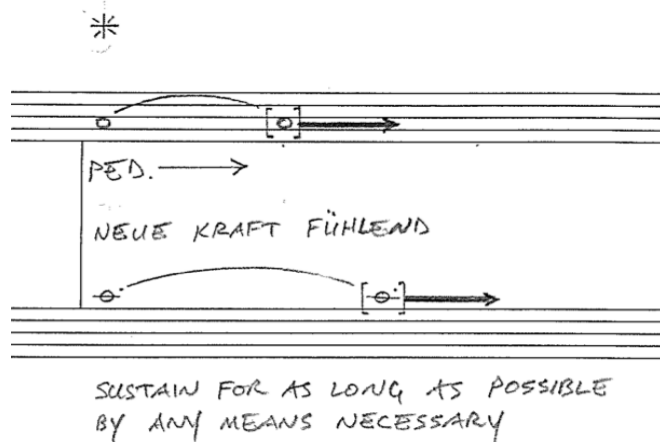


Figure 1.3: *Vorrücken*, illustrating the outset of “unnaturally long” sustain

The final measure of Tacke’s *Vorrücken* consists of a single E-natural that is bowed for six counts, however, the note has a fermata above it with the written instruction, “as long as possible” regarding the sustain of the note. Had Tacke and I been successful in implementing the electromagnetic actuators, this is a moment where they would have continued the note’s sustain,

seemingly “unnaturally” for an extended period of time without any contact to the bar itself. However, since the electromagnetic actuators were not used, I embedded a small speaker inside of the vibraphone’s resonator which played a recording of the exact E-natural on the instrument itself. As the recording faded into my bowed note in real time and as I released the bow from the vibraphone bar, the speaker matched the volume and extended the note beyond its natural decay, directly suspending the final moment of performed time within this musical situation.

The last event of the concert program consisted of the activation of a spinning disc, Euler’s disc, that was amplified with a condenser microphone. The physics of Euler’s disc shows that in the absence of friction, the means by which the disc functions—the combination of potential and kinetic energy—would oscillate with a constant angular velocity forever. However, the friction eventually forces the disc to a resting position. Before this occurs, the disc increases the number of bounces as the spin slows, the frequency resulting from the disc against the glass mirror raises, until eventually concluding in a quick snap, canceling both motion and sound instantly.

Through the development, preparation, and execution of these recital programs, my original quest with undefined goals yielded an understanding of my creative work and instrumental discipline that I had long been contemplating, and whose conclusion I have finally arrived at within this document. It is that the true focus of my work and perhaps even the field of percussion at large, is a practiced-based study into time itself. While timbre and rhythm have often been the immediately defining features of the percussive art form, they are ultimately aspects in service to the pursuit of time. Given the amount of time it has taken me to arrive at such a notion considering I have been steeped in this artform for most of my life is indicative of the challenges I face in presenting precisely what I mean in the coming pages. Time is more than

just the ticking of a clock or the successive measuring of events. In his text, *The Time of Music*, Jonathan Kramer mentions in his discussion of the ways in which music makes time. He says, “the difference between ordinary lived time and musical time is, according to [Thomas] Clifton, the difference ‘between the time a piece *takes*, and the time which a piece *presents* or *evokes*.’”¹¹ While Kramer discusses this in consideration of music at large, I will take on this concept from the narrower standpoint of percussion, positioning time itself as the core feature of a percussive practice as I have come to understand it. We will see the ways in which time has been a central aspect of the works I have devoted my creative efforts to, some specific ways in which time appears to emerge, and its impact on interpretive approaches.

¹¹ Kramer, Jonathan D. *The Time of Music New Meanings, New Temporalities, New Listening Strategies*. Schirmer Books, 1988, pp. 17.

Chapter 1: Establishing A Time Based Performance Practice

In our music, the listener's time and musical time meet halfway. The music, by taking its course, by being always on its way but never in a hurry, redirects the feeling of time. We may follow its progress easily, and therefore need not devote much effort to staying on the path. In this situation our eyes stray to the path running alongside us, on which someone just like us is walking. In this way the music is a mirror in which we see ourself, reflected through a gauze made of time that is stretched across the mirror. The gauze is held in place by sound.¹²

-Michael Pisaro

Eight triangles, 4 players, and 672 eighth-note unison attacks at a tempo of ♩= 48 beats per minute. Following this, the four players move directly *in time* to eight small metal objects (4 finger cymbals, 2 crotales, and 2 small cymbals) and proceed through 672 eighth-note attacks at the same tempo. From there, the four players tremolo on one cymbal each for 224 counts, then each scrapes a tam-tam for 224 counts, alternating between the center and the edge of the tam-tams in a slow oscillation. Following, bell plates are rubbed with small stones for 224 counts and then tapped in unison sixteenth notes for 406 counts (1,624 total attacks), changing only the number of finger pads that make contact with the plate throughout. Silence. Then, phrases of unaligned bass drum attacks played by each percussionist occur with brief rests in between. Large stones are rubbed together while a soft humming from all four players sounds, barely audible as it remains underneath the primary sound of the stones. A continuous sustain of bass drum tremoli occurs, however, the players alternate their individual tremolo and their pauses; they overlap with one another but never play in unison. The bass drum's low sustain never ceases throughout but changes slightly in its color. Following, the most timbrally diverse section emerges: skin drum heads rubbed with the hands, stones rubbed against one another, and foliage

¹²www.wandelweiser.de 2004, Haan All Rights Reserved. "Michal Pisaro." *Wandelweiser*, Wandelweiser, https://www.wandelweiser.de/_michael-pisaro/texts.html#Times_Underground.

(“laub”) ever so gently rubbed together with the hands enters and exits underneath the sound of rubbed skin and stone. Lastly, a succession of bass drum tremoli in phrases of 12 beats, accompanied by unison humming from the percussionists with silence in between.

What is one to take away from the above description that we may deem a musical situation? A straightforward point of departure would describe this as a musical work that employs a significant collection of percussion instruments that are activated in myriad ways, and that the responsibility of such musical material is quite literally in the hands of four individuals who assume the title of “percussionist.” Therefore, it is a percussion quartet entitled *Metal, Stone, Skin, Foliage, Air* (1996-2001) composed by the Swiss composer and clarinetist, Jürg Frey. Formally, the quartet is sectional; each section is identified by the instruments that are played and/or by the manner in which they are activated. For example, the shift from triangles to finger cymbals communicates the first change in section, albeit the material remains the same in both sections: 672 eighth-note unison attacks. Conversely, while the bass drums are initially activated by single legato strokes, a later section for the same four bass drums utilizes an entirely different mode of activation, the tremolo (or roll). This signifies not a return to a previous section (as could be inferred by the return of an instrument that has already appeared) but as something else entirely, given the differing mode of activation and therefore, the contrasting type of sonic material. Approaching this work through such a lens is to take a conventional approach to musical analysis. However, to do so for this piece in particular casts a shadow on a crucial aspect of the work’s identity. Rather than approaching the work via its material make-up and formal design (ultimately derived from the instruments themselves in this approach), considerations of what the piece *does* prompts a different pathway of discourse. In order to uncover this, we must prioritize time as a primary actuator of this situation. This requires a discursive approach that

recognizes the instruments and musical form as components that are in service to the domains of space and time (including the human experience of both) rather than the nucleus of the work's identity in and of themselves. Through aspects such as counts, length, duration, sustain, activation, silence, sound, repetition, proportion, pacing, progression, continuity, and direction, particular notions of time become emergent in this musical situation and the foundation towards a temporal cartography is established. Such an approach centralizes time as an active agent when it is so often left to mere implication. Time is often discussed peripherally at best as a tool of measurement, if at all. More commonly, time is expressed as a distant part of a situation driven more immediately by harmonic and/or melodic progression, or in more recent scholarship, analysis and narratives of social and cultural action. Therefore, time (and space) is treated merely as a resource to be mined, so to speak, for the sake of musical and/or cultural production. Time is of course "there" in any situation musical or otherwise (i.e. ordinary time) which makes navigating this topic very tricky. I am not the first to attempt to do so and in many other cases, authors provide a preface with an straightforward admittance of difficulty in broaching such a topic. For example, as Lawrence M. Zbikowsky notes:

To speak of time, in any substantive way, is to court madness. And our purchase on the slippery concepts through which we would grasp time is, if anything, made less secure by differences among our phenomenal experiences of time.¹³

One clear aspect that illustrates Zbikowsky's view is that the study of time is not a specialized subject localized to specific intellectual discipline. Rather, it permeates all fields of study although no field assumes time as its central agent. "One does not need to be a scientist, engineer, or scholar of time to perceive and live with a sense of time," as Alexander Bonus notes.¹⁴ Time is central to our individual and collective experiences and understanding. To pair

¹³ Suzannah Clark, *Music in Time*, pp. 33

¹⁴ Alexander Bonus, *The Metronomic Performance Practice*, pp. vi

that with the notion of time as something that is also ephemeral illustrates the slippage that Zbikowsky speaks of. Moreover, attempts at defining time is in and of itself an issue. In *The Study of Time III*, Toda Masanao articulates:

Occasionally, my ignorance frustrates me, not only about time itself but also about what I really want to know of time. Obviously, it is a fool's errand to try to "define" time. Defining a notion is to find for it an equivalent ideational construct made of some other, usually more primitive, notions.¹⁵

It is no coincidence that attempts to define music prove equally difficult. "Music" could readily replace "time" in Masanao's above thought. Such difficulty in definition can be attributed to time itself, which attests to my consideration that time is a (if not the) core feature of musical activity, that music is actually a property of time rather than the other way around as it is so often presented. As Jonathan Kramer states, "time is both the essential component of musical meaning and the vehicle by which music makes its deepest contact with the human spirit."¹⁶ In conjunction with Masanao's view, I will not attempt a definitive approach to the subject of music as time, but seek to establish points of departure that expand particular notions of time. This is in essence the same goal as Kramer when he says, "Music's temporalities are too varied to be explicated solely by a linear argument. Rather than a change of causally related ideas, therefore, I try to present a field of information, opinion, speculation, and strategies for listening."¹⁷

A point of departure that can and will be taken is one where time is approached as a "cluster concept with a whole bunch of logically detachable properties."¹⁸ This is a reasonable

¹⁵ Lawrence, Nathaniel Morris, et al. *The Study of Time III: Proceedings of the 3rd Conference of the International Society for the Study of Time, Alpbach, Austria*. Springer-Verlag, 1978, pp. 371.

¹⁶ Kramer, Jonathan D. *The Time of Music New Meanings, New Temporalities, New Listening Strategies*. Schirmer Books, 1988, pp. 2.

¹⁷ Ibid, pp. 11

¹⁸ Kuhn, Robert Lawrence, director. *Craig Callender - What Is Time?*, Closer to the Truth, 25 Aug. 2014, <https://www.youtube.com/watch?v=TuIMcce0j6k&t=408s>. Accessed 19 Oct. 2021.

way in which one may begin breaking down an ostensible aspect of our physical world and real aspect of human existence that crosses and threads every boundary line and discipline.

Furthermore, it accepts that time can be discussed in distinctive local areas, without necessarily requiring a rational alignment to other areas. One such recent approach illustrates this in Richard Grover and Bryn Harrison's *Being Time*, in which experiential arguments propel discussions of the temporal experience in experimental music. In one such account, the author provides an analysis of *Piano, Violin, Viola, Cello* (1987) by Morton Feldman written in a way that captures the author's very thoughts in time throughout the listening experience. Therefore, the reader's temporal experience in reading the author's account contains myriad layers of temporality, including the formal temporality of the work itself, a capturing of the author's listening experience of the work, and a reflection on the emergent temporal properties within such frames of reference. *Piano, Violin, Viola, and Cello* is the first work discussed in Harrison's *Being Time* but the last work in Feldman's compositional output. Feldman's composition is a daunting work to explore in the opening chapter of a text on the consideration of musical time: As Louis Goldstein notes of Feldman's work:¹⁹

His concern with how a musical composition sounds, rather than how it is made, set him on a path toward a new concert experience. A temporal landscape is created, where memory, the cornerstone of perceiving musical form, is consistently thwarted.

In Harrison's account, she provides her notes written down throughout the listening process, interwoven among her general reflections of the way time operates in Feldman's work, "As I continue to listen, twelve minutes into the piece, I become aware of a change: the piece seems to be getting slower but also more spacious." Observations such as these, paired with

¹⁹ Glover, Richard, et al. *Being Time: Case Studies in Musical Temporality*. Bloomsbury Academic, 2019. pp. 21

broader notions of temporal experience (such as considerations of recontextualization by Dora Hannien and Brian Kane, affliction of memory by Steven Schick, repetition by Bob Snyder, and so forth) provides a temporal account of many different layers for the reader. Such an approach expands Feldman's view of his later compositions in that:

My sense of time has been altered, so intently focused was I on the way the music changed from note to note and chord to chord. It created a living, breathing network of relationships that extended across its length. You don't really listen to these pieces, you live through them and with them.²⁰

Another recent collection of essays that probes the ways in which music brings time forward is Suzannah Clark and Alexander Rehding's *Music in Time* which comprises thirteen scholars who probe an understanding of music that is "time shaped in sounds" from perspectives including performance practice, history, ethnomusicology, aesthetics, cognitive psychology, and dance studies. Each essay approaches a musical situation through the departure point of time and creates a framework for understanding time via the processes, interactions, relationships, and parameters at play. In both texts mentioned above, time is pursued not through the creation of a singular universal temporal framework in which all situations and perspectives are situated and categorized appropriately. Rather, each essay explores musical activity or material as means of uncovering properties and experiences of time (whether they be broadly applied or specific to the individual circumstance). Such an approach aligns with Callendar's view of time as a "cluster concept with logically detachable properties."²¹ This document will take a similar approach by examining the temporal characteristics of individual works for percussion.

²⁰ Ibid, pp. 17

²¹ Kuhn, Robert Lawrence, director. Craig Callender - What Is Time?, Closer to the Truth, 25 Aug. 2014, <https://www.youtube.com/watch?v=TuIMcce0j6k&t=408s>. Accessed 19 Oct. 2021.

While I mentioned prior that there is no singular discipline that owns the field of time study, that does not mean that it has not been pursued, contemplated, and discussed in significant detail. Time has many themes in writing; it has been captured in myriad ways.

Table 1.1: Outlining the means by which time is described

phenomenological	chronometric
“inner time” ²²	“outer time” ²³
subjective time	clock-time
event-based time	fungible time
“virtual time” ²⁴	absolute time
“basic dimension of human experience” ²⁵	“profane time” ²⁶
qualities of time	quantities of time
being	“objective time” ²⁷
spatial time	becoming
mythic/sacred time	linear time

While I will not trace them all, it is important to look at some of the overarching ways in which time is discussed to provide a framework that will allow us to examine the musical works to come. In my examinations of time, many descriptions can be generally placed into two broad categories. While these terms have been categorized into two general areas, they cannot and

²² Alfred Schutz, “Making Music Together: A Study in Social Relationship,” in *Alfred Schütz: Collected Papers II. Studies in Social Theory*, ed. Arvid Broderson (Den Haag: Martinus Nijhoff, 1964), pp. 88

²³ Ibid, 89

²⁴ Susanne Langer, *Feeling and Form: A Theory of Art*, pp. 109

²⁵ Kramer, Jonathan D. *The Time of Music New Meanings, New Temporalities, New Listening Strategies*. Schirmer Books, 1988, pp. 17

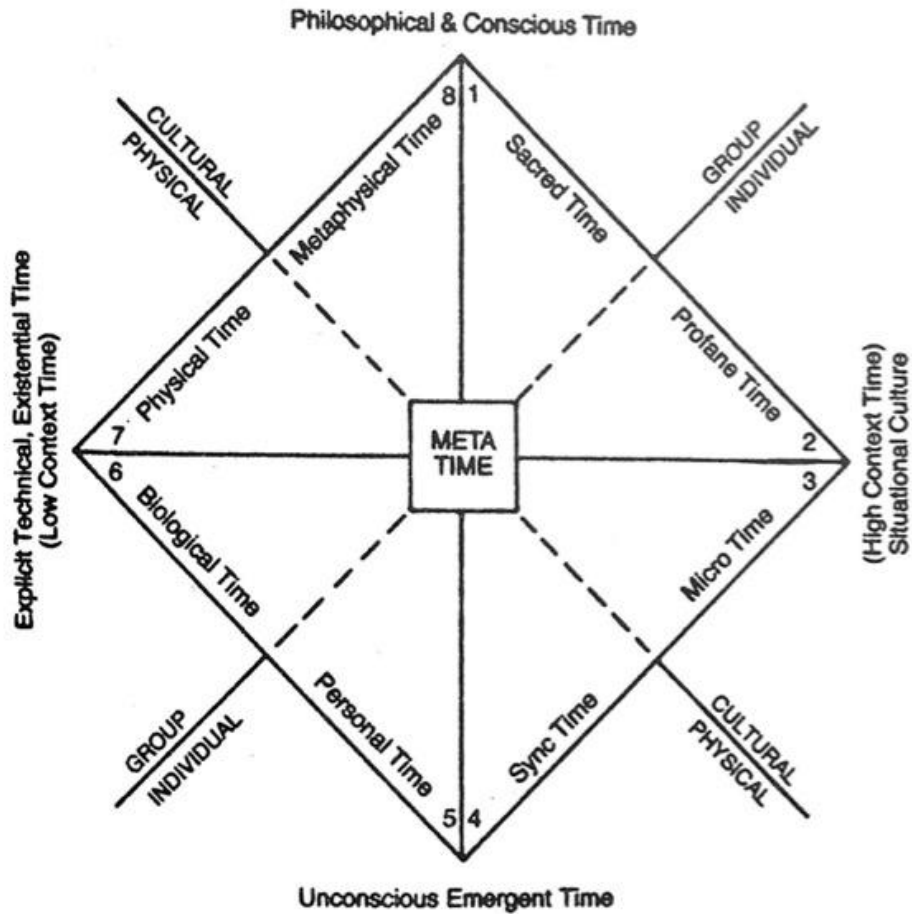
²⁶ Edward T. Hall, *The Dance of Life: The Other Dimension of Time*. Garden City, NY: Anchor, 1984, pp. 25-26.

²⁷ Thomas Clifton, *Music as Heard: A Study in Applied Phenomenology*. New Haven: Yale University Press, 1983. pp. 51

should not be considered synonymous with one another. While each term is placed on a distinct side of a basic terrain, the context in which these descriptions of time are originally introduced are important, although beyond the scope of this paper. They all present independent features and accounts of time. Furthermore, the above table is by no means a comprehensive framework of time as we know it. A contrasting representation of time can be seen in Edward T. Hall's mandala which illustrates aspects of time as it pertains to humans in a way that would not fit into the above table. Hall also expresses a similar concern regarding his depiction when he says that, "Viewed in this light and taking into consideration the different classes of time, it is important to note that the rules for understanding one category are not applicable to another category."²⁸ Hall notes that these different classes of time are like different universes with different laws, or that different times are different just as words and things are different.

²⁸ Edward T. Hall, "The Dance of Life: The Other Dimension of Time (Garden City, NY: Anchor, 1984), pp. 15-16

A MAP OF TIME



Note: To discuss complementary systems it is necessary to invoke Meta Time, which is where the integrative concepts are located.

Figure 2.1: Edward T. Hall's Mandala

The first diagram consisting of two columns introduced above showcases an approachable arrangement to time that distinguishes between externally measured processes of

time and internally experienced processes of time. Through Hall's mandala, he illustrates a more nuanced classification of time that shows distinct interrelationships between different types of time. Another framework to consider is Julius Thomas Fraser's nested levels outlined in *Time and Conflict*. In these levels, which Fraser refers to as "Umwelts," time itself has evolved throughout the progression of the universe. Fraser outlines six distinct levels of time: atemporal, prototemporal, eotemporal, biotemporal, nootemporal, and sociotemporal. The progression through these layers yields different series of unresolvable conflicts. As Fraser states, "I wish to postulate that the origins of temporality are neither in the nomothetic nor in the generative aspects of nature alone, nor in their possible coincidence as contraries, but rather in the conflicting separateness of certain opposites."²⁹ The atemporal is that of objects at the speed of light and the earliest moments of the universe at the Big Bang. The prototemporal exists at the quantum level, where particles traveling less than the speed of light result in statistical instants. The eotemporal accounts for things that are countable and orderable but without direction. The biotemporal accounts for the organic present and intentionality; directionality. It is here that our notion of past, present, and future emerges. The nootemporal is the "umwelt of man."³⁰ The organic intentionality of the biotemporal is joined by the mind. Free will and a sense of self exist at this level; an individual is aware of the self/other dichotomy. This is the level of the psychological. The last level, the sociotemporal, is the "integrated level of cultures and civilizations."³¹ In Kramer's *Time of Music*, he associates musical experiences of time with Fraser's temporal levels. For Kramer, uncompromisingly vertical compositions suggest Fraser's first layer—compositions that have separate events which are heard arbitrarily, rather than in a determined order. In this case, "form is understood cumulatively as the totality of constituent

²⁹ Fraser, J. T. *Time, Conflict, and Human Values*. University of Illinois Press, 1999, pp. 18.

³⁰ *Ibid*, pp. 137.

³¹ *Ibid*, pp. 24.

events.”³² The musical metaphor of the third layer is what Kramer refers to as “multiply-directed time,” which suggests a specific ordering of events, however, various directions are presented at once. Kramer’s metaphor for biotemporality is that of a dream-world, where “one event progresses to another, yet there is no large-scale sense of direction.”³³ Lastly, Kramer likens Fraser’s nootemporality to that of linearity.

Time can appear as something that is fixed, something that is relative, something that flows, and something that is discrete. We feel moments of time as well as the passage of time. The framework of our language positions our experiences *in* time and experiences *of* time. We speak of keeping time, of things *with* time, and of being *on* time, all of which indicate very different instances of the way we understand, perceive, and interact with time, the way we *spend* time, as well as the values that we place on and in time. Similarly to my initial table at the beginning of this chapter (table 1.1), Kramer outlines two overarching ways in which time may be examined. The left-brain orientation against the right-brain orientation, the formalist approach against the humanist approach, the syntactic, semiotic, and analytical side against the personal, social, aesthetic, and culturally significant side.

In science, time has been treated as both something fixed and something fluid. The idea that time is perhaps not an active agent in the events that occur in our world, that it ticks in the background regardless of action or presence is indicative of a dialectical framework that presupposes an absolutism with respect to time, that “time passes uniformly without regard to whether or not anything happens in the world.”³⁴ Isaac Newton’s doctrine of space and time

³² Kramer, Jonathan D. *The Time of Music New Meanings, New Temporalities, New Listening Strategies*. Schirmer Books, 1988, pp. 395.

³³ *Ibid*, pp. 396.

³⁴ Rynasiewicz, Robert. “Newton's Views on Space, Time, and Motion.” *Stanford Encyclopedia of Philosophy*, Stanford University, 22 Aug. 2011, <https://plato.stanford.edu/entries/newton-stm/#toc>.

formulated in his *Philosophiæ Naturalis Principia Mathematica* made a strong argument for such a view of time, and that it would become the basis of classical physics which would serve as a pillar for scientific thought until the rise of modern physics in the 20th century, surely influenced understandings of time within western musical culture that are still embedded in musical practices and discourse today, especially given that much of university musical practice is rooted in music composed during and just after the establishment of Newton's theories. Similarly, Einstein's theory of relativity has inspired our contemporary views on musical performance and interpretation. In Nicholas Cook's examination of Carl Reinecke's musicianship, he approaches Reinecke's style from the standpoint of time itself and considers two classifications of time: fungible (chronometric) and event-based time. In utilizing these two concepts of time which lay the groundwork between rigidly measured time and a more subjective experiential time, Cook analogizes Einstein's theory of gravity's influence on time to that of a musical object's influence on the experience of time:

Time is still bent, rather than flowing with the unachievable evenness of a perfect gramophone. But not by the local phenomena of melody, harmony, texture, or emotion. In an almost too perfect analogy with the very twentieth century idea of relativity, time is instead bent by the gravitational force of a regularly articulated musical object.³⁵

Whereas Newton's work established time as an entity operating independently of the events that operate within it, Einstein's theory establishes time as something dependent on a particular frame of reference; time passes differently according to a specific observer. This determines that time is no longer an implacable entity ticking away in the background but that it is an active agent in the events that transpire throughout the universe. Gravity affects time as does motion. To illustrate this from the standpoint of the events themselves: changes and events in the universe give rise to time. While Einstein's theory reinterpreted the inner workings of the

³⁵ Clark, Suzannah, and Alexander Rehding. *Music in Time Phenomenology, Perception, Performance: Essays in Honor of Christopher F. Hasty*. Harvard University Press, 2016, pp. 32

universe, he was not the first to hold such a view about time. Aristotle denied the existence of absolute time, instead arguing for a relationism with respect to time, that the temporal relations among things and events are at the essence of time itself. While the debate between these views has transpired across ages of written discourse, the social constructs of our current time seem to prioritize mechanizations of time that echo absolute time. Western lives have continually developed an increasingly measured, almost metronomic pace. It's as if recent scientific understanding of time in the universe ("out there") and our establishment of time in society ("down here") are in direct opposition to one another.

It is through my efforts in music that my understanding of time has shifted from some background force or mechanism to a central, mysterious, malleable, and overarching conglomeration of things that propel function and meaning in my individual life and earthly understanding. I will explore this relationship to time through a collection of new or rarely performed works. In this manner, I pursue these works with the understanding that the instruments operating within a musical form are subservient to the broader pursuit of exploring and mapping the spatiotemporal domain, and that in turn, time as an emergent phenomenon is the primary feature of musical and performative situations. It is in this manner, the pursuit of time gives credence to my creative work as a percussionist and the means by which I identify my creative practice. This may seem a radical stance to take against the conventional modes of musical analysis. I do not seek to position my discussion in opposition to such methods but to consider the potentialities of shifting the focus of a musical situation from the prioritization of the sounding materials (including the metaphorical, expressive, and aesthetic aspects that are tied to them) to a framework that centralizes the phenomenon of time and considers other musical features as components of temporal phenomenon.

I began with an introduction to Frey's *Metal, Stone, Skin, Foliage, Air* because my attempts to invert the relationship of music and time is precisely what Frey does in this particular work. A vast array of percussive instruments and a sectionalized form presents an evening-length musical situation that serves as a means of exploring two different aspects of time, as Frey explains:

One possibility of experiencing time is the path. It is what lies ahead at the start of a performance: the composition develops, takes first one direction then another, perhaps doubles back, sets an accent here and there, focuses on certain sonorities or thematic levels. It unfolds continuously, and the more we hear of the piece, the more of a past the piece acquires[...] Another possibility of experiencing time is expanse. Music consists of sound; unchanging and unchanged, it expands in space. Attention is not trained on the individual event but wanders in space, laying claim to space just as sound does.³⁶

For Frey, pathway and expanse are akin to the philosophical notions of becoming and being, two aspects of time which have been discussed philosophically, scientifically, and psychologically in great detail. With the Heraclitean becoming, "everything flows and nothing abides; everything gives way and nothing stays fixed. You cannot step twice into the same river, for other waters and yet others, go flowing on."³⁷ Thereafter, Parmenides argued the opposing view of time, that of being when he said, "There remains, then, but one word by which to express the [true] road: Is. And on this road there are many signs that What Is has no beginning and never will be destroyed: it is whole, still, and without end. It neither was nor will be, it simply is—now, altogether, one, continuous...."³⁸ Similarly to Frey, Jonathan Kramer associates his concepts of linear and nonlinear musical time with becoming and being. For Kramer, it is a robust area of theoretical research while for Frey, it is at the root of his

³⁶ "www.wandelweiser.de 2004, Haan All Rights Reserved. "Jürg Frey." *Wandelweiser*, https://www.wandelweiser.de/_juerg-frey/texts-e.html.

³⁷ Savitt, Steven. "Being and Becoming in Modern Physics." Stanford Encyclopedia of Philosophy, Stanford University, 6 Oct. 2021, <https://plato.stanford.edu/entries/spacetime-bebecome/>.

³⁸ Savitt, Steven. "Being and Becoming in Modern Physics." Stanford Encyclopedia of Philosophy, Stanford University, 6 Oct. 2021, <https://plato.stanford.edu/entries/spacetime-bebecome/>.

compositional and creative practice. Such writings pursuing this dual nature of time bridge both the way time manifests externally through physical changes and the way we as sentient beings experience time in momentary instances. For Frey, the path is associated with a melodically driven situation (i.e. changes in frequency represent direction or linearity), whereas the expanse, or “spatial thinking,” deals with the sounds themselves as they operate in space, “Melody and the path have a beginning and an end, but sound and space have a timeless presence.”³⁹ Frey states that he operates compositionally on a threshold between these dual aspects of time.

Another composer who has considered time as a crux on which their compositional activities operate is the Austrian composer, Klaus Lang. For Lang, time is of itself the central aspect of the musical situation altogether:

Music is seen as a free and self-standing acoustical object. In his work he is not using sound, sound is explored and given the opportunity to unfold its inherent rich beauties. Only when sound is just sound is it perceivable as that what it really is: a temporal phenomenon – audible time. Klaus Lang sees time as the genuine material of a composer and at the same time also the fundamental content of music. In his view musical material is time perceived through sound, the object of music is the experience of time through listening.⁴⁰

In Lang’s description, the musical experience stems from time itself rather than any pursuit of sonic or aesthetic purity. His work is often characterized by its extreme quietness, delicate textures, and slow pace, alluding to very similar notions of using sound briefly outlined in the overview of Feldman’s *Piano, Violin, Viola, Cello* but taken a step further. For Lang, it is in consideration of structure and scale that notions of time in their various appearances are primarily found. This is discussed in notable depth by Daniel Wilson. In looking at Lang’s early

³⁹ “www.wandelweiser.de 2004, Haan All Rights Reserved. “Jürg Frey.” *Wandelweiser*, https://www.wandelweiser.de/_juerg-frey/texts-e.html.

⁴⁰ Lang, Klaus. “ESC Medien Kunst Labor.” *Klaus Lang | Esc Medien Kunst Labor*, <https://esc.mur.at/en/bio/klaus-lang>.

musical works, *der wind und das meer* and *the sea of despair*, Wilson illustrates the way in which Lang's music is at its core, "audible time:"

The theme of repetition is something that is embedded in the compositional foundations of both *der wind und das meer* and *the sea of despair*. The use of repetition is not, however, always visible on the surface of the pieces, and is often applied in such a way that is barely perceptible to the casual listener. Indeed, with the *sea of despair*, repetition only really becomes apparent when the work is analysed in depth. I do not think Lang wishes the repetition to be immediately – or perhaps even ever – visible/audible to the audience. Rather, I want to suggest that Lang uses complex repetition in order to trigger memories on a subconscious (or pre-conscious) level. The activation of memories then serves to give the listener a sense of the familiar, triggering a Bergsonian pure memory and inviting the listener to (su)spend time searching for the connecting link. This searching process causes the listener's perception of time passing to be altered, deferred, or, perhaps, stopped all together.⁴¹

When considering music as a feature of time, as opposed to the more commonly asserted view that time is a component of the musical situation, musical objects (e.g. scores), situations (concerts and performances), and overarching arts structures (arts organizations, arts groups, etc.) take on a strikingly different complexion. While I have probed this in a broad manner so far, the following chapters will explore more specific aspects centralizing time through the field of percussion and specific percussive works.

⁴¹ Wilson, Daniel. "Bergson, Mourning and Memory: The Fragility of Time in Klaus Lang's Trauermusik." *Tempo*, vol. 71, no. 281, 2017, pp. 53–70., <https://doi.org/10.1017/s0040298217000419>, pp. 59.

Chapter 2: Percussionists Are Time Beings

At the outset, it is quite clear that percussion stands apart from other acoustic instruments and instrumental disciplines. Percussionists are required to do a number of tasks as musicians and performers. The execution of sound making in a performative setting is just a fraction of them. Percussionists must become knowledgeable of the material world in ways that other instrumentalists are not required. It is important for a percussionist to gain knowledge of woods, metals, skins, ceramics, glass, plastics, rubbers, carbon fibers, and other synthetics in consideration of instruments and their sonic properties, mallets and their activating potential, as well as stands and frames to hold, support, or suspend percussion instruments. We must be to a certain extent, materialists, architects, craftspersons, alongside our primarily held function as instrumentalists and musicians. It is in consideration of this that a key aspect that sets percussion apart from other instrumental categories emerges. Percussion does not have an identifiable instrument—a specific sound-making object of a categorical type—as the root characteristic of it as an instrumental discipline. For the individual that plays an instrument, they often derive their identity directly from the object that they play. An individual who plays the violin assumes the title of violin-ist, one who plays the piano assumes pian-ist, one who plays clarinet assumes clarinet-ist, etc. This language implicates a particular bond between an individual and their instrument. This bond is often expressed as a unified relationship between body and object. Moreover, this can often imply an individual's technical prowess and mastery. This illustrates the common notion that a performer's instrument is an extension of who they are, therefore, it is inseparable from their musical and creative identity. Luc Nijs and Michelle Lessafre's *The Musical Instrument As a Natural Extension of the Musician* posits that this very notion is “the

most natural mediator between subjective experience and physical reality.”⁴² For Nijs and Lessafre, a bond between an individual’s inner artistic drive and a sound-making object bridges subjective experience and the physical world. Furthermore, researchers have argued that such a relationship is even advantageous within the performative realm. By identifying an instrument as an extension of the individual, the performer will be more confident and have less performance anxiety. Simoens and Tervaniemi see this very relationship as a strong candidate index for professional well being in musicians.⁴³ Therefore, not only is this notion a common way in which individuals relate to their instruments, but it may also be considered the primary way in which an individual may develop as a professional musical performer. By viewing an individual’s instrument as an extension of their body, it implies a sense of depth and invokes an appearance of overcoming technical challenges. This presents the musician as someone in complete connection with their artistry, unfettered by technical shortcomings or hindrances between object and individual.

When considering the percussionist in the context of the body/object binary, the aspects that make up what it means to be a percussionist do not fit into this mold. If the percussionist employs myriad objects in their instrumental craft, then which—if not all—is the primary extension of oneself? And if that cannot be answered, is the percussionist therefore disadvantaged given Nijs and Lessafre claim? Perhaps in some aspects that is certainly the case. If a percussionist has dozens of instruments to play, how may they expect to master them at the same level as an individual who must only play one? An obvious rebuttal is that an instrument such as the woodblock does not require the technical sophistication of the violin. However, while

⁴² Nijs, Luc & Lessafre, Micheline & Ieman, Marc. (2013). *The Musical Instrument As a Natural Extension of the Musician*.

⁴³ Simoens, Veerle L., and Mari Tervaniemi. “Musician–Instrument Relationship as a Candidate Index for Professional Well-Being in Musicians.” *Psychology of Aesthetics, Creativity, and the Arts*, vol. 7, no. 2, 2013, pp. 171–180., <https://doi.org/10.1037/a0030164>.

an object such as a woodblock does not demand the level of technical sophistication as that of the violin, the percussionist must garner a knowledge of the different types of woodblocks, the types of implements that can be used to activate them, and within what musical contexts to employ one wood block from another. Percussionist and composer Sarah Hennies illustrates this in *Night After Night's* "The Art of Exposing Hidden Possibilities," when she says:

The more I thought about this percussion thing... like Steve Schick says in his book, the thing that makes percussionists unique is that we don't have an instrument, that we build our own set-ups, and that our objects don't have a performance practice. He's right, but I think that I would take it one step further, which is actually that because percussionists could be asked to do potentially anything in a piece of modern music, if that's the case then we must be something other than the thing that we play.⁴⁴

In stating that percussionists are something other than the thing that they play, Hennies illustrates a distinct quality of percussion performance that is not found in other instrumental disciplines. The question must then be asked, If a percussionist is something other than the thing(s) they play, then what are they? This sits in opposition to other instrumentalists given that a specific object—their particular sound maker—is the primary representative of that instrumentalist's musical capacity via their standardized techniques, performance practices, and material type. If a particular object is not the primary representative of a percussionist, then perhaps a percussionist's identity lies in action rather than object. Hitting, striking, or activating with the hands, sticks, mallets, or beaters is the fundamental action that a percussionist employs. Therefore, it could be said that percussion consists of instruments played through the act of hitting, striking, or activating. However, this does not take into consideration all the aspects of the art form (or even the modes of activation that percussionists must learn). Percussion instruments can and have been classified primarily by their material type: membranophones,

⁴⁴Smith, Steve. "Sarah Hennies: The Art of Exposing Hidden Possibilities." *The Night After Night Archives*, 2020, https://www.nightafternight.com/night_after_night/2020/09/sarah-hennies-the-art-of-exposing-hidden-possibilities.html.

idiophones, chordophones, aerophones. Other times, percussion instruments may be classified by whether or not they hold pitch (i.e. pitched percussion instruments vs. non-pitched). Such classification systems are readily found in orchestration texts such as Samuel Adler's *The Study of Orchestration* and the Hornbostel–Sachs system of musical instrument classification.

Percussion instruments may also be classified by their geographic location or cultural origin.

Some primary examples of this include gongs of Javanese and Balinese gamelan, a tabla from Hindustani classical music, steel pans from Trinidad and Tobago, various drums from West African drumming traditions, to name only a few.

Establishing a percussionist's identity via a collection of material objects is an attempt to align percussion alongside other instrumental disciplines that operate off of the above mentioned binary between an individual and their instrument, albeit in an extended manner. However, if a percussionist's identity is in fact independent from the thing(s) that they play, then this route of categorizing objects by their material type is ultimately a no outlet path. There is tension embedded in the classification systems within the percussive discipline. Percussionists clearly perceive themselves as not having a specific instrument (as Hennies highlights), all the while, formal definitions often define the percussive field via a list of instruments of categorical types. Furthermore, with the ways in which percussion incorporates an ever-growing world of sound within its purview, a comprehensive list of instruments is not attainable and will constantly be subject to updates. Such an approach illustrates many of the objects that a percussionist may employ as well as the actions utilized to activate them. However, in the quest for percussionist's musical, artistic, and creative identity, such a model falls short in truly uncovering the deeper seeded impulses of the percussive act. In my examination, we will see that the act of percussion is fundamentally an act of temporal study. Percussionists are temporalists who

uncover time through the potentialities of sound. Percussionists shape time, keep time, assert time, ingrain time, and ultimately *are* time.

Time is a daunting subject even in the area of percussion alone. To claim that a percussionist's identity is so closely oriented to time itself is to consider the numerous approaches to time that we take. Rhythm is an immediate example. Groove is an entire subject in and of itself which will largely not be broached here. Gesture and motion incorporate both the visual domain of percussion performance (which certainly bears weight on experiences of time) as well as the characteristics of the many sounds utilized; their amplitude, resonance, sustain, decay, and timbre. In order to understand the centrality of time in percussion study, I will discuss some of the most basic aspects of percussive study which will provide a foundation in the consideration of a selection of complex works for and with percussion.

Chapter 3: Studying Musical Time and Other Considerations

Virtually no instrument questions [i.e. challenges] the creativity of the performer so demandingly as percussion instruments. Percussive sounds express not the passage of time in its concrete, physical dimension, but the metaphysical, eternal flow of time as well.⁴⁵ -Toru Takemitsu

In the previous section, I examined the issue of a percussionist's identity given that a specific object cannot be attributed to this instrumental discipline. While I seek to retain the strength of that claim, I must also pursue the next discussion by focusing on a particular percussion instrument that is in practice, often considered to be the core instrument of percussive study, the snare drum. I do not do this to contradict the claims of my previous discussion. Rather, I present the snare drum as a confined framework in which the seeds of an instrumental practice based primarily on the study of time originates. The snare drum is in essence a single-unit lab where technique can be developed alongside the fundamental concepts of gesture, pulse, rhythm, meter, and tempo. Oftentimes, individuals may also begin on the drum set, a collection of drums and cymbals that incorporate all four limbs in the development and shaping of musical time. However, for the purposes of this discussion, we will focus on a single instrument in order to emphasize aspects of musical time.

Early musical developments in percussion utilize the snare drum to introduce the basic concepts of musical time, namely pulse rhythm, meter, and tempo. It is also here that the general motions associated with time making are cultivated. A survey of method books by Mitchell Peters shows the way in which musical time or performed time progresses through distinct stages of method: Elementary Studies, Intermediate Studies, Advanced Studies, Etudes, and *Hard Times*. In early study, the basic principles of musical time are established:

1. Generating pulse through playing (simple quarter notes) and through resting

⁴⁵ Siddons, James. Toru Takemitsu: A Bio-Bibliography. Greenwood Press, 2001, pp. 69-70.

2. Feeling division of the pulse in both two, three, four, and six parts in both playing and resting. It is here that the seeds of duration are planted
3. Sustain (via the snare drum roll)
4. The introduction of additional temporal layers, primarily dynamics (terraced and gradual) and accents
5. Embellishing the primary articulations of time through the use of flams and ruffs



Figure 3.1: *Intermediate Studies for Snare Drum*, rhythmic examples

As the method progresses, rhythms become more intricate. The concept of sustain is elaborated with intricate roll patterns, and the temporal areas between the established divisions of two and three (and their multiples) are introduced, primarily quintuplets (the value of time between sixteenths and sextuplets) and septuplets (the value of time between sextuplets and thirty-second notes). Metric changes occur locally, and pulse increasingly varied in both number per groupings and rate. Increased instances of modulation both in terms of pulse or meter also become prevalent. Temporal devices such as syncopation, hemiola, metric modulation, and nested polyrhythms are seen at advanced levels as well as odd rhythms over the course of multiple beats (e.g. an eighth-note or quarter-note quintuplet or septuplet). Peters' extensive method is not just a method of snare drum playing but a method of time study. Through it, individuals gain heightened abilities to:

- Measure time (tempo, pulse, rhythm, meter, hemiola, metric modulation)
- Layer time (dynamics, accents, embellishments)
- Mold the experience and understanding of duration and sustain (rolls, form, and phrase)
- Develop internalizations of pulse and the various relationships of rhythm against it
- Garner a sense of phrasing in regards to local rhythms against a pulse and larger groupings of measures that comprise a temporal phrase.



Figure 3.2: *Advanced Studies for Snare Drum*, rhythmic examples

In Figure 3.2, which is taken from Peter's first etude of *Advanced Studies*, illustrates heightened rhythmic complexity from the earlier example in Peters' *Intermediate Studies*. Here, quarter note, eighth note, and sixteenth note triplets are introduced. While eighth note and sixteenth note triplets are prominent in the advanced study, this is the first instance of the quarter note triplet. Furthermore, the sixteenth note quintuplets appear for the first time in Peters' method. Syncopation at the sixteenth note level is prominent and the division of the thirty-second note is featured in the last measure (also a new rhythmic feature).

While this highlights one aspect in the progression of rhythmic study, the manner in which these rhythms are performed is also an important component in the development of musical temporality. The stickings applied to the rhythms (right hand lead, left hand lead, or alternating) create additional opportunities for analysis. Each sticking listed above bears a considerable weight on the realization of the notated rhythms. Furthermore, Peters develops aspects regarding metric and dynamic phrasing that are equally as valuable and intriguing. However, I do not intend to provide a full analysis of Peters' method given the scope of this paper. Rather, I seek to showcase the ways in which early percussive study can be understood primarily from the standpoint of time.

Peters continues his method through additional collections of etudes which develop rhythmic and technical complexity as could be expected. *Hard Times* consists of etudes with rhythmic and temporal sophistication that easily surpasses the temporal demands of most music today. This particular collection of etudes certainly challenges the technical abilities of the developing percussionist, but it also strengthens an individual's ability to internalize, divide, and ultimately feel the different components of time in an exhaustive method. I use "feel" to illustrate that the increased complexity of the notation itself is not the sole focus of what I consider to be heightened temporal sophistication. It is in the realm of time and music that number and proportion acquire an identity that can be understood corporeally, in the bodily internalization of rhythmic values applied to patterns of handedness. Number can be felt and physical gestures are key in communicating such feelings. In Peters' *Hard Times* (and all prior etudes), to feel number in time begins with points of attack on a conceived grid, measured and executed in a precise exactitude. However, in working through this, gesture, phrasing, and feeling take over processes of temporal measurement and quantities of time unveil qualities of time. It is in connecting the

different components: rhythm, meter, tempo, measure, and phrase that the western temporal experience is truly cultivated and Peters' collection of snare drum etudes provides a clear pathway through these different components.



Figure 3.3: *Hard Times*, rhythmic examples

In addition to studying these aspects of musical time through various etudes, one must learn the various ways in which the body is engaged in performing musical time. One can readily look at the conceptual foundations of musical time (such as those mentioned above). However,

the way in which those concepts are enacted, physically and performatively, is a large aspect in the overall experience of musical time. For example, a musician does not merely understand the relationship of eighth notes to quarter notes as 2:1, or simply that eighth notes occur at twice the rate as quarter notes. The corporeal reality of performing eighth notes is also an important factor in their understanding of such a relationship. Take for example a violinist who would understand those eighth notes as a sequence of up bows and down bows if occurring at a quicker tempo. However, they may consider a series of eighth notes at a much slower tempo as repeated down bows. While in both cases, the relationship of the rhythm to the beat is 2:1, they will feel very different and therefore be rendered in experience as very different moments in time. Similarly, a percussionist alternating eighth notes between the right and left hands will conceive of them differently than if they are all played with one hand.

To consider this within the purview of percussion, we can begin by examining the sounding of rhythms on a snare drum as a physical left/right duality. Different stickings upon the same rhythm can produce noticeably different results. Broad sticking concepts such as right-hand lead, left-hand lead, or alternate sticking are commonly implemented. The first two of these concepts are most often applied in correspondence with handedness. Our dominant hand is often the hand that corresponds to rhythms sounding on the beat, while the non-dominant hand is attached to rhythms between beats. Therefore, right-handed individuals will lead rhythmic patterns with their right hand and left-handed individuals with their left. It is uncommon that a percussionist would lead a rhythm with their non-dominant hand in performance. Although, they may do so in practice for technical training and exercise. Associating the sounding of a beat with the dominant hand reinforces the ability to do so consistently, resulting in a standardization of rhythmic execution. This provides consistency of execution and reliance regarding time keeping,

however, the standardization of assigning patterns to rhythm (specific motions to specific kinds of time) can be stifling in the search of musical-temporal experiences. An exceptional example (and an important one at that) is the drummer Marcus Gilmore who performs predominantly on a drum set arranged for right-handedness. However, Gilmore has occasionally been seen assuming a setup arranged for left-handedness. As Gilmore says,

I guess most people would say that I am right-handed[...] if I'm going to play a ride cymbal I usually play it with my right hand. But then a lot of times when I start phrases I start with my left hand[...] then there have been times when I have set up left-footed so I was playing the kick drum with my left foot and the hi-hat with my right foot[...] I do it every now and then, it's kind of rare, but I do it in situations where I feel like I really want to hear what would happen if I just did it like that. That's why I have done it in concerts because I felt like I was getting into a creative rut and I felt like things were just starting to sound the same and I just needed to freshen up[...]⁴⁶

Gilmore goes on to explain that it's both a radical way to resist a kind of creative stalling, the inversion of dominant handedness generates new pathways of material that would have remained undiscovered otherwise, therefore resisting the kind of standardization mentioned above in the implementation of broad sticking concepts. Gilmore's approach highlights the ways in which the way rhythms are assigned stickings or a particular handedness can generate different avenues of musical time. Within the coordination that individuals build between the areas of their body are tendencies at certain kinds of time making and in order to break from those tendencies, one must actively challenge their body's dexterity and limb independence.

A more local examination of the ways in which sticking patterns bear significant weight on the internalization and experience of musical time can be seen in the different groupings of left and right hands within a given rhythm. For example, if a basic rhythm consisting of a measure of four quarter notes could be played with a variety of sticking patterns, each of which has a significant character and effect on the rhythm itself:

⁴⁶ Schaefer, John, director. *Live in Studio: Marcus Gilmore*, New Sounds, 23 Aug. 2019, <https://www.youtube.com/watch?v=tNVZkfW52F0>. Accessed 11 Nov. 2021.

Table 3.1: Illustrating the means by which handedness can be applied to a rhythmic sequence

RLRL	LRLR
RRLR	LLRR
RRLR	LLRL
RLRR	LRLR
RRRL	LLLR
RRRR	LLLL
RLLL	LRRR
RLLR	LRRL

A basic example of sticking patterns in groups of four notes can quickly turn complex. If one were to start combining these sticking patterns together, the result would be something like George Lawrence Stone’s *Stick Control*. One may also vary the duration of each activation within the sticking groups, at which point the possibilities increase significantly. This illustrates variation at the level of rhythm. However, if we consider temporal variation at the level of meter, an additional temporal layer emerges. In the above mentioned sticking patterns, the way in which the two hands are grouped indicate a particular agogic emphasis against the set the rhythm. The first sticking pattern (RLRL) situates the right hand, or most commonly the dominant hand, on beats 1 and 3 which are largely considered to be “strong” beats. Whereas the left hand activates beats 2 and 4, commonly referred to as “weak” beats. This would remain the case for an individual who is left-handed and employs the “LRLR” sticking pattern. Conversely, the sticking pattern “RLLR” shifts this emphasis; each hand plays on activation on both a strong beat and a weak beat. While many western concert percussionists practice these various sticking patterns

with the intent of making them all sound the same, the reality is that this takes a great deal of work in order to do so. The amount of effort required in order to do so highlights the natural ways in which the internalization of a numerical time (i.e. assigning numbers to pulses) against the handedness binary of sticking patterns yields dramatically different feelings of time and rhythm. This is also something that can be impactful visually as well. Different sticking patterns result in different visual gestures, and this influences the experience of rhythms immediately and musical time more broadly.

One additional aspect to consider within handedness and systems of musical time can be seen with one small edit to the above example of the various sticking patterns being assigned to a sequence of four quarter note pulses. If we make the minimal edit of removing one of the quarter note pulses but retain the specified sticking patterns above, then the relationship between the sticking patterns and the number of pulses creates a hemiola effect. In this case, the first sticking pattern would appear to reset at different points in the repetition of three pulses.

Table 3.2: Illustrating how handedness and number in time generate temporal feeling

1*	2	3	1*	2	3	1*	2	3	1*	2	3
*R	L	R	L	*R	L	R	L	*R	L	R	L

Internalizing this particular sticking pattern in groups of four activations within a meter of three pulses creates a distinctly different experience of time than if one grouped the sticking patterns into three strokes, therefore alternating between right hand and left hand with the start of each grouping. It is in pursuing these relationships that the quality of musical time begins to emerge. It is no longer a mathematical consideration of successive points within an ongoing grid but the physicalization of them and the forces between their moments of alignment and moments

in between. A geometrical equivalent is that of planetary motion, where orbits are elliptical rather than perfectly circular. Gravity renders their motion not of continuous and uniform speed but variable between moments of perihelion and aphelion. The experience of rhythms, sticking patterns, and metrical groupings moving, in both body and mind, at rates can be thought of similarly as moments of perihelion and aphelion. A clear example of this is the consideration of pulses within a measure having weight (i.e. gravitational pull). Rhythms can be considered moving away or towards them. Gesture is derived from such weight and the expression of motion as propelling outward from- or falling into and arriving at- is a fundamental characteristic of western music writ large. Therefore, it is largely here that time as a functional musical element in western concert practices emerges. However, there are other features of time that emerge in broader forms beyond that of measurement which we must consider next.

Such a method like the one discussed above is something that in and of itself takes a substantial amount of time in developing and executing. The undergraduate performance curriculum is largely devoted to these matters, although they are primarily pursued as components in the development of physical technique. In these contexts, various exercises which draw from the principles above serve to build physical dexterity as well as internalizing time. While they may appear as simple rhythmic exercises, they help to unravel deeper considerations of how we develop a sense of musical time. While considerations of measuring time in the form of tempo, rhythm, meter, measure, and phrase is perhaps the most immediate aspect of time in music, to study time in and of itself requires that aspects of musical situations beyond the measuring of it via meter, rhythm, and tempo be addressed.

Looking at the scores to a selection of the compositions listed in the overview of my creative work illustrates the variety of ways time can be mapped onto the page. The scores are

cartographic representations of distinct temporal situations and in many cases, one temporal cartography bears little relation to another. Take for example Richard Barrett's *Abglanzbeladen/auseinandergeschrieben* which situates the performed material against a grid of 32nd notes (in groups of four). In this example, there are no bar lines and no prescribed meter. As Barrett notes, the 32nd note groupings "are not to be understood as being in any way metrically significant. In the first half, the tempo indication should be borne constantly in mind as an 'ideal', even if sometimes unattainable."⁴⁷

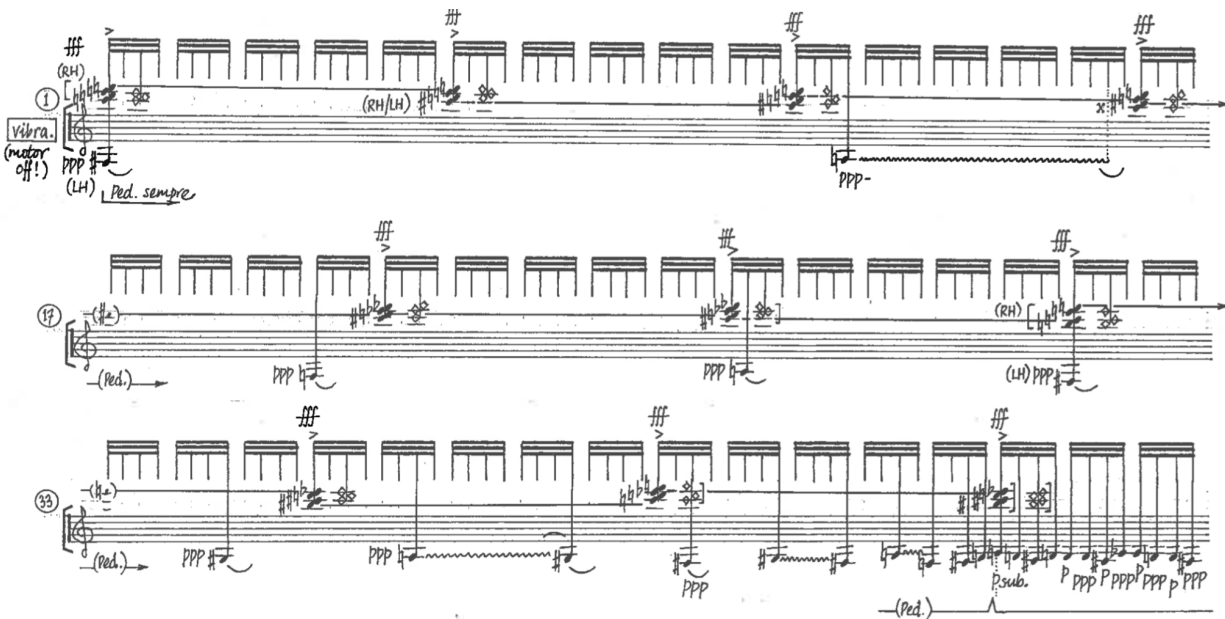


Figure 3.4: *Abglanzbeladen/auseinandergeschrieben*, example of vertical activations

In this case, an idealized fixed time competes against gestural time in consideration of the tempo. In this first section, there are numerous moments where the performer will have to decide whether to alter the performed material in order to remain in close alignment with the 32nd-note grid, or expand the grid in order to execute the various events within it. This occurs both due to

⁴⁷ Barrett, Richard. *Abglanzbeladen/auseinandergeschrieben*. Bury St. Edmunds, England: UnitedMusic Publishers Ltd, 1992-96, preface.

physical limitations in the performed material itself or in the changing of implements used. The first page of the score highlights both of these situations immediately. The initial moment of the piece presents a challenging conflict. A 4-note cluster chord is notated at the highest end of the register with a low F-sharp (F-sharp3) indicated to sound in unison. Immediately following, three of the four notes in the cluster chord must be dampened with the use of a mallet head, therefore allowing the low F-sharp and the high F-natural to sustain. Already, the percussionist must decide where to compromise. The possible solutions to this impossibility can be outlined as such:

- Play the low F-sharp first, followed by the cluster chord and immediate dampening, however, this drastically changes the temporal identity of the opening note of the piece as something no longer heard as an event consisting of a unison activation but an event consisting of two smaller occurrences.
- Remove two of the lower three notes in the cluster chord (in my case I removed the middle two notes), allowing the low F-sharp to sound in unison with the (now) dyad. This alters the identity of the cluster chord itself, which is a prominent feature of the opening structure.
- Employ the use of four mallets in the right hand. This causes major issues as the cluster chords are not all the same shapes and as the material at the lower end of the vibraphone becomes more prominent, attempting four mallets in one hand is fully unrealistic.
- Create a single mallet that has the capability of striking the cluster chord or two mallets with enlarged heads that can strike the two adjacent notes. This is also

unrealistic given that the cluster chords differ in pitches and take on every possible shape given the layout of the vibraphone.

- Attempt to hit multiple bars with each vibraphone mallet by aiming the central points of the mallet head in the space between two adjacent vibraphone bars.

While this can be executed, it is unlikely that it could be achieved with any consistency given the designs of both instrument and mallets. Furthermore, the relative amplitudes of the notes would not be equal.

The entire first section of the work requires that the performer make significant decisions regarding the arrangement of material, between the four-note cluster chord and the underlying material. Generally, they will either have to remove notes in the chord to retain vertical accuracy between the two layers of material or shift the underlying layer in order to activate all four notes of the cluster chord. My solution consisted of dealing with each moment individually (rather than deciding systematically to prioritize one layer over the other). For example, in the opening chord the inner notes of the chord are removed in order to play the low F-sharp simultaneously with the upper D-natural and F-natural. However, the subsequent five chords are played in full and the surrounding material is offset. This is effective as the first chord sustains its highest note (the F-natural) along with the *ppp* F-sharp in the left hand. I consider this a more important feature of the opening chord rather than the inner two notes of the chord cluster. As the section progresses, the chord clusters and underlying material develop separately from one another. Therefore, I retained the vertical relationships as much as possible but ultimately prioritized the vertical integrity of the two layers less and the formal developments within both individual layers more. In doing so, Barrett's chronometric grid (representing a temporal ideal) expands and contracts in

certain areas given the multiple layers which are currently impossible to execute and how the performer ultimately chooses to confront this. Through this piece, notions of time previously unexplored in this document peer through the fault lines of the above framework which situates rhythm against pulse inside of meter.

In addition to the above discussion of fundamentals of musical time and aspects of time which begin to emerge beyond them (as illustrated in Barrett's solo), it is also worth noting aspects of time that can be considered from the experiential side of musical performance in order to consider the ways in which musical time exists beyond the musical work or the moment of performance itself. Specifically, the way that time is conceived within the context of listening processes creates metaphysical worlds of possibility, where experiences of time are abundant yet individual. A thorough discussion of the listening process is challenging to propound. My efforts here do not attempt to exhaust this topic but rather to briefly illustrate additional ways in which time appears within the context of the musical situation. For example, in many discussions of music, the experience of the performer and the audience are often seen as two separate and incommensurable vantage points within the musical situation. However, in consideration of both parties, listening occurs and the process of listening is closely tied to the experience of time. It is listening that connects individuals within a musical situation regardless of their functional designation. Given that both the performer and the audience are in fact listening to the musical events occurring in time together, they are both undergoing temporal experiences that can be considered simultaneously commensurate and incommensurate. While the performer may be physically active in the *kind of time* created and the audience physically inert in that respect, the overall time within a given space felt through identifiable sonic events is still shared between the two groups. It is in performative action that a moment seems distinctly special. In many

instances, these moments are implanted in memory. Associative experiences and overall experiences of such an event may differ between each person throughout a musical performance, therefore individualized experiences of time ensue, but the fact of listening occurring together also creates a collective experience of time, regardless of whether or not an individual is performing or observing. This demonstrates a collective experience of time and a private experience of time. Collectively, we can recount particular sequences of the musical performance, where distinct sounds or performative events occurred. This is a relatively easy aspect of listening to parse. As Pauline Oliveros describes, “[...] one ought to be able to target a sound or sequence of sounds as a focus within the space/time continuum and to perceive the detail or trajectory of the sound or sequence of sounds.”⁴⁸ To be able to do so takes a great deal of focus and practice, however, such an approach to listening allows multiple individuals to discuss a progression of sonic events, therefore giving them a collective understanding of time. Conversely, in considering the private experience of watching and listening to a performance, it is understood that such experiences cannot be truly shared from one individual to the next. At a certain level, this experience of time is inaccessible to others. Language might be able to decipher this private experience to a certain extent, however, one person cannot truly share the same temporal experience as another at a musical performance. An example that illustrates this is the post-concert conversations that often occur, where experiences of the events of a recent performance are shared between individuals. Through this process, two individuals might have observed and committed to memory different aspects of the performance. Perhaps one focused on the way the performer’s hands moved, another being fixated by the sound of a particular instrument, a third driven by the narrative of the piece. This is illustrated in even better fashion

⁴⁸ Oliveros, Pauline. *Deep Listening: A Composer's Sound Practice*. IUniverse, 2005, pp. 3

(although in a drastically different context) in Mark Evan Bonds' *Music As Thought*, he illustrates different orientations of listening in a discussing Beethoven's 5th Symphony:

Whether you are like Mrs. Munt, and tap surreptitiously when the tunes come—of course, not so as to disturb the others—; or like Helen, who can see heroes and shipwrecks in the music's flood; or like Margaret, who can only see the music; or like Tibby, who is profoundly versed in counterpoint, and holds the full score open on his knee; or like their cousin, Fräulein Mosebach, who remembers all the time that Beethoven is "echt Deutsch"; or like Fraulein Mosebach's young man, who can remember nothing but Fräulein Mose- bach: in any case, the passion of your life becomes more vivid...⁴⁹

This shows the individual ways in which time is lensed through the focal point of distinct events. In recalling different memories of a distinct event, divergent timelines emerge (in memory). Our ability to retain events and moments operates within a limited scope (that is, it can't take into account all the possible conceptions of time paths that could occur) and each time path may diverge from another in consideration of its own experience. However, if two individuals find that they comment on the same event within a performance (a straightforward example is perhaps the climactic moment of a piece, a common feature of the musical experience that is both anticipated and generally memorable), it reflects a way in which their time paths were more unified in that moment than in others and are, to a certain degree, unified in the very moment that they are both revisiting a specific past moment. In either case, lived time is being shared in moments of conversation, and the specifics of those particular moments—the way past times are communicated between individuals and the self—influences future times given that we will move through them as composites of our past times. Such a consideration highlights the ways in which time is emergent in performance, the way it is recollected, and how it expands given social interaction. Through this chapter, we see temporality as a fundamental study of

⁴⁹ Bonds, Mark Evan. *Music as Thought: Listening to the Symphony in the Age of Beethoven*. Princeton Univ. Press, 2006, pp. 5.

number in time (pulse, rhythm, meter), as gesture that expands and compresses (Barrett's *Abglanzbeladen/auseinandergeschrieben*), and the way that it continues beyond the performative moment in memory, recollection, and social interaction. In the coming chapters, we will primarily consider the first two in greater depth through a selection of musical works for percussion.

Chapter 4: Temporal Processes and Their Qualities, Works by Josh

Levine

At the root of this piece's conception was noticing how my parents' worlds changed as they got old, how some things seemed to close in on them but time somehow opened up. Such thoughts manifest themselves in the piece through various interlaced processes of compression and rarefaction, and the changing weights of silence and resonance.⁵⁰ -Josh Levine

Shrinking world/expanding is an immediate site to investigate the ways in which music “makes time audible,” as Lang expresses. Before introducing the materials of the work itself, it is pertinent to note that the work's overarching form originates from an earlier piece Levine composed entitled *Timepiece for Chaya* written in honor of Chaya Czernowin's 60th birthday. This work consists of a trio of twig snaps recorded by Levine himself. The “trio” can be discerned by the spatial location of the snaps in the recording (center, left, and right). For much of the work, there is a considerable amount of silence between each snap apart from a few moments where the three timelines of the trio come into close proximity with one another, therefore multiple snaps occur within a close range. Initially, Levine intended that additional material such as the result of bundles of twigs falling to the ground from an elevated drop point or the crackling of leaves would be incorporated between the primary twig snaps. However, Levine abandoned such a plan, noting that:

I found the ascetic, ritualistic quality and intensely focused listening it provokes so intriguing that I felt it would ultimately be a shame to use the other materials I'd been preparing.⁵¹

⁵⁰ Levine, Josh. *Shrinking world/expanding*. Cambridge, MA: Josh Levine, 2019, preface

⁵¹ Email correspondence received by Josh Levine, *Shrinking World/Expanding*, 2020.

As the work stands, it brings about notions of time in a striking way. Each twig snap is unique in its sonic profile—whether quick and abrupt or consisting of smaller ripples leading to a clean break—resulting in intense demarcation of time against a silent backdrop. These sonic moments generate a strong sense of *nowness* against a seeming flow of silence. It’s worth noting in this context that not even the room noise is audible between twig snaps. Only in some cases can the room be heard underneath a twig snap, however, it is removed as quickly as the snap dissipates, resulting in not just a lack of performative activity but of zero recorded input altogether. This amplifies the effect of the twig snaps as they appear out of zero-input-nothingness. Each snap in their varying profiles is quickly transferred to the memory and may be stored there, transformed by processes of remembering, until abruptly overtaken by a different snap. It is within a seemingly austere musical condition (in regards to its overall sounding activity as opposed to experiential potential) that the processes in our experience of time are brought to the foreground, and it illustrates the way Levine explores the “unity of memory and imagination—remembering as an act of imagining, and imagining as an act of remembering”⁵² throughout his creative work as a whole. It is important to introduce *Shrinking world/expanding* with this preface for two reasons. The first is to show a specific example in which Levine foregrounds time itself in his work and that he agrees with the notion that time is more than just a musical tool, “I have likewise long felt that music doesn’t ‘use’ time (which is not a thing or a resource, after all) but rather forms it in the sense of conjuring particular sorts of temporal experience.”⁵³ The second is that this temporal structure of *Timepiece for Chaya* is used as the skeletal framework or base form for *Shrinking world/expanding*. The crotale attacks in

⁵² Levine, J. (2020). *Josh Levine - Music*. Josh Levine. Retrieved October 10, 2021, from <http://www.joshlevine-composer.com/work>

⁵³ Email correspondence received by Josh Levine, *Shrinking World/Expanding*, 2020.

Shrinking world/expanding align precisely with the twig snaps in *Timepiece for Chaya*. Moreover, the spatialisation of the twig snaps (right, center, left) correspond directly with the three pitches of the crotales, right: e-natural, center: f-sharp, left: b-natural. Furthermore, the additional recorded material that Levine made in *Timepiece for Chaya* (consisting of leaves and stick bundles that went unused) prompted the materials composed between the individual crotale attacks. The unused recordings in *Timepiece for Chaya* were then “transformed from a musical subject into textural inspiration and rhythmic modeling for the material in *Shrinking world/expanding*.”⁵⁴ Thus, wooden planks, stone slabs, metal pipes, and almglocken serve as what Levine describes as ligaments, muscle, and flesh supported by a skeletal structure (crotales) derived from the twig trio, “with *Shrinking world/expanding* specifically, I do think I was imagining it as a living, breathing incarnation of *Timepiece for Chaya*.”⁵⁵

The woods, metals, and stones are distinct and separate in their musical material and temporal processes. Each group is activated by a specific crotale: stone slabs, B6 crotale; metals, E7 crotale; and wooden planks, F#7 crotale. Therefore, not only is each part of the twig trio represented by a specific crotale but also by the instruments that operate within the domain of each crotale. The compositional materials of each instrumental group differ as well, the woods employ an extensive counterpoint; note against note patterns that alternate between four wooden planks of varying pitch.

⁵⁴ Email correspondence received by Josh Levine, *Shrinking World/Expanding*, 2020.

⁵⁵ Ibid.

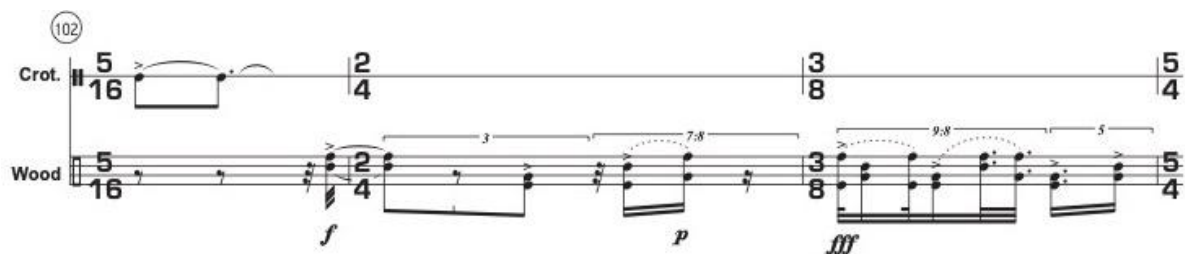


Figure 4.1: *Shrinking world/expanding*, example of contrapuntal material of woods

The stones sound out a complex polyphony of rhythms which are transcriptions of stick bundles dropped by Levine’s own hands. While the rhythms are intricate, they are the result of an uncalculated situation, or more specifically, subservient to the grace of gravity’s influence upon letting go of a stick bundle from an elevated point. Motion, after all, is distance over time. The sounding result is gravity’s motion at play. Therefore, the performative character when approaching the stones’ musical materials should represent that process. The rhythms should not necessarily be internalized, phrased, and executed with a sole goal of rigid accuracy and precision like the complexity of the notation might suggest on its surface. Rather, the rhythms should be treated with a consideration of gravity’s natural influence upon a spontaneous act. Therefore, the mechanisms that propel an ability to perform this material—of which time is the most sophisticated part—require that the very foundation of an approach to rhythm be thoroughly examined.

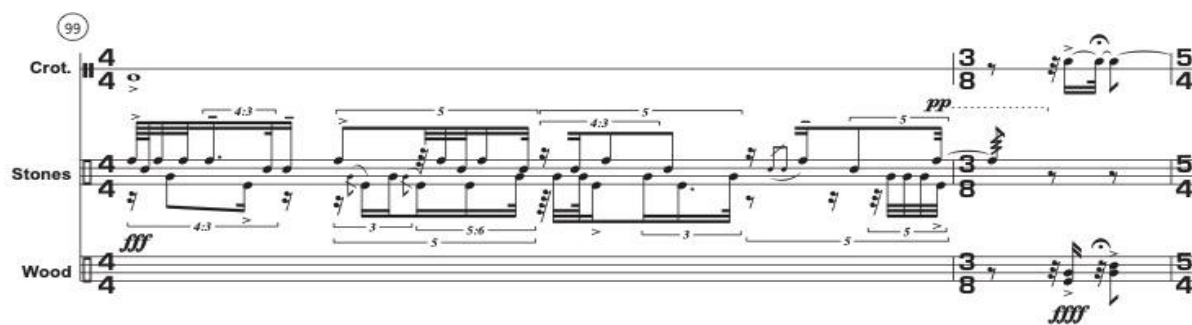


Figure 4.2: *Shrinking world/expanding*, example of polyrhythmic material of stones

My individual process in such a consideration began simply by learning the sequence of attacks, devoid of meter, and only slightly proportioned by their visual arrangement with little regard to the numerical designations attached to them. This was then molded loosely with the implementation of a pulse; the first step in more accurately proportioning out the rhythms. At this stage, the rhythmic line is appropriately set at the pulse level while the local action within each beat may be something other than the notated rhythms precisely (i.e. some local inaccuracies may still be present). The next step is to consider the subdivision of the pulse that best handles the rhythms at play. The subdivision utilized may not remain the same from pulse to pulse. One pulse within a measure may contain eighth, sixteenth, or thirty-second note rhythms while the next pulse in the measure may contain a differing value such as a triplet, quintuplet, or septuplet rhythmic scheme. Then, the procedures of internal subdivision must change in tandem with the rate of rhythm as well. In this manner, a dual responsibility of time is pressed upon the performer as they must keep track of the appropriate changes in rhythm but also an accurate shift in internal subdivision. This already is a great deal of effort in the processing of time. What has yet to be taken into account are all the other actions beyond the moments of activation themselves that must occur.

One possible approach to the stone's material in *Shrinking World/Expanding* would be to feel the weight of different moments and have the rhythmic profile of this material gravitate towards those areas; just as the bundles of sticks are received by the floor through the force of gravity, only for the kinetic energy acquired from the fall to be partially returned to the sticks, resulting in a bounce back and a series of smaller bounces until they ultimately lay at rest. The percussionist can apply a similar approach to the way in which their mallets come into contact

with the stone, accepting the influence of gravity on the downstroke and utilizing the return of kinetic energy on the upstroke. Conversely, the rhythms in the almglocken demand an assertive and calculated approach to the rhythmic duo between two almglocken (one corresponding to each hand). Furthermore, each instrumental group undergoes individual temporal processes: the woods regularly accelerate in their materials through the piece, the stones accelerate exponentially, and the metals slow in their materials. This is illustrated outright at the very outset of the piece.

Figure 4.3: *Shrinking world/expanding*, example of rarefaction in almglocken

The middle crotales (E7) initiates the beginning rhythmic lines which are played on two almglocken (Eb5 and Bb5). While the opening section as a whole is a large-scale deceleration serving as the first encounter of rarefaction, local accelerations and decelerations within each of

the two rhythmic lines are seen at a rapid pace. The crotale attacks in mm. 1, 5, 9, 13, and 17 mark the beginning of a recurring rhythmic cycle which is slowed down at the rate of 11:10 with each recurrence. Additionally, the two rhythmic lines are flipped at each recurrence as both undergo their own local processes of compression and rarefaction. In mm. 14, the lowest crotale (B6) activates the stones as a brief interjection—the onset of an exponential increase in material density—and in mm. 18, the highest crotale activates the wooden planks which cut off the final repetition of the introductory rhythmic idea.

In the initial section of the work, different layers of time are brought about through the use of different instruments and their contrasting sonic profiles. One could theoretically hear the material of the stone planks as its own timeline developing at an exponential rate independent of the metals and woods. However, in the second section of the piece, all the materials are played on a single thai gong. Rather than instrumental diversity, it is now an array of implements—cord mallets, brass mallets, thimbles, finger pads, brushes, knuckles, rubber ball—that articulate different temporal layers. But that they all emanate from a singular source presents them more drastically as a singular moment composed of various parts, as if they have been distilled from past moments. It is this moment that exemplifies Takemitsu's claim that, "the choice of a single mallet can change entirely the entire spatial aspects of sound." Levine knows this, as the use of a single instrument with a variety of differing implements presents the second half of the piece as something entirely different from the first, however it is in fact a rearticulation of the first section in a wholly different form. There is no motif or indication from the sonic material that these two sections share any commonality. However, the primary connective tissue is not that of sonic material but of time itself, as Levine notes:

The two sections sound radically different from each other, but the second one is, in fact, a revisiting of the first, laying bare its predecessor's core temporal structure (formerly articulated by the crotales) in shrunken form.

In this manner, the actions, events, and moments of the initial section have been transformed from an act in time to a representation of a past event through time. As the percussionist moves to the single thai gong, they conclude a significant moment and prompt a new one in new time is used to relive the immediate past time that had just occurred. A performance in the processes of memory played out through a musical situation in time, as Levine describes, “it is as if we have seen an image up close, but in memory can only imagine it at a great distance.”⁵⁶ Levine further illustrates this by implementing a contrasting method of notation. In the initial section of the work, time is written out in a conventional (although complex) notational format. Rhythms are precisely measured and are situated within meter determined by measures indicated with time signatures. However, in the latter section of the work, Levine removes these temporal devices, instead placing unmeasured activations within measures (indicated by dotted bar lines) that last one second each. Therefore, performed material is placed within a particular second of time, although it loses features of emphasis, weight, and phrase as it is not identified by any distinct rhythm, only spatial arrangement.

⁵⁶Levine, Josh. *Shrinking world/expanding*. Cambridge, MA: Josh Levine, 2019, preface.

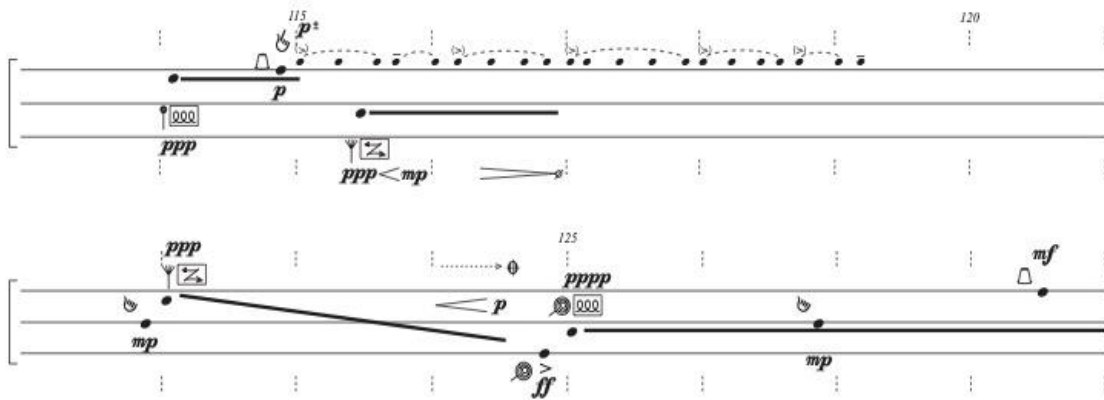


Figure 4.4: *Shrinking world/expanding*, alternate notation of succeeding section

Levine explores a similar pursuit of temporal structuring in his earlier work for solo vibraphone, *Les yeux ouverts*. At the outset, Levine presents an incredibly difficult sequence of trichords that jump throughout the vibraphone’s range at a quick pace. Each chord is represented as the primary note value within a given meter. That is, the meter reflects the number of trichords within a given measure. However, even at the outset of the work, Levine deploys subtle devices which destabilize the systematic progression of trichords. Interruptions of *sffz* tetrachords in odd meters at the level of the immediate division interrupt the progression of trichords while sudden changes in tempi throughout—measured accelerations and decelerations—set the trichord progression off-kilter. What is unusual about this situation is that Levine inverts the usual hierarchy of internalization in the way performers typically handle time. Generally speaking, meter and tempo are usually elements that are established at a fixed rate. Therefore, rhythm is able to function like fluid temporal play over a stable backdrop. In this case however, the tempo and meter are the two primary temporal elements that are in constant flux whereas the rhythm is fixed at the eighth note value. Successfully hitting the marked tempi, whether by acceleration, deceleration, or a terraced jump in either direction, is incredibly difficult as it is too fast and too

sporadic to convert the tempi changes into rhythmic values. Furthermore, the ratio of adjacent tempo markings is that of 11:12 making any pursuit of rhythmic modeling even more difficult. It is a process that must ultimately be internalized in a corporeal way. What I mean by that precisely is tricky to ascertain. However, it can be likened to that of recalling a melody. As one may recall a tune via its impact on the ear, the body may recall a sense of time. With enough practice over a significant period of time, an individual can readily discern the discrete distances between tones, the underlying goal of any aural skills class. Similarly, if the changes in tempi in *Les yeux ouverts* are practiced methodically and consistently, the differences in rate of speed can be ingrained. When rhythm is learned, the beat or pulse is often the point at which the accuracy of rhythm can be evaluated. For example, if an individual is seeking to insert four notes within a beat and then five notes the next beat, the beats themselves serve as points in time. The rhythms simultaneously move away from one beat and towards another. As an individual passes through multiple beats, the consistency of the pulse is often a key marker of steady and persistent time. The ability to keep beats steady, consistent, and equal from one passing through to the next is typically a fundamental building block in the development of “good” time. Therefore, in order to approach the beginning of *Les yeux ouverts*, an individual must learn this process of “good” time and then unlearn this process in order to shift the beat in the ways that Levine demands. This continues throughout the first section of the piece, however, Levine inserts an additional layer of material that emerges from the trichord events. It is here that the difference between changes in tempi and rhythmic material are skewed. As the rhythmic material increases, the tempo decreases its rate of change, eventually stabilizing at $\text{♩} = 60$ bpm. It is at the point of stabilization at letter H that the general hierarchy of musical time is established, although small extensions of the meter remain in place: an additional sixteenth note in mm. 175 and additional eighth notes

added to the meters in mm. 176-180. Letter K marks the beginning of the next section which presents itself in stark contrast to the initial section of the piece. In the latter section, the percussionist alternates between the two lowest notes of the vibraphone's range while also presenting two separate layers of material. The underlying layer consists of wavering nested polyrhythms with a complex system of articulation. Accents, ties, dotted ties, and grace notes embellish a second layer of approximated activations on an F-natural which are understood by their spatial representation on the page rather than any system of mensuration. It is at this moment that we see a similar tactic deployed in *Les yeux ouverts* that occurs in *Shrinking world/expanding*. In both cases, the first section contrasts the second. Also in both cases, the second section is a revisiting of the first section. The accented F-naturals beginning at letter K is the exact temporal pattern of the tetrachord accents from the first section recontextualized. Levine describes a similar relationship between these two sections as he does the two sections of *Shrinking world/expanding*. Whereas Levine articulates the gong in *Shrinking world/expanding* as the recollection of the first section in memory, the second section of *Les yeux ouverts* takes on the quality of dreaming, a process closely tied to that of memory, "a metaphor that comes to mind is that the vibraphone begins to 'close its eyes,' starts to lose control of its materials and begins to dream them."⁵⁷ The section at H depicts eyes fluttering, as if struggling to stay awake, Levine achieves this through a one handed tremolo between the mallet head continually striking G-flat and the back shaft repeatedly striking the lower F-natural. The performer must choke up on the mallet, placing their fulcrum in the middle of the shaft.

Levine uses a specific temporal device of reimagining material as the glue that binds the binary structure of both works. Moreover, just as Levine used a skeletal temporal structure that

⁵⁷ Email correspondence received from Josh Levine, *Les yeux ouverts*, 2015.

propels local musical material in *Shrinking world/expanding* (the twig snaps in *Timepiece for Chaya*), a temporal skeletal structure in *Les yeux ouverts* is also the driving feature behind dense local material. The accented tetrachord attacks articulate the skeletal structure of the work (in both sections). From a formal standpoint, this is what drives the local motion in terms of the number of trichord attacks, the sporadic changes in tempo, and the various temporal layers that develop against the trichord attacks. Such a compositional approach resonates directly with the temporal features of our daily lives. Just as the local events and moments of our individual lives are ultimately bound by the cycles of our cosmic arrangement—the earth revolving around the sun—as well as our modern structures of time, i.e. the gregorian calendar and the 24-hour clock, large temporal cycles in both of Levine’s works for solo percussion propel the local material throughout. It is in the outer, structural layer of temporality or *time pillars* that a sense of fixed time emerges. Just as the Earth will continually complete both its orbit and rotation (unless altered by some significant force or event) independent of the events that occur at ground level, the tetrachords in *Les yeux ouverts* and the crotale strikes in *Shrinking world/expanding* mark their time regardless of the local activity within them.

Chapter 5: The Performative Limits of Time, Jason Eckardt's *Transience*

A large feature of Levine's music that was not discussed is the complexity of the rhythmic notation itself. While it is certainly a significant aspect of both *Shrinking world/expanding* and *Les yeux ouverts* (as well as Levine's compositional output generally), it is a subject better discussed in the context of Eckardt's work, *Transience* for solo marimba. Here, time is presented as an insurmountable task, a cartographic mapping in an intensely elaborate manner. It is a work that demands the highest order of time keeping, pressing up against the limits of human capability. Moreover, set on top the rhythms is a system of constantly changing articulations consisting of staccato, marcato, accented, tenuto, and slurred markings. Lastly, a dynamic layer similarly undergoes constant change, whether gradually through swells or in a terraced fashion.



Figure 5.1: *Transience*, example of general notational scheme

The beginning of *Transience* starts with intricate nested rhythms on a single F-sharp. Individual pitches are added until reaching a collection of four notes: D-sharp, E, F-sharp, G are repeated in various different groupings. The next section suddenly expands the range of pitches

utilized, ultimately spiraling outwards into longer pauses filled in by fragments of material that occur simultaneously at the very low and end very high end of the marimba. The fragments of rhythmic material grow longer and longer until converging directly back onto the single F-sharp in mm. 98. Fragmented interjections of material deployed from earlier in the piece break the strand of repeated F-sharps, until those interruptions evolve into arpeggiations of an octatonic scale spread once again across the register of the instrument and set in various nested polyrhythms. This leads towards the conclusion of the piece which converges on the higher range of the instrument as pitches from the octatonic scale are gradually transposed up in register. Eckardt's work presents significant challenges for the performer technically. In certain sections, both hands are operating at the far ends of the instrument in tandem, requiring the performer to have their arms stretched in both directions for large periods of time - but also in the granular measurement of time. Looking at the below table, one can see the decimal value of each kind of rhythm deployed in the piece.

Table 5.1: The various rhythmic values found in Eckardt's *Transience*

Rhythms	# of Grid Spaces per Rhythmic Activation
thirty-second notes	4.0
7 notes over the period of 6 thirty-second notes (7:6)	3.4286
quintuplet	3.2
3 notes over the period of 4 (3:4) nested in a grouping of septuplets	3.048
4 notes over the period of 3 sixteenth notes (4:3)	3.0
11 notes over the period of 8 thirty-second notes (11:8)	2.9091
sextuplet	2.6667
5 notes over the period of 4 (5:4)	2.56
7 notes over the period of 6 notes (7:6) nested in a grouping of 11 notes over the period of 8 thirty-second notes (11:8)	2.4935
13 notes over the period of 8 thirty-second notes (13:8)	2.4615
4 notes over the period of 3 (4:3) nested in a grouping of quintuplets	2.4
5 notes over the period of 3 thirty-second notes	2.4
5 notes over the period of 4 notes (5:4) nested in a grouping of 11 notes over the period of 8 notes (11:8)	2.3273
3 notes over the period of 2 notes (3:2) nested in a grouping of 7 notes over the period of 6 thirty second notes (7:6)	2.2857
Septuplet	2.285
11 notes over the period of 6 thirty-second notes (11:6)	2.1818

Table 5.1: The various rhythmic values found in Eckardt's *Transience* (continued)

Rhythms	# of Grid Spaces per Rhythmic Activation
4 notes over the period of 3 notes (4:3) nested in a grouping of 11 notes over the period of 8 thirty-second notes	2.1818
3 notes over the period of 2 notes (3:2) nested in a grouping of quintuplets	2.1333
5 notes over the period of 4 notes nested within a grouping of sextuplets	2.1333
7 notes over the period of 6 notes (7:6) nested in a grouping of 13 notes over the period of 8 thirty-second notes (13:8)	2.1111
5 notes over the period of 3 notes (5:3) nested in a grouping of 7 notes over the period of 6 thirty-second notes (7:6)	2.0571
sixty-fourth notes	2.0
5 notes over the period of four notes nested in a grouping of 13 notes over the period of 8 thirty-second notes (13:8)	1.9692
5 notes over the period of 3 (5:3) notes nested in a grouping of 5 notes (a quintuplet)	1.92
4 notes over the period of 3 notes nested in a grouping of 13 notes over the period of 8 thirty-second notes (13:8)	1.8462
3 notes over the period of 2 sextuplet notes	1.7778
4 notes over the period of 3 septuplets	1.714
one-hundred-twenty-eighth notes	1.0

What can be observed is how close in proximity the rate of the rhythms are in relation to one another. In some cases, the difference is so small that the possibility of genuinely internalizing and executing these rhythms is a questionable pursuit. The decimal values assigned

are determined from placing each rhythm against a visual grid of 64th-notes. Each 64th note contains 2 grid spaces allowing for division of the 64th note value. The various meters of *Transience* most commonly operate at either the eighth note level ($2/8$, $3/8$) or the sixteenth note level ($3/16$, $5/16$). This means that the range of rhythmic values is between 3 sixteenths, 6 thirty-seconds, 12 sixty-fourths, 6 sixteenths, 12 thirty seconds, and 24 sixty-fourths. Translated to the number of grid spaces (which is two spaces per sixty-fourth note), that equals a range of 24 to 48 grid spaces per measure. A rhythm such as 7 notes over the period of 6 thirty second notes (7:6) translates to 7 notes over the period of 24 grid spaces. Therefore, 24 divided by 7 equals 3.4286 grid spaces per note.

Graphing out the rhythms in relation to one another shows a visually heightened spatial relationship between the various rhythms that can be practiced and internalized at very slow tempi, allowing for the granular spectrum of a performer's temporal capacity to be expanded. Such small distances between intricate rhythms within a standard framework of musical time (rhythm against pulse within meter) at the written tempo brings to question the viability of accurately executing such rhythms. To put this another way, the range of rhythms that are highlighted in the chart above span from a 32nd (4.0) note to a 128th note (1.0). These note values are used in order to retain the same rhythmic levels as seen in *Transience*, however, if we simplify the rhythmic values for the sake of discussion, the relationship between 32nd and 128th notes is equal to the relationship between quarter notes and sixteenth notes. Generally, there are two divisions of rhythm that are seen between the quarter note and sixteenth note: the eighth note and the eighth note triplet. Just two divisions between these two rhythmic values comprise the entire method of Peters' *Intermediate Studies for Snare Drum* discussed in Chapter 3. We could extend that to five divisions if we include quarter note triplets, eighth-note quintuplets and

eight-note septuplets (over the course of two quarter note beats). Doing so would constitute an advanced level of temporal study by the standards of Peters. In *Transience*, Eckardt has deployed twenty-six different divisions (or rhythmic rates), a significantly more granular pursuit of time than seen at the advanced level of Peters' method. The question of whether the ability to execute such fine temporal differences is genuinely attainable must be considered. At the very least, the performer must understand the relationships between each rhythm, knowing generally which rhythms are faster or slower in relation to a different rhythm. For example, we can tell from the chart that 7 notes over the period of 6 thirty-second notes (7:6) is considerably slower than 5 notes over the period of three notes nested inside of a grouping of 5 notes (a quintuplet). Understanding the spectrum of rhythmic divisions (like I have charted above) is a good general approach to learning these rhythms. However, cultivating the ability to internalize them as effectively as more general rhythmic divisions is unlikely. According to Marc Whittman, the temporal threshold for distinguishing two events is somewhere between 20 and 60 milliseconds. Two events that occur within a range smaller than 20 milliseconds would then likely translate to simultaneity between two events in our experience of them. If we take a look at two rhythms that have a very small difference between their rate or speed and take that difference into consideration of *Transience*'s prescribed tempo, we can consider how closely Eckardt has come to our perceptual limits, therefore the performative limits in consideration of measured time. 3 notes over the period of 4 septuplet notes against 4 notes over the period of 3 sixteenth notes yields a difference of .048 in speed. To put this into context, the prescribed tempo of ♩ = ~66, an eighth note attack occurs every 909 milliseconds, a sixteenth note attack occurs every 454.55 milliseconds, a thirty-second note occurs every 227.275 milliseconds, and a sixty-fourth note occurs every 113.6375 notes per second. Therefore, the independent attacks of these rhythms are

certainly discernible on their own as they are well above the threshold of our perceptual capacities. However, it is the difference between them that must be perceived. Within our graph, each square represents a total time of 56.8185 milliseconds when passing at a rate of 66 eighth notes per minute. With the the first rhythm's notes occurring at 3.048 squares or 172.727 milliseconds between each attack and the second rhythm's notes occurring 3.0 squares or 170.455 milliseconds between each attack, the difference in the time of attack between the first rhythm and the second rhythm is 2.272728 milliseconds. This difference in time between the first and second attack of each of the two rhythms is well below the perceptual threshold of human ability to distinguish separate events. However, this is not the full picture, given that the experiments Whitmann refers to are simply the sounding of two events spaced closer and closer together until rendered "simultaneous." The difference between two rhythmic rates does not necessarily equate to these experiments, admittedly. However, if we are unable to discern them as separate in a given moment, it seems to follow suit that discerning between the two in terms of rate is also highly unlikely. At least this must be the case initially. Although, what we also must realize is that each attack compounds the difference between the two rhythms. Where the first two attacks between the two rhythms will be very closely situated at 2.272728 milliseconds apart, the next attacks will be further apart, and the ones after that even further. So ultimately, if the rhythms are played for long enough strands against one another, their difference will emerge and become readily perceptible. However, this does not happen in *Transience*. Rather, the performer must move through these different divisions at an overwhelmingly quick pace, oftentimes moving through various contrasting divisions within one beat. Therefore, whether or not a performer could genuinely alternate between the numerous rhythmic values at Eckardt's prescribed tempo is questionable. In my own experiences, having spent a rigorous one year on the piece almost

exclusively, I found that the ability to genuinely internalize these rhythms and execute them reliably had to be approximated to some degree. Larger points of demarcation had to be aimed for, while more local changes were not internalized but executed via the cultivation of physical movement and gesture which consisted of stick height, vertical or horizontal motion in the wrist and arm, and the orientation of the body to the instrument.

If we consider these notions within the subject of pitch, our conventional rhythmic scheme, incorporating values between whole notes-sixteenth notes with mterical division of two or three parts, is likened to that of discrete pitches with the half-step being the smallest interval between two discrete pitches. Just as there are multiple frequencies between that of the interval of a half-step that we place within the designation of “microtonal,” there are divisions of time between the conventional that, in turn, warrant the designation of “micro-temporal.” Furthermore, just as the audible range of the frequency spectrum is a sliver of the whole, our perceptual limits of time is but a sliver of time’s range which is seemingly unquantifiable. This is part of the magnificence of Eckardt’s *Transience*, as over the course of about 8 minutes, the performer moves through intense granularities of time, all the while it is likely received as as an ongoing flow or cascade of notes in time against a reality where the performer is working so intensely in their efforts to press up against the biological limits of perceptual time. For a range or a spectrum of something to occur, discrete values of some kind must be put into place to distinguish certain areas of magnitude or type from others. In consideration of time (beyond that of biological time), this seems to be an inappropriate route to take as we so often describe time in a kind of continuous flow. This question of whether or not time has any fundamental granularity has been a prominent question in physics. Carlo Rovelli argues that time is indeed granular, that a minimum interval of time does exist:

Continuity is only a mathematical technique for approximating very finely grained things. The world is subtly discrete, not continuous[...] Granularity is ubiquitous in nature: light is made of photons, the particles of light. The energy of electrons in atoms can acquire only certain values and not others. The purest air is granular, and so, too, is the densest matter. Once it is understood that Newton's space and time are physical entities like all others, it is natural to suppose that they are also granular. Theory confirms this idea: loop quantum gravity predicts that elementary temporal leaps are small, but finite.⁵⁸

For Rovelli, a minimum scale exists for all phenomena, often understood at a Planck level (taken from the theoretical physicist Max Planck.) Below this granular level, it is assumed that concepts such as time, space, matter cease to exist, their meaning breaks down entirely. While the rhythmic demands of Eckardt's *Transience* are insignificant on the grandest and most miniscule levels of time at large, they do go beyond the limits of our biological capacities of time and serves as marking points in which to gauge the vastness of time beyond the sliver we know and experience.

One interesting musical technique that indirectly challenges the limits of our temporal perception, or perhaps more specifically the ceiling of human ability to internalize and accurately execute calculated, measured time is the technique of phasing. A technique often discussed in the realm of minimalist music, specifically the composer Steve Reich, phasing is the subtle and careful acceleration of one line against another line (both playing in unison at the outset). It is in this situation that the granularities of time that are beyond our ability to rhythmicize them can be explored. The performer must focus on a gradual acceleration from a fixed starting point, however, the phase itself is not understood in terms of any rhythmic measurement but in relation to another line that holds steady. A phase is not calculated by it's rate of change in any numerical way. Rather, it is felt, the way it unravels from one frame of time, gains momentum away from the stationery equivalent, and then falls towards the pulse point immediately ahead of the

⁵⁸Rovelli, Carlo. *The Order of Time*. Penguin Books Ltd, 2019, pp. 24

stationery line. The practice of such a musical technique does not yield a strict sense of measurement but an intuited one.

The final interesting point to note in Eckardt's *Transience* is that ultimately, the performer must compromise in their interpretation and the choice of that compromise will impact heavily the overall temporal stamp that such a performance will leave. It is not physically possible by today's performance standards to faithfully execute the musical situation that Eckardt has devised. This is largely due to the conflict between the fast rate of the rhythmic material and the range of articulation. Articulation itself is already problematic given the nature of the instrument. To successfully deploy the range of articulation that Eckardt seeks is in and of itself an almost impossible thing to do. Two examples of past performances help contextualize this problem. Makoto Nakura's (the commissioner of the work) studio recording of *Transience*, from his 2009 album *Ritual Protocol* largely ignores the articulations altogether in order to accurately perform the rhythmic material in a near accurate tempo. Conversely, a performance by percussionist Ross Karre seems to prioritize the articulations as he implements the use of dead-strokes for the notes marked staccato. In doing so, the tempo must be significantly slowed to allow for the mechanisms of the dead stroke to occur. It could be said then, that by slowing the tempo down significantly, Karre brings the imperceptible nuances of the rhythmic material into our domain of perceptibility. With a slower tempo, the time in milliseconds is greatly expanded, the small shifts between polyrhythms are magnified, and with the layer of articulation now heard against the shifting rhythms and swelling dynamics, a more robust time is created. I position my own performance between Nakura and Karre. I felt that the overall energy of the work necessitated the faster tempo, however, I greatly desired to hear the layer of articulation against the rhythm, therefore, I inserted dead strokes wherever possible but let them go in certain moments in order

to sustain the energetic drive of the work overall. I also felt that pursuing the boundaries of rhythmic perceptibility was a meaningful point of tension in the work that I wanted to retain.

Chapter 6: Layering Time in Daniel Tacke's *einsamkeit*

As mentioned in the overview of my creative efforts, Tacke's *einsamkeit* appears in diametrical opposition to Eckardt's *Transience*. Where Eckardt seeks the limits of our standard notational scheme and the human perceptibility of rhythm, Tacke removes aspects of temporal measurement in his work altogether.

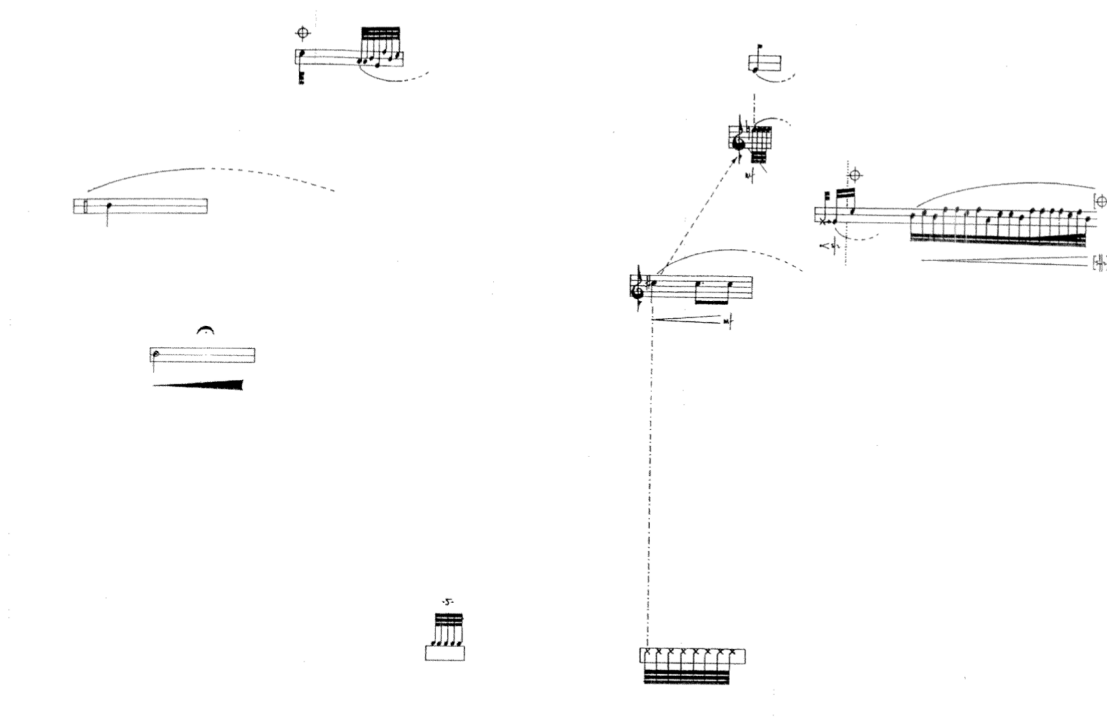


Figure 6.1: *Einsamkeit*, example of general notational scheme

The impression garnered from the score to *einsamkeit* may be one that suggests rhythmic approximation and temporal flexibility. Rhythms are situated throughout the score pages without indication of tempo, measure, or meter. Furthermore, the rhythms themselves are not necessarily reflective of any discrete notional value. For example, some sixteenth notes appear to have more space between them than others as do the eighth notes. The fragmentary nature of the materials

gives off the impression that the work can be approached through the traversal of independent musical cells, and that the performer may connect them with a fair amount of artistic freedom. Such an approach is indicative of what Kramer refers to as “moment time,” where different events are completely separate (as opposed to a purely vertical time where an entire composition is a single extended event).⁵⁹ However, further examination revealed this was not necessarily the case throughout the work’s development. In discussion with Tacke, he revealed that the entire piece was strictly notated despite how the score looks. The rhythms are indeed reflective of discrete notational values and their spatial representation has been measured out to the millimeter, representing the correct value within a page divided into 15 seconds, although there are different collections of material that are operating at separate tempi in a ratio of 6:4:3. An earlier draft version of the score reveals this very information. Rhythms have numerical brackets above them, indicating triplets, quintuplets, septuplets. In this case, measures are still indicated with bar lines and rests are notated with quarter and eighth note values. The conventional temporal scheme is present. Furthermore, longer strands of rhythms are beamed in a way that implies the quarter note as the pulse level. Vertical relationships are very clear in this version of the score including moments where multiple layers generate straightforward polyrhythmic material. While the layering of material is clear, the notation is largely conventional without little left to question regarding the temporal features of the work.

⁵⁹ Kramer, Jonathan D. *The Time of Music New Meanings, New Temporalities, New Listening Strategies*. Schirmer Books, 1988, pp. 395

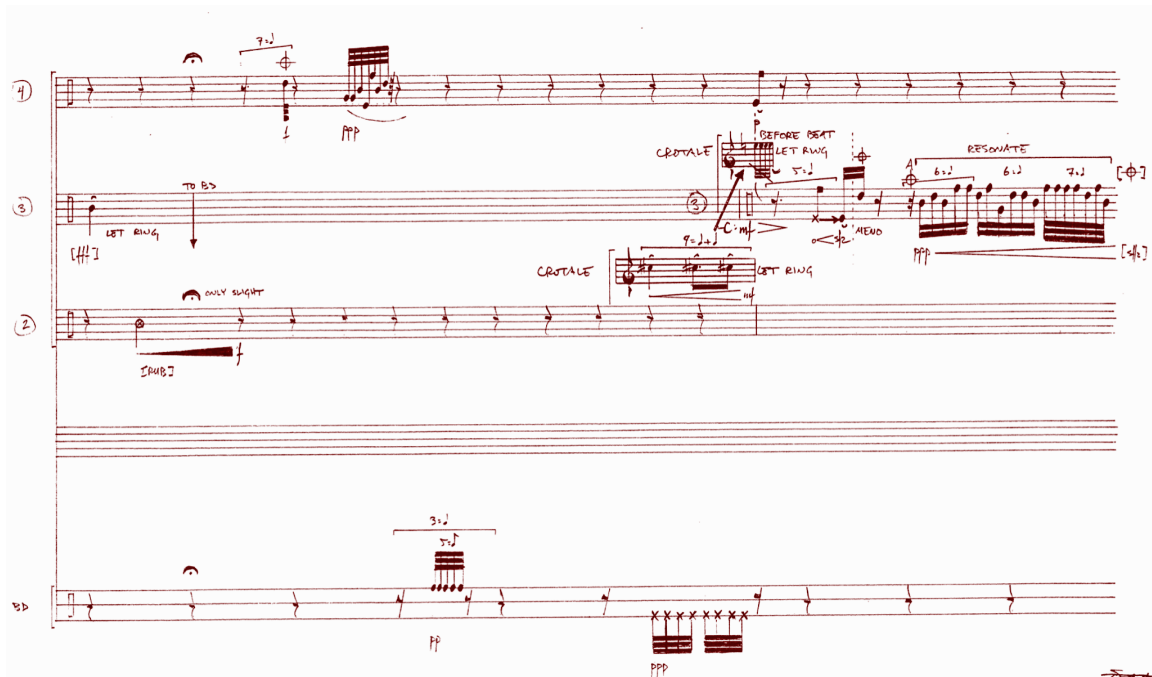


Figure 6.2: *Einsamkeit*, draft score with conventional temporal parameters

It is in the final score that Tacke removes this information. In doing so, Tacke demands that the performer must make their own way through the temporal aspects of the piece which will have a significant amount of bearing on the expressivity of the performance. In my early stages with the piece, I questioned Tacke on what approaches to realization he had in mind given the oddity of the notation and he expressed openly that the performative decisions one takes must come out of an individual interaction with the notation itself. This seems basic in concept, however, given the conundrums embedded in this work in the particular—the multiple layers of rhythmic, motivic, and textural materials overlaid by various means, spread across different groupings of instruments with different modes of activation—results in a simple idea materializing as a complex process of decision making. In my early approach, I created a system of measurement to discern both the horizontal distance between events and the vertical alignments between overlapping events. In a very basic way, I sought to insert what Tacke had

taken away. At the time, I believed it was the most straightforward way to make sense of the vertical relationships between different cells. When revealing that I had done so to Tacke, he expressed the following:

Once when Cornelius Cardew was asked by a group of performers working on *Treatise* if they would discover anything about the true nature of the music if they put in the time to measure all of the visual distances in the notation, he replied by telling them that yes, they would discover something: they would learn that everything had been measured when it was drawn! I guess I feel similarly. The precision of the spacing in the notation, I hope, demands a certain amount of carefulness (perhaps even anxiousness) in rendering the gestures as significant sounds, but I view this much more as a kind of mood device than a responsibility to learn the rhythms as they were originally invented. The move to a freer notation was a turning away from this kind of machinery in favor of a performance practice that is more... human.⁶⁰

A few important points can be gleaned from this situation. The first is that the notation in *einsamkeit* is much more than just a system of instructions for performance. On numerous occasions, Tacke has expressed the role of notation as in and of itself a creative act containing its own expressive potentialities and this is reinforced in his own writing, *Notation as a Compositional Tool, Three Exemplary Pieces*. Tacke draws his scores by hand. Composing in such a way is a process that requires a significant amount of time spent. Moreover, in that time, decisions are made out of an individual interaction with the production of notation itself. It may seem in this particular musical situation that the composer and performer inhabit very different roles: the composer, who holds the secrets of measured time, and the performer, who must find a way through a temporal puzzle, both bound together only by the score itself. However, given Tacke's inclination towards the poetics of notation on their own, it is more the case that Tacke seeks to unify the composer and performer across the boundary lines of their separate disciplines. Each must undergo an extensive and individualized decision making process. In this way, the score acts as a site for temporal potentiality rather than an ossified temporal schematic to be

⁶⁰ Email correspondence received by Daniel Tacke, *Einsamkeit*, 2014.

constructed. And while it may seem like the composer has withheld information as an overseer, in fact, it is removed to pass onto the performer a similar undertaking as the one Tacke experienced himself in the creation of the work. Such a claim is strengthened by the note regarding performance that Tacke writes in the score's preface: "the performance environment is fraught with peril and the audience is extremely dangerous[...] you are doing this for yourself, not them."⁶¹ Tacke alludes to this in the draft score as well, stating that, "these challenges are all important parts of the work's identity."⁶² Tacke's words outline a desire towards a musical situation that prioritizes the creative interactions that arise from visual notation and its expressive potential in an expressly individual and solitary orientation. It is an opportunity for percussionists to develop a distinct approach to a musical situation riddled with conundrum and compromise.

In removing strong temporal indicators in *einsamkeit*, the demand that a performer conforms to strict measurements of time is relieved, however choices must be made concerning the degree of exactitude pursued. In my own approach, I sought an approximated horizontal schematic that would allow me to know approximately where events on a page would fall in relation to the passing of time in seconds. I divided the page into 15 equal sections and understood that within a specific second marking or over a series of seconds, that the different events would occur. Initially, this demanded that I count the seconds in a manner that resembled a pulse within a meter. Although I did not situate the musical gestures against the ticking of seconds. Rather, this was approximated; I did not assign specific rhythmic values for the starting and ending point of each musical gesture. Furthermore, moments where musical material was more active, I did not retain a strict internalization of the seconds. Rather, I switched to a mode of internalization that prioritized gesture and an intuited rate depending on the nature of each

⁶¹ Tacke, Daniel. *Einsamkeit*. New York: American Composers Alliance, 2009, preface.

⁶² *Einsamkeit* draft score, preface

rhythmic moment. Over time, these two modalities of internalization merged. I found that I relied much less on the counting of seconds and that my gestures became more consistent in their length and duration when executed. Phrases, pages, and sections became known entirely by their gestural motions, sonic activations, and expressive direction. With vertical layers, I never conceived of the rhythmic interplay numerically. I did work a great deal to ensure that contrasting rhythmic values were played accurately (i.e. the correct number of notes are played and in the correct order). Occasionally, a common polyrhythm would present itself naturally and I could not help but render that moment with a numerical understanding, 2:3 for example. However, others were ingrained simply by the steps of motion between the two hands and reinforced through a practice of listening that resembles the way in which melody is ingrained and remembered. I could sing the rhythms but perhaps did not know their precise relationship in a numerically measured way. This is perhaps the “human” element that Tacke articulates above.

We do not move about our days constantly analyzing the passing of events and actions in numerically represented ways. To do so would yield a complex web of polyrhythmic material akin to that of Eckardt’s *Transience*. However, we do intuit the passage of time a great deal and without analytical devices can feel moments, transitions, progressions, accelerations, and so on. It is here in *einsamkeit* that a similar orientation should be taken. The initial stages required a great deal of analytical effort, however, at a certain stage it must be absorbed by bodily memory rather than upheld by devotional mental counting. The performer should move through the work intuitively, with breath, and an individualized pacing. Timing may vary from performance to performance and gestures may naturally occur quicker or slower depending on the performer’s state. *Einsamkeit* presents a situation where the analytical and measured sides of time converge with the intuited and subjective experiences of time. Furthermore, through the process of

learning such a work, any given individual will certainly learn a great deal about their own temporal leanings, mechanisms, and values.

Chapter 7: Performing the World, Music, Time, and Cosmos in Richard Barrett's *Urlicht* and Justin Murphy-Mancini's *Sic Itur ad Astra*

Time is perhaps at its most unusual in the world of science, physics, and astronomy given that the observational study of these disciplines pursues the full scope of both space and time in their immensities and infinitesimals. While we have witnessed the ways that time is emergent in a musical situation, that “music makes time audible,” it is within the sciences that the seemingly absurd question of whether time is a real entity or merely an illusory phenomenon resides. When looking at the fundamental laws of our universe, Rovelli notes that, “the fundamental equations [of the universe] do not include a time variable.” What Rovelli means is that, the laws that we know of that govern the interactions and activities that we see do not require the variable of time in order to function. It is at both ends of the physical scale—from the quantum to the cosmic—that time behaves very differently than it does in its ostensibly fixed state at our level. In the ways we often conceive of time, it tends to function as an unalterable feature of our day to day experiences. However, when phenomena of the physical world are observed at much larger (cosmic) or much smaller (quantum) scales, time becomes an unfixed entity, therefore, what time is can be influenced by what the universe does. For example, mass affects time, as does speed. Suddenly, what seemed to be an implacable force is now a facet of our physical environment that is as secure as the tectonic plates we live upon, constantly shifting and taking on new shapes, forms, and states. Time is an interesting feature in cosmological study in that the one primary concept pointing to its existence is entropy. The word entropy represents the idea that the physical universe began in an unusually ordered state and will become more and more disordered as time goes on. More specifically, the second law of thermodynamics states that heat will

always transfer from a warmer body to a cooler body; this will not occur in reverse. It is within the concept of entropy that the nature of time seems to reside. This does not indicate that there is a master clock, a “father of time,” that is occurring, but that characteristics of our universe move in only one direction, and that gives rise to the property of time. It is here that we can now consider the problem with absolute time. As Rovelli notes, while time can be represented as t mathematically, there is no precise quantity of t . Almost nothing that we have observed in the universe has given us an indication of an absolute time. Pulsars (spinning neutron stars which emit beams of electromagnetic radiation at their poles) are notably accurate timekeepers relative to our understanding. As well, the developments in the atomic clock have given us devices that are purely accurate to within less than a second over the course of 15 billion years (which is older than the observable universe itself). But neither are beyond events and things, time *keepers* themselves are not absolute. As mentioned previously, the early 20th century shattered the notion of absolute time, as Einstein predicted that it is not just humans who have internal observational biases but that time itself—as a property in the physical realm—behaves differently depending on one’s speed and/or proximity to a body of mass. Speed slows time down, likewise as does mass. That is to say, if two individuals were to sync their identical clocks and locate themselves to different places on the Earth—one at sea level and one well above sea level—when they returned to one another, their clocks would be out of sync. The person having spent their time well above sea level would be older; time would have moved more quickly for them. The 20th century shattered the unity of time. But Einstein’s theory also gave us the equations to describe how times develop relative to each other:⁶³

The single quantity “time” melts into a spiderweb of times. We do not describe how the world evolves in time: we describe how things evolve in local time, and how local times evolve relative to each other.

⁶³ Rovelli, Carlo. *The Order of Time*. Penguin Books Ltd, 2019, pp. 13.

Submerged in the constituents of physical time are the conundrums of one of the most basic principles of our existence: that what is in the present is now, that what has happened in the past is behind us, and that what has yet to happen in the future is in front of us. We live through this scheme every day. Our capacity of memory allows us to mentally travel backwards in time (to the degree that our recollection will allow). Recognizing “now” is what we commonly think of as “being alive” and it guides our seemingly constant transition from present to future, and present to past. Our individual passages through time are conceived as an arrow beginning at birth and ending at death. However, for the laws of physics, this is not at all the case:⁶⁴

The differences between past and future, between cause and effect, between memory and hope, between regret and intention... in the elementary laws that describe the mechanisms of the world, there is no such difference.⁶⁵

In fact, only one basic law of physics distinguishes the past from the future; the law that heat moves from a warm body to a cool body and not the other way around. Technically, considered the second law of thermodynamics, the German physicist Rudolf Clausius introduced the quantity that measures the irreversible progress of heat. He gives it the name *entropy* from the Greek *transformation*. It is indicated as: $\Delta S \geq 0$ where S = entropy. It reads, “Delta S is always greater than or equal to zero” (i.e. it never decreases).⁶⁶ According to Rovelli, this is the only equation in fundamental physics that differentiates between past and future. It is here in this concept of entropy, that our discussion of music comes back into play.

Barrett has a close relationship to the sciences, however it doesn't just stem from general civilian inquiry. Barrett graduated with a degree in genetics and microbiology before taking on composition professionally. Even from a general survey of Barrett's music and writings, it is

⁶⁴ Ibid, pp. 25

⁶⁵ Ibid. pp. 34

⁶⁶ Ibid. pp. 44

clear that these two aspects of his life are not separate but are interwoven in a very individual way. In an interview with Daryl Buckley, Barrett discusses the relationship between science and music today, namely cosmological and quantum mechanical study, as they pertain to his own work DARK MATTER:

Maybe we're now moving into a situation where the possible relationships between "science" and "art" are clearer than they have been since the Renaissance. This has to do with the kind of fundamental questions scientists are asking, as a result of the huge advances which experimental science has made, and also with the way that artists, since early in the last century, have been engaging with the inner workings of their "language" in a way that wouldn't have been conceived previously - I mean beginning with people like Schoenberg, Varèse, Picasso, Kandinsky, Joyce and so on.⁶⁷

I began my initial preparations for Barrett's *Urlicht* ("Primordial light") at the beginning of 2018, around the same time that astronomer Judd Bowman and his team discovered, for the first time, long-sought signals of primordial light from the universe's earliest stars. Bowman's work advances our understanding of some specifics surrounding our universe's origin, but even more arousing are the ramifications this discovery could have for humanity's heightened understanding of the universe and its make-up. Bowman's results hint that the gas of the early-universe was colder than originally predicted, which astronomers currently surmise is due to dark matter's influence (a hypothetical form of matter that is thought to account for approximately 85% of all matter in the universe). If confirmed, this would mark the first time that dark matter has been detected through anything other than its gravitational effects, therefore positioning dark matter a further step from a hypothetical force into a confirmed component of the physical world. My initiation to Barrett's *Urlicht* occurring in tandem with Bowman's discovery was uncanny to me in particular considering this discovery has been sought for 35 years and most current

⁶⁷ Buckley, Daryl. "Dark Matter." Richard Barrett, 2003, <https://richardbarrettmusic.com/DARKMATTERinterview.html>.

musical practice has little-to-no invested alignment with today's cosmological research. This wasn't always the case: for the early Greeks, then Romans, music and astronomy were two interrelated parts of a whole and such connections would remain (albeit less centrally) throughout the medieval era.

Today, Barrett is of the few whose overarching compositional method pursues a contemporary realignment of these previously unified subjects. In Barrett's case, cosmological theory propels his creative impetus while the sonic practice offers an experiential and metaphysically engaged means to an understanding of the universe's phenomenon. From its outset, *Urlicht* serves as a key example of this compositional orientation:

[*urlicht*] is concerned with the metaphor of an evolving universe, with a focus on the unfolding of asymmetry from an initially symmetrical condition (the "Urlicht", so to speak), the "special conditions" in Roger Penrose's view of cosmology...⁶⁸

The "special conditions" described by Penrose argue a universal tendency towards entropy which implies that *extremely* special conditions (or more ordered conditions) must have taken place in the early universe in order for regularities that we currently observe today to exist. This theory is directly translated to the opening chord of *Urlicht* which spans the entire range of the vibraphone via a symmetrical superimposition of semitones and major thirds. The chord is repeated *fff* with a set of durations which are a condensed version of the entire piece's structural proportions (1-4-5-9-6-2-8-7-3).

⁶⁸Barrett, Richard John, and Michael Spencer. "Portfolio of Original Compositions: Music of Possibility." University of Leeds, The University of Leeds and Richard John Barrett, 2017, pp. 107-108.

Figure 7.1: *Urlicht*, first measure of the work

Following this opening chord are eight sections (“phase-shifts”) whose structural divisions and pitch material emanate from the opening chord. Barrett attributes these phase-shifts to “that of shifting phases of matter (solid, liquid, gas)... or to the phase-shifts hypothesized to have taken place in the early universe as its expansion drove a sequence of symmetry-breakages.”⁶⁹

- 1: mm. 1
- 4: mm. 2-25
- 5: mm. 26-45
- 9: mm. 46-98
- 6: mm. 99-134
- 2: mm. 135-142
- 8: mm. 143-188

⁶⁹ Barrett, Richard John, and Michael Spencer. “Portfolio of Original Compositions: Music of Possibility.” University of Leeds, The University of Leeds and Richard John Barrett, 2017, pp. 109.

- 7: mm. 189-216
- 3: mm. 217-225

Barrett likens each section to “that of shifting phases of matter (solid, liquid, gas) ... or to the phase-shifts hypothesized to have taken place in the early universe as its expansion drove a sequence of symmetry-breakages.” Take for example the second phase immediately following the repeated opening chord: each player activates the vibraphone in unison with two bows, resulting in a series of 24 block-chords configured from six pitch vectors. The material undergoes a large scale crescendo from *ppp* to *f* while separated releases of each individual bow indicates movement towards a much less symmetrical situation. Barrett interweaves the six pitch vectors throughout the section while initiating a gradual reduction of the vectors’ sinusoidal amplitudes towards the center of the vibraphone’s three octave-range. As the bowed releases and dynamic swells bifurcate, Barrett alludes to the material of phase 3, which consists of linear successions of the values of the six pitch-vectors as opposed to the more vertically aligned material in phase 2. These formal processes as well as the consideration of sinusoidal function are derived from the puzzling influence of dark matter within our current understanding of the observable universe. Barrett presents a musical situation that is representational of humanity’s current understanding of the world, just as our experiences of musical harmony does not typically consider the underlying sinusoidal functions, we observe a universe that is propelled by a force that we cannot see:

To take another cosmological analogy, these beautifully but somewhat mysteriously varied harmonies are in fact the result of invisible but completely deterministic forces in the form of the aforementioned sinusoidal functions, as the enormously diverse forms and orientations of galaxies in the universe are considered to be the visible traces of the operation of “dark” matter and energy which cannot be observed directly.

Section 3 also introduces a recurring feature: the movements to an auxiliary metallic instrument. In this section, player 1 moves to the waterphone, thus extending the prevailing ensemble sound in the direction of instability in pitch and timbre. While the rhythmic structure remains in the part, pitch is notated only relative to the range of the instrument; pitch is not fixed on the waterphone.

6

wp. (see preface for guide to waterphone notation)

wp. pos.

2 vib.

3 vib.

68bpm

Figure 7.2: *Urlicht*, introduction of waterphone

Section 4 can easily be likened to the so-called “cosmic dawn.” It is theorized that some 380,000 years after the Big Bang, neutral hydrogen gas formed. The force of gravity caused the hydrogen to clump together and the first stars and galaxies were formed. In this section, all three players alternate between the same A-sharp and B-natural with their bows, analogous to the primordial “soup” of ionized plasma. This minor 2nd is situated at the center of the opening chord’s range. At each division in the section—marked by rests following a gliss on the

vibraphone—a single bow is substituted for a beater (of varying type). As the players re-enter, points of sound appear above and below the cosmic horizon (A-sharp and B-natural), indicating the development of activity (e.g. the formation of stars and galaxies). As the end of the section approaches, bow sounds cease altogether and irregular glissandi lead immediately into the next section.

In phase 5, each percussionist holds 4 mallets of varying degrees ranging from soft yarn to wooden stick. Additionally, Barrett gradually introduces a small set of auxiliary percussion (stacked cymbal, guiro, snare drum with pinecones, wind chimes, sleigh bells, and log drum) as a separate stratum from the vibraphones. Through accumulative density, percussion overcomes the vibraphones entirely. In phase 6, the vibraphones drop out abruptly, leaving only the percussion instruments which—as an extrapolation of the preceding layer—proceed through a sequence of wave-like swells, each swell more elongated from the previous. From these timbral swells, the following section (phase 7) suddenly emerges which Barrett conceives as, “a single six-handed vibraphone from the trio.”

In the final section, Barrett indicates a return to bows. All players activate the highest f-natural and lowest F-sharp on the vibraphone; one semitone higher and lower than the extremes of the opening chord. Locked in a double hoquet between each player with the ratio of 9:7 in between the upper and lower layers, Barrett affirms the range of tempi throughout the entirety of the piece via the more local polyrhythm: all sections in *Urlicht* have a tempo of 70, 80, or 90. As the performers visually stretch their limbs to the limits of the vibraphone to produce a soft, sustained glow with occasional spurts of bowed “*forte*”, Barrett alludes to the sobering implications of Penrose’s theory: entropy’s inevitable maximization in an ever expanding universe will ultimately lead to a cosmological heat death, or as we so often like to say. Only a

century prior, it was widely accepted that gravity would eventually overcome the momentum of the universe's expansion propelled by the Big Bang, pulling all matter back to the infinitesimally small point from which it once came, resetting everything anew. However, thanks to the work of the sharpest star gazers of the late 20th and 21st century, it is now clearer than ever that the universe is not only expanding but that the rate of expansion is also accelerating. It is here in *Urlicht* that the passage of time through the universe, driven by entropy, is encapsulated into a musical situation

What is a new aspect of time introduced in this piece is the consideration of individuals playing together or sharing time with one another. Much of *Urlicht* rivals the materials of Levine's *Shrinking world/expanding* or Eckardt's *Transience*. The temporal architecture of the work uses extended polyrhythmic phrases. Take for example the penultimate section (mm. 189-216) which deploys intricate rhythms nested inside polyrhythmic figures across entire measures. Bar 215 is a paragon example, as player one must play disjointed rhythms within a feel of 15 against the meter of 17 pulses (15:17) while players two and three must execute their rhythms at a rate of 19 against the meter of 17 sixteenth note pulses (19:17).

The image shows a musical score for a piece titled 'Urlicht'. It features three main melodic parts on vibraphone (vib.) and several percussion parts. The top staff is for vib. 1, the middle for vib. 2, and the bottom for a group of percussion instruments including cym. guero, seed pods, tenor drum, gong, sl. bells, and log drum. The score is marked with complex time signatures: 17/16 at the beginning, 15/17 for the first melodic phrase, 4/5 for the second, and 19/17 for the third. Dynamic markings include *ppp* (pianissimo) and *ff* (fortissimo). The score is numbered 17, 16, and 809.

Figure 7.3: *Urlicht*, example of polyrhythmic complexity amongst three parts

The internal timekeeping mechanisms for each individual are in and of themselves overwhelmingly complex, however, maintaining the correct temporal relationship between the three parts—to remain *in sync* with one another—adds yet another dimension of temporal complexity to the situation. The use of such intensely prescribed meters and rhythms unveils the micro characteristics of each individual’s musical time. From the perspective of chamber playing, the small nuances in how the three performers internalized these complex rhythms was very noticeable due to the very small divisions of the rhythms. A great deal of the rehearsal process was devoted to processes of remaining in time with one another and understanding how we each internalized our own rhythms. It is in these situations where time is so intensely prescribed that the distinctive temporalities of each individual emerges. As the human body and mind is pushed to its limits of their temporal capabilities, the uniqueness of the way each individual handles time, creates time, and is in time is illuminated. From the percussive upstroke,

the downstroke, and lateral motions, to the the bodily motion in the shoulders, arms, and torso, as well as the weight and agogic emphasis (i.e. the rhythmic phrasing) of a given measure, each individual's temporal beings become more visible. While musical works themselves can have a kind of temporal stamp, it is the acts of the performer in all their motions and gestures that realizes the temporal experience.

Where Barrett's *Urlicht* approaches time in the physical world through a formally and technically complex work inspired by the scientific efforts of Sir Roger Penrose, Murphy-Mancini's *Sic itur ad Astra* focuses time through sonic sustain and the juxtaposition of two instruments whose traditions inhabit different periods of time. Percussion within the western purview of music is often considered to have established itself as a field in the 20th century. Understandably so, as significant advancements occurred including the increasing prevalence of percussion in works such as George Antheill's *Ballet Mecanique* (1924-1925), Amadeo Roldan's *Ritmicas* (1930), Stravinsky's *Histoire du Soldat* (1918), the first composed works for percussion ensemble such as Edgard Varese's *Ionisation* (1931), Carlos Chavez's *Toccatà for Percussion Instruments* (1942), Johanna Beyer's *Percussion Suite* (1933), and Henry Cowell's *Ostinato Pianissimo* (1934), as well as the first composed percussion solo works including Karlheinz Stockhausen's *Zyklus* (1959), Morton Feldman's *King of Denmark* (1964), and Helmut Lachenmann's *Interiur I* (1966). Such works serve as the genesis of a percussive art form that operates within the domain of western concert music today. Furthermore, the rise of percussion works in western notated music of the 20th century illustrates the broader developments of "noise" as a domain of untapped expressive and musical potential. As the Italian Luigi Russolo, a composer, painter, and developer of the noise instruments known as the *intonarumori*, notes, "we must break at all cost from the restrictive circle of pure sounds and conquer the infinite

variety of noise-sounds.”⁷⁰ Therefore, within the context of western art music, percussion is considered to be a relatively new discipline. Conversely, the harpsichord has a rich history of musical activity spanning from the Renaissance era through the early common practice period, until gradually overtaken by the fortepiano and later the modern piano. However, it is interesting to note that while 20th century artistic activity embraced the domain of noise, a re-emergence of interest in historical instruments and musical practices also occurred. Therefore, in the context of *Sic itur ad Astra*, the historical identities of these two instruments—their lifetimes through time—cannot be ignored. It is with these two instrumental disciplines that Murphy-Mancini embarks on what he refers to as a space exploration. The percussion, representing the cosmos, transports the harpsichord to a territory that it cannot access on its own:

The harpsichord explores one set of exhaustive possibilities in the piece - a "space exploration," if you will. When I felt like I had truly gotten everything out of the instrument given this piece's initial conditions, I eliminated the possibility of its sounding and allowed the music to transcend its limitations into "pure" sustain. The irony for me is that these percussion instruments have no decay *as long as* they are constantly activated. Sustain is the one thing a harpsichord cannot do without constant activation (hence the *arpeggiando* and the presentation of the longest possible decay time on the instrument), but the side effect of this is that you hear constant attack as well. I imagined the "breath" of the harpsichord (the pluck) being transported via the "sound of space" (metal percussion) into a realm it cannot access but yet the path there is built along the same lines. I thought of this connection as the primary way the two instrumental families could be brought into relationship without collapsing into a straightforward presentation of material dialectic. "Thus one goes to the stars" here reflects the process of exploration and the transcendence of initial conditions. It's also just music about space in so many obvious ways that I couldn't help myself.⁷¹

In the final two sections that feature the harpsichord, the postludium *arpeggiando* and the section (untitled) immediately following, consisting of single tones generated from twelve-tone rows, Murphy-Mancini explores the notion of sustain on the harpsichord in two distinct but

⁷⁰ Russolo, Luigi. *The Art of Noises*. Pendragon Press, 1986, pp. 6.

⁷¹ Email correspondence received by Justin Murphy-Mancini, *Sic itur ad astra*, 2018.

equally effective ways. In the postludium arpeggiando, Murphy-Mancini notates a series of chords that move from the higher region of the register to the lower. Near the end of the section, chords arpeggiated in the low register result in a sound that resembles the notion of complete sustain. Timbre and tone blend together in a seemingly monolithic sonic structure. Immediately following, Murphy-Mancini pursues the notion of complete sustain in an entirely different way: single, unrepeated tones sound; the performer removes the stops from each string, allowing the string to sustain for as long as physically possible. Concluding this section, the harpsichord is no longer heard between the percussive movements, silence replaces pure sustain.

The overarching structure of *Sic itur ad Astra* is derived from Murphy-Mancini's consideration of clock-time versus experiential time. Initially, Murphy-Mancini created a fixed temporal framework in which material would be situated within, similar to the way Levine used the framework of *Timepiece for Chaya* to create the skeletal time structure of *Shrinking world/expanding*. However, where the materials in *Shrinking world/expanding* remained bound to a fixed temporal structure, Murphy-Mancini felt compelled to break away from his preconceived structure during the development stages of *Sic itur ad Astra*. In doing so, Murphy-Mancini highlights an interesting distinction between time's influence on musical material. An approach that primarily uses clock-time will restrict the material development for the sake of retaining an overarching form. However, experiential time is an aspect that is difficult to plan or account for in advance; to preconceive temporal experience in this context is impossible, how can one know a given experience of a future time? It is articulated simply and clearly by Murphy-Mancini when he says, "I *felt* the need to extend." Where one approach asserts a structure of time, an imagined instance of time calculated by the ticking of the seconds, the other creates time in its process, born from the very process itself:

At first, I wanted to work with an idea I had been toying with for a little while - that being successions of identical "clock time" that resulted in different "experiential time." I have been exploring the relationship between these two concepts for a decade now, and in the last couple of projects I have been curious to build several connected but developing experiences of musical time into a single piece. I had also noticed that in the work of some composers of the Baroque era, something like this relationship was also on the table if only emergently: many Bach dance movements fit onto two score pages but can differ widely in duration. I also thought of my abstractions of dance movements as flattening the temporal variability in favor of attaining a kind of structural unity for those sections. When planning the piece, I had originally selected 3 minutes 3 seconds as my basic time block - this choice was made as a consequence of the number of sections I initially anticipated in conjunction with the global duration.

In the end, I allowed the material to develop without strict adherence to any clock time considerations that informed the early decision-making process. The "prelude" is much longer than 3.5 minutes, though the following sections are closer. In performance, they still vary because I didn't ask for a slavish approach to tempo from either of us, and I wouldn't want it from anyone. Initially, the chaconne and postludium sections were supposed to mimic the opening ones but I definitely began to feel the need to extend and extend and I think this flexibility was good for the piece.⁷²

The overall form of *Sic itur ad Astra* consists of separate sections that are threaded together via the two aspects discussed above: sonically through the consideration of sustain and formally through the use of the dance movements of a baroque suite. In the beginning of the piece, the two instruments alternate between movements, each performing alone. There is no performative break between movements, time is measured continuously from one movement to the next.

The central theme of the work resides in an investigation of coexistence between the sonic properties of the harpsichord and a selected family of percussion instruments: vibraphone, tuned stone bars, elephant bells, cymbals, thai gongs, altar bells, and bell plate. Initially, the instruments are posed in dialogue, alternating between each movement as a means of exploring aspects of resonance, sustain, and decay within each instrument individually. Concluding the

⁷² Email correspondence received by Justin Murphy-Mancini, *Sic itur ad astra*, 2018.

Gigue, which is played on sizzle cymbal, the instruments sound together for the first time in the Chaconne. In the final tutti section (which breaks from the mold of the suite), the harpsichord sounds single pitches. Following each pitch, its respective jack is removed to allow the maximum amount of sustain before dissipating into emptiness. The work concludes with a series of percussion sections: vibraphone, altar bells, cymbal, and bowed bell plate. The percussionist moves gradually from instrument to instrument with periods of silence in between, “a distorted mirror of the opening dialogue.” The sections are outlined as follows:

- Prelude: vibraphone
- Allemande: harpsichord
- Courante: tuned stones + bell plate
- Sarabande: harpsichord
- Interlude: elephant Bells
- Gigue: sizzle cymbal
- Chaconne: harpsichord & thai gongs, cymbals, bell plate (tutti)
- Postludium arpeggiando: harpsichord & vibraphone
- Final tutti: harpsichord and small stones
- Percussion Coda: vibraphone; silence (30’); cymbal; silence (1’); altar bells; silence (1’); bell plate

The cosmic aspect of *Sic itur ad astra* can be considered through means which are much less systematic than seen in Barrett’s *Urlicht*. The title is taken from Virgil’s epic poem *The*

Aeneid and threads through many different aspects of the work's materials as well as in the process of creation.

The title came toward the end – I had accumulated a lot of ideas and had even written a good amount of the score, but it felt like an assemblage of sections and not quite a piece... [...] Reading it [Virgil] gave purpose to my intuition that the percussion should end the piece, and I was able to find a shape for the harpsichord's departure... [...] "Thus one goes to the stars" here reflects the process of exploration and the transcendence of initial conditions. It's also just music about space in so many obvious ways...⁷³

It is important to note the generative contribution the work's title had on Justin's final structuring of the work as a whole. Embedded in the sound, form, and instrumentation of the work and enclosed in the title is a consideration of the nature of cosmological study throughout time. The harpsichord and use of baroque form enlivens the modes of the past: the visceral nature of Kepler's *Harmonices Mundi* or Boethius *musica mundana*. Conversely, the percussion instruments (particularly non-pitched) and pre-determined durational architecture are closely associated with aspects of our modernity. Threading these distinct areas of identity is a *harmonic fabric* that simultaneously recalls the musical practices of the past while exploring contemporary practices of the "now." One is not replaced by the other but overlays it in the manner of palimpsest. This musical situation metaphorically brings to the fore a distinction made by Jakob von Uexküll of a shift from a perceptually constituted functional universe to a more operationally constituted functional universe:

Astronomy was originally a science of the perceptual side; it was a matter of finding the design behind the bewildering multitude of stars, a design ordained by God that made it possible for them to move in perfect harmony; in his search for the harmony Kepler found the laws governing the planetary motions. Newton on the other hand we find completely immersed in the operational side of the starry sky, as he formulates the laws of gravity. Kepler was looking for a design – Newton was looking for a cause for the same phenomenon.⁷⁴

⁷³ Email correspondence received by Justin Murphy-Mancini, *Sic itur ad astra*, 2018.

⁷⁴ Jakob von Uexküll, *The New Concept of Umwelt: A Link between Science and the Humanities*, trans. Gösta Brunow, *Semiotica* 134 (2001), pp. 114.

A model example of this dialogue can be seen in the prelude of *Sic itur ad Astra*. This opening section for vibraphone presents quiet harmonic material in two or four voices. Large felt mallets are used on the lower portion of the vibraphone to activate the bar without any audible attack. Subtle but regular pulses are created by the vibraphone's motor which rotates the disks located in the resonators of the instrument. The regularity of this pulsing can be heard in relation to the variability of the harmonic changes. The harmonic material implies motion locally and broadly. The movement begins with a tremolo on F and A-flat (indicated low to high), indicative of f-minor, and alternates between dyads on F, G, and A-flat throughout the first two phrases of the first system. The third phrase begins on A-flat and C which could imply the relative major of f-minor or the complete voicing of an F-minor triad considering the opening f and a-flat. The third phrase of the first system ends on B-flat and D-flat (iv) if the F-natural is implied. The second system imitates a similar motion between B-flat, C, and D-flat as seen in the opening system between F, G, and A-flat (itches are indicated low to high: F to A-flat). Concluding the first phrase of the second system is the first uninterrupted leap from C & D-flat to C-natural and F-natural. The F-natural in the top voice "resolves" down to E-natural, suggesting a possible cadential moment in F-minor. However, instead of resolving back to F-minor the phrase concludes on the C & E-natural, sustaining through 3 beats of rest. The second phrase begins on B-flat & E-natural which resolves in the following measure to A-natural and F-natural. Occurring at the beginning of the second phrase and preceded by C-natural & E-natural, this abstracted cadential moment solidifies an initial tonal area of F-minor before expanding the sense of harmony in the following systems.



Figure 7.4: *Sic itur ad astra*, opening measures of the prelude

In systems 3 and 6, four mallets are employed for richer harmonies. The speed of the tremolo between mallets is slowed, delaying the activation of subsequent chords and naturally amplifying the amplitude of the oscillating effect of the motor. The harmonic material in these two systems strays from readily implied tonal motion but at the substitution of a heightened sonic effect from the oscillations and the composite sound experience from the vibraphone. The penultimate system concludes on a fully voiced F-major chord in first inversion, tacitly alluding to an imperfect cadence. The final system sustains F-natural in the upper voice while descending from B-flat to G-natural, finally landing on F-natural and A-natural or the overarching “major” resolution from the minor opening of the prelude. The above analysis is more readily an account of my own inclinations in regard to the harmony of the Prelude. However, they don’t stray far from Justin’s conception of harmony, as he explains:

I think this relationship developed out of my experiential relationship with Baroque harmony and voice-leading as a keyboardist. I developed local harmonic goals in a way I thought was at least inspired by Baroque models, especially those of people like Froberger, d’Anglebert, and Bach. For me, Baroque composers use very simple (but often less straightforward than Classical) architectures with a wonderfully high degree of local variability. My local relationships are based primarily on intuitive extensions of step-wise motion that do not conform strongly to functional harmonic progressions (though they’re not forcibly removed from them) and my bigger considerations followed traditional rounded binary forms when there were the pitches available.⁷⁵

⁷⁵ Justin Murphy-Mancini, correspondence with author, May 3rd, 2019

Justin's use of harmony in the Prelude caters to his investigation of experiential time within a fixed durational framework, "clock time." Each line is separated by a rest of either 3.6 (3/4 at 50 bpm) or 4.8 seconds (4/4 at 50 bpm). The primary phrase length within each line is 25 eighth note pulses separated by a bar of rest (always 6 eighth note pulses) which the vibraphone sustains through. This durational framework is consistent in system 1, 3, and 5. The second system contains an expanded phrase of 32 eighth note pulses while systems 4 and 6 play one uninterrupted phrase of extended length. Thus, Justin establishes his initial architecture of clock time but ultimately deviates from a strict implementation, as mentioned in the introduction to this work.

The Allemande played by the harpsichord takes on a traditional AABB form:

- A: mm. 72-82
- A: mm. 83-92
- B: mm. 93 - 105
- B: mm. 106-mm. 120

Similar to the structure of the prelude, the allemande consists of local rhythmic variation within a broader architecture of clock time. Each phrase lasts approximately 10 measures, however, this is offset slightly with the insertion of single bars of rest between the sections. The harmonic material is also indicative of f-minor, though it is not readily apparent as in the prelude. Rather, the implied center is found at the end of phrases. The final phrase concludes with a fully voiced C7 in third inversion to f-minor in first inversion.

The Courante consists of a selection of quarter-tuned stone planks and one large bell plate (played with a gong beater with a kick pedal). A two-voice theme is introduced, the left hand

alternates between f-natural and g-natural, while the right hand activates stones surrounding the note E: e-flat, e-quarter-flat, e-natural, and e-quarter-sharp. Underlying the primary material of the limestones is a single bell plate played quietly with a soft beater.



Figure 7.5: *Sic itur ad astra*, opening measures of the courante

The large bell plate requires a mallet significantly larger and softer than those used to activate the limestones, in which a hard cord mallet is used. As four mallets are required to activate the limestones given there are six voices at the densest moments of the movement, the mallet for the bell plate was specially made, fitted into a bass drum pedal in order to be activated by the foot. The result is a long sustained tone quietly underneath the dryer activations of the stones. The activation points of the bell plate are unpredictable in their placement. For example, the first activation occurs in mm. 122 while the next does not occur until mm. 129, some 38 beats later. Conversely, the third and fourth activations occur within two beats of one another. A large bell plate will likely sustain through to the next attack, although in the largest stretches between activations (mm. 122-129 and mm. 140-147) will result in the bell plate's sustain disappearing beneath the sound of the limestone material. However, at the very end of the movement the bell plate is activated on its edge with metallic beaters at the dynamic of *ffff*. By activating the bell plate on its edge rather than the face, the upper frequencies of the bell plate are heard without lower frequencies. What was initially a low sustained pedal tone is reactivated as a

rich spectrum of overtones. This sudden burst is held for only one measure and gradually choked as the harpsichord enters with the first chord of the sarabande.

The piece retains its initial structure of alternating between harpsichord and percussion with the addition of an interlude played on elephant bells. The first tutti, the Chaconne, is Justin's take on the many French models that he himself has performed. The movement progresses through different cycles, each one governed by its own local tonic. Unlike the other movements, there is no sense of harmonic closure. The harpsichord arpeggiates through a series of chord progressions based on Bach's *Chromatic Fantasia* (mm. 44-49) while the vibraphone plays the highest F-natural in repetitive eighth notes for the duration of the section. Following each progressive cycle, the harpsichord modulates up minor 6th, (F to D to B). In the third cycle, the harpsichord begins working its way slowly down the range of the harpsichord, chord by chord. Over time, the instrument's timbre overtakes the harmonic arpeggiations. The sound blurs together in a combination of harmony and timbre at which point the harpsichord has achieved the maximization of continuous sound. In the final measures, the harpsichord outlines an F-minor triad in the low register of the instrument. The upper voice moves its way chromatically D-flat, D-natural, E-flat, E-natural, until arriving at F-natural. Outlining a fully voiced F-minor triad, the conclusion of the movement is the most cadential moment in the piece. Following is a final tutti section that breaks from the mold of the suite, consisting of a 12-tone row. The harpsichord achieves maximum sustain while the percussion, playing three high pitched stones, sounds with the least sustain. Following the pluck of each pitch, the jack is removed to allow for the maximum sustain. The harpsichord is heard for the final time as its strings gradually decay, sustaining for as long as physically possible. Material that alludes to the opening Prelude is then heard on the vibraphone: soft tremolo with felt timpani mallets. Following would be another

instance of the harpsichord, however, it does not sound, only silence. The percussionist alternates between sound and silence. Each time the percussionist moves to a different metallic instrument: vibraphone, (rest), cymbal, (rest), altar bells, (rest), bell plate. The piece concludes with a seven minute section on the bell plate which is bowed continuously. The material is loosely directed by the instructions in the score outlining frequency types:

Bow the bell plate. Play the following progression of evolving frequency content.

0' – 1' Primarily fundamental

1' – 2' Allow higher frequencies to emerge

2' – 2'20" Eliminate fundamental

2'20" – 3' Highest frequencies possible

3' – 3'30" Gradually reintroduce lower frequencies 3'30" – 4' Lower frequencies only

4' – 5' Build as rich as frequency spectrum as is possible 5' – 6'30" Gradually isolate only highest frequencies 6'30" – 7'00" Highest frequencies only

Different frequencies are activated through the variation in bow pressure as well as pressure from the finger pads of the opposite hand. The spectral complexity of the bell plate, its resonant properties, and the way in which frequencies can be isolated through the use of pressure is indicative of the complex harmony of the universe and echoes the concept of Musica Mundana outlined by Boethius.

Chapter 8: Returning to Where We Began

In my introduction to a time based performance practice, I illustrated the overall trajectory of Jürg Frey's percussion quartet *Metal, Stone, Skin, Foliage, Air*. In doing so, Frey's two notions of time—pathway and expanse—served as an introduction into the ways that music creates time and the idea that time is a prominent and active feature of music rather than a background feature. To return to this work now is in and of itself a consideration of time as it pertains to the traversal of this document and my own suspicion that to have introduced the broader considerations of the piece at that time, without a more extensive elaboration of the idea of this document, would result in having moved too far too fast. Now that I have illustrated the ways in which music elevates our experience of time, it is now more readily apparent when I say Frey's work is a piece about time in a way that goes beyond the conventional mensural aspects of musical time.

What is particularly interesting about the first pages of Frey's score, the pages that contain the material of the first two sections (672 eighth note activations on triangles followed by 672 more eighth note activations on finger cymbals), is that all of the notes have been written out by Frey, by hand for a total of 10,752 notated eighth note activations.

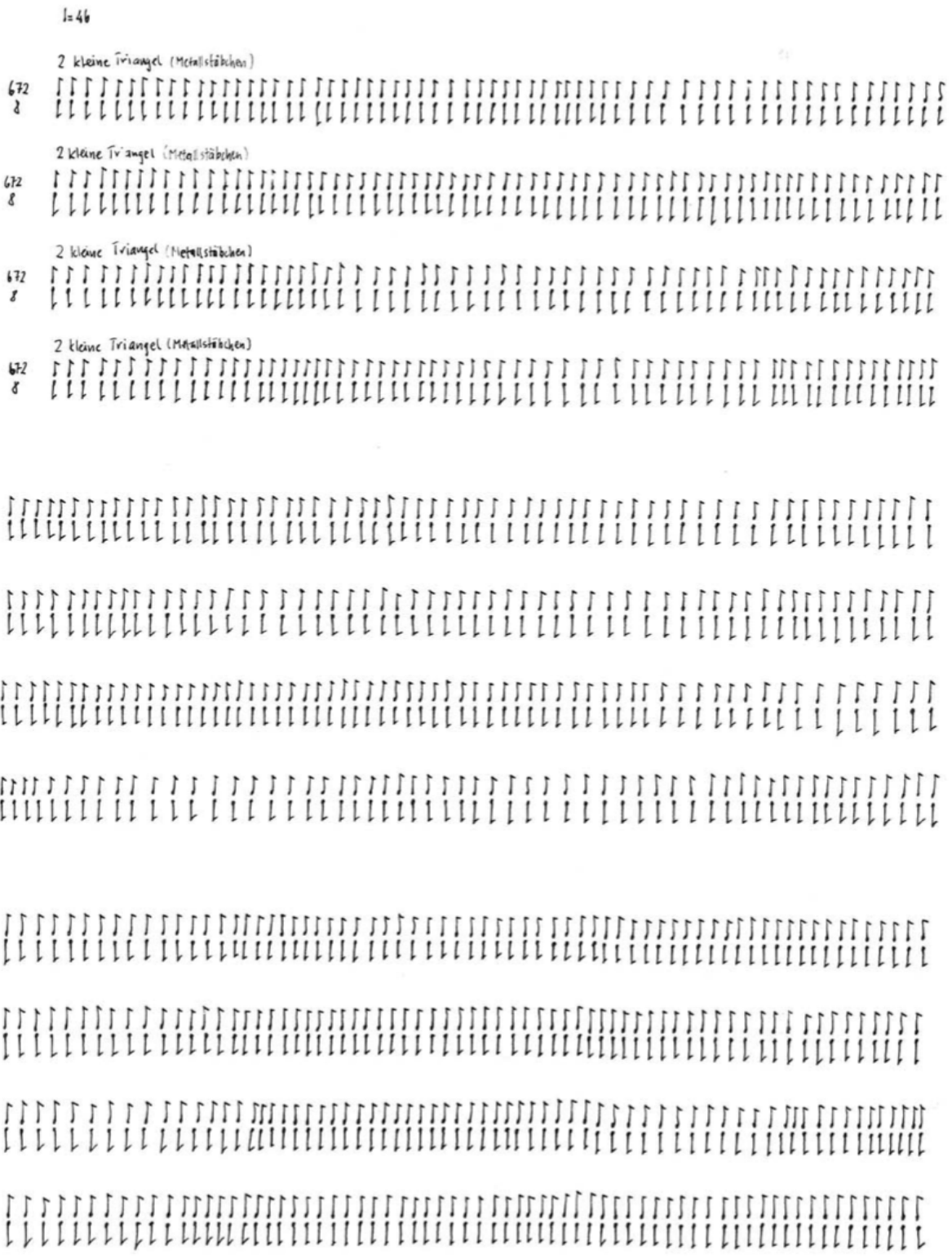


Figure 8.1: *Metal, Stone, Skin Foliage, Air*, opening section written by hand

If the score is simply an instruction manual for a performative situation, why not just write one set of eighth notes followed by a simple indication to play a certain number of activations? The score is indeed more than a set of tasks laid out in writing in Frey's mind. The act of writing each note directly parallels the act of playing each note, they are both connected via their commitment to time whether in writing or playing. Just as each written notehead contains small differences in shape, size, and grain, each their own moment on the page that has been given a moment in time, each activation of the triangles produces a subtly different sonic profile, communicating the same idea. Certain overtones come and go as new activations add to the ongoing resonance made up of all the previous activations. With four individuals activating a total of eight triangles, the result of the vertical profile will also shift inevitably. A goal of this section is certainly togetherness, however, unwavering vertical precision is not the priority. It is worth noting that subtle variability is desirable. Just as Frey's notation projects the individuality of each note, each activation similarly continues an ongoing sequence of regularly distanced activations while embracing the subtle differences from one to another. The experience of time is therefore one that can focus on the subtle but distinct activity between each activation—quick passings of distinct moments overtaken by the next—or more broadly as the sum total of all the activations can be felt as one larger section if one were to pay closer attention to the ongoing resonance than the ongoing attacks themselves. Such a situation is the very threshold outlined by Frey, in between the path and expanse. Moreover, encased within this situation is the very idea that Michael Pisaro outlines in his essay "Time Underground" when he says:

At the boundary of musical expression, time passes in ways hitherto unknown. For many years, music concerned itself with forcing a structure onto time. Beginning with the music of John Cage, it has become possible to see time as having its own structure: not as

something imposed on it from the outside by music, but something which is already present, which exists alongside the music.⁷⁶

Moreover, the eighth notes, written individually on the page and performed individually in time, develop a different sense of rhythm, one that is aligned with the way Christopher Hasty speaks the experience of things which appear static but are rhythmic in our experiences of them:

By calling something rhythmic we mean that it is not fixed - it is dynamic as opposed to static; fleeting as opposed to permanent. A block of wood is not rhythmic unless we closely observe its grain and find the shape of the marking interesting. Of course, the grain is as permanent as the block itself - we can return to the block later and expect to find the markings unchanged. But what we cannot return to is our experience of the rhythm as we attend to the markings. That we can call apparently static arrangements properly, and not metaphorically, rhythmic shows how closely linked rhythm is to immediate experience.⁷⁷

Hasty's description of the block of wood parallels an examination of Frey's score. The shape of the eighth note markings, with their slight variations but broad uniformity engages the examiner in multiple and immediate experiences of time which Hasty would consider rhythmic. To deploy such an imagining of time in performance is to make this temporal situation audible. It is here in this work that the many of the previous aspects of time discussed converge into a single situation. Temporal processes, originally showcased in Levine's works, reappears as what Frey expresses as the path across eleven distinct sections of music. Where Eckardt's *Transience* pushed the seeming granularity of time to the point of incomprehensibility, therefore ostensible fluidity, it is embraced entirely in the resonance, sustain, and decay of the percussion instruments in Frey's quartet. Hanna Kulenty's arcs of time appear here as a large arc of time comprised of sectional arcs, "and now the music is a journey with an end quite far away from the beginning."⁷⁸

⁷⁶ www.wandelweiser.de 2004, Haan All Rights Reserved. "Michal Pisaro." *Wandelweiser*, Wandelweiser, https://www.wandelweiser.de/_michael-pisaro/texts.html#Times_Underground.

⁷⁷ Hasty, Christopher Francis. *Meter as Rhythm*. Oxford University Press, 1997, pp. 12.

⁷⁸ Email correspondence received by Jürg Frey, *Metal, Stone...*, 2016.

Tacke's layering of time is not seen literally as a layering of musical materials in this case but of temporal experience itself. Given that Frey presents sections that are seemingly static units, the performance of it results in a sounding of space to be explored by the ear, echoing Murphy-Manicini's view that *Sic itur ad Astra* is "just music about space in so many ways," again merging our sense of sonic space and cosmic space. It is in Frey's quartet, in a work that is seemingly bare in its materials (especially in the level of musical activity seen in the above mentioned works) that time becomes most apparent. In *Metal, Stone, Skin, Foliage, Air*, Frey does not seek to control time, to tame it, or to necessarily even use it. Rather, he uses percussion as a means of uncovering time. The world of percussion instruments, through their timbral, textural, and resonant potentialities allows us to probe time in ways that centralize it, in and of itself. Apart from a few isolated exceptions, each of the eleven sections is homogenous in texture and is most easily identified by the instruments used and the manner in which they are played:

- I. Two triangles for each performer (struck with beater)
- II. Two finger cymbals each (with the exception of crotales in player 2)
- III. One cymbal each (tremolo)
- IV. One tam-tam each (scraped)
- V. One bell plate (rubbed) and stone (rubbed)
- VI. One bell plate each (tapped with finger pads)
- VII. One bass drum each (individual attacks split between the four players)
- VIII. One stone + voice (*stimme*) each
- IX. One bass drum (tremolo, "long sounds")
- X. Bass drum (rubbed), foliage players 1 & 3; Stone (rubbed), foliage players 2 & 4.
- XI. Bass drum (tremolo), voice (*stimme*).

These sections, along with the variation of pulse (individual attacks) and sustain (long sounds), is where the sense of direction in the work resides.

Each section of the piece is a static unit, without its own development. But on the other side, I was interested to give the piece a direction, a very slow flow, a movement through different states, an energy of going on that is not arbitrary. And now it has various paths in the piece, some are obvious, some more in the underground: from high to low sounds, from hard material to soft material, from compact to air, from dense to loose, high quality instruments to natural sound sources, from continuity to breaks. The material is static, but there are directions in the piece, an awareness of how early or how late things happen, and now the music is a journey with an end quite far away from the beginning.⁷⁹

An additional feature in the work worth noting is the subtle variations in most sections. For example, in the third section which utilizes four cymbals, after sustaining irregular tremolos for over one hundred counts, Frey instructs the playing spot to move a small distance closer to the bell of the cymbal. In discussion with Frey, he indicated that this was not meant to be a dramatic shift in sound or color. Rather, it should parallel the experience of light, in that sometimes it is unclear if the luminosity of the light changed itself or if the eyes have dilated, changing the experience of the light when the light itself remains unchanged. Here, the subtle shifts are meant to create a similar experience, a listener may wonder if the sound has changed or if the ears have changed the experience of the sound. In order to create this effect, we actually did not move our implements closer to the bell. Rather our primary tremolo (A) was performed with small metal rods positioned at an angle to the edge of the cymbal. When moving to the secondary tremolo (B), we simply changed the angle of the implements so that the tips struck the face of the cymbal itself rather than the shaft striking the edge. Such an approach holds true of the later sections as well and it is worth noting that this is not necessarily clear in the score's instructions. Looking at section V, performers may have an inclination to play the rubbed stones

⁷⁹ Email correspondence received by Jürg Frey, *Metal, Stone...*, 2016.

that vary in duration above the rubbed bell plates that are continuous throughout the entire section. In working with Frey, he made it clear that it is in fact the other way around. The stones should be played beneath the bell plates, as if our ears are imagining a greater spectrum of sounds emerging from the bell plates themselves. Additionally, in section VIII, the voices should emerge out of the stones as if the source of the sound itself is unable to be located. Such an approach requires an in depth study of the space in which the work will be performed and resonance is certainly a helpful feature in creating these effects.

A full performance of Frey's quartet is a consideration into the passage of time itself via the properties of percussion instruments and their propagation through space. Their sounds in this context yield little in the way of metaphor, association, rhetoric, or narrative, giving rise only to time itself. From my own experience, it was in the study of this piece that I felt I had discovered what I had been searching for in my study of percussion for many years. It was in a situation of raw time that I discovered that the study and practice of percussion is really the study and practice of time. Where other instrumentalists are often considered to be bound by the technical practices of a single object which is considered an extension of their being outright, or a fusing of the human condition and the material world, percussion—despite its utilization of various material objects—uses them not as the primary agent of its identity but as a means of pursuing time. Through such work, exploration, and commitment to percussive sounds, one may ultimately develop their time being in ways perhaps otherwise unattainable.

Chapter 9: Exploring Time, *WHEN*

WHEN is my first full length album composed of musical material developed and recorded solely by myself (largely influenced by the restrictions of the covid pandemic throughout 2020). In *WHEN*, I pursue musical material that is generated beyond a notion of time as the equal passing of ticks or traditional rhythms against a pulse, inside of a meter. Clock-time, fungible time, chronometric time, these are aspects of time which as a performer I have practiced and cultivated throughout the trajectory of my academic study. Percussion can so easily be synonymized with time keeping; a sense of “good” time is the ability to accurately measure time. The early works of this document illustrate a performative practice that demands such an approach from a performer. The intricate rhythms of Eckardt’s *Transience* require a huge investment from the performer in their time keeping efforts as do Levine’s. We have discussed the ways in which time from compositional and experiential standpoints materializes through these works. However, in consideration of the performer directly, we see from the materials of Levine, Eckardt, and Barrett, that they are tasked with an extreme demand of time keeping. As we have progressed through this document, we have seen the ways in which time seems to “open up” (borrowing from Levine’s description of time in *Shrinking world/expanding*) from both the standpoints of the works themselves, the performative demands of them, and the listening experience within their performative situations. It is in this particular project of *WHEN* that I expand my responsibility of *time keeping* beyond immediate rhythms and metrical groupings. Furthermore, I shed the notion of a “perfect” time, where accurate and precise measurement is based on objective references. Rather, I explore musical structures and material that does not fit precisely into our conventional modes of measurement. Time is not a component of the musical

situation, the musical situation is a component of this temporal exploration. Through performed material as well as a large collection of field recordings, I explore our considerations of and orientations to time. As discussed in depth by Alexander Bonus in his dissertation, I consider time as an “intrinsic trait of civilization; ‘time’ is a culture’s faith in temporality, one that alters over the ages.”⁸⁰

WHEN consists of four pieces whose materials are the result of an engagement with various sound making processes through, in, and with time. At the outset, I had no preconceived temporal framework in which to situate musical activity, contrasting works such as Levine’s and Murphy-Mancini’s which did. Rather, the musical activity was the result of temporal exploration in and of itself. In order to do so, I used a number of unstable performative techniques as well as various field recordings. In both of these situations, material cannot be preconceived and by-in-large cannot be controlled within the moment of performance and/or recording. Located originally in the epigraph of this document, “time is weather” is representative of this approach and takes as its basis Calcidius’ view of nature and time when he says, “of all such things the beginning occurs in time, for the birth of nature is as and coeval with that of time.”⁸¹

What I mean by the use of unstable performance techniques is that the resultant sound of a given technique cannot be fully controlled or replicated in future attempts. For example, the second movement consisting primarily of bowed cymbals presents a situation that is unable to be replicated due to the nature of the mode of activation on the given instrument. Bowing a cymbal can result in a variety of tones depending on the pressure and tautness of the bow as well as the type of bow stroke used. The cymbal can be controlled to some degree, however, it is difficult to

⁸⁰ Bonus, Alexander Evan. “The Metronomic Performance Practice: A History of Rhythm, Metronomes, and the Mechanization of Musicality.” Case Western Reserve University, 2010, pp. 3

⁸¹ Hicks, Andrew J. *Composing the World: Harmony in the Medieval Platonic Cosmos*. Oxford University Press, 2017, pp. 39.

achieve the same results in multiple attempts, especially if the material spans a considerable amount of time (about twelve minutes in this case). If a finger is pressed close to the area where the bow is in contact, it will result in the isolation of higher frequencies from the cymbal. Conversely, if no finger pressure is used and the bow is the only object to make contact with the cymbal, it is more likely that lower frequencies will be isolated, therefore heard. Over extended durations, changes in these variables can result in frequency shifts. If a low frequency is occurring and the performer places finger pressure onto the cymbale, this will likely result in a change in frequency. These acts are extremely difficult to replicate with consistency. Therefore, the second track, "Petrichor " consists of ongoing bowings of multiple cymbals and embraces the natural changes that occur without any preconceived result in mind. What is captured in the moment of recording is something which cannot be replicated in future attempts. Although similarities may emerge, it is likely that the majority of material will be significantly different on future attempts.

The other three works which comprise *WHEN* utilize a combination of field recordings and recorded material that explores similar techniques of unstable actions. The first piece, "Avenoir" activates tam-tams with the use of a rubbed dowel placed on its face, bowed bell plates, Ebow on piano strings, the scraping of metal plates with stones, VLF recordings of the aurora borealis, field recordings of fire, vehicles, and wind. Not only do these sounds generate distinct experiences of time given their particular sonic properties, but given that they were all recorded at different times in different places, various strands of "when" (did this happen) are overlaid on one another and through playback give off an impression of simultaneity. The third work, entitled "Blue Straggler " utilizes a system of feedback that occurs between a contact microphone, a loudspeaker cone, and a resonant metal instrument such as a bell plate, cymbal,

tam-tam, or almglocken. The resulting sounds are uncontrollable, resulting in the activation of various frequencies which shift drastically with small motions between the microphone and speaker cone. The percussionist must search throughout the performing process for sonic possibility while accepting that any sort of desired development is largely unattainable. Since much of the sound cannot be reproduced through the measuring of distance between the contact microphone and speaker cone, the type of motion or movements, or pressure, the percussionist must accept an unpredictable outcome to a significant degree. In the case of “Blue Straggler,” I situated one contact mic and speaker pair on a cymbal resting upside down and let the microphone, speaker, and cymbal generate material on its own. The magnetism between the contact microphone and speaker cone paired with the vibrations on the cymbal resulted in small motions between the speaker and microphone across the cymbal resulting in small changes in tone from the cymbal over time. This is an example of a musical situation that is self-contained, functioning on its own without the engagement of the percussionist in any way. In addition to that, I performed with another mic/speaker pair on bell plates, additional cymbals, almglocken, and crotales. Here, I moved the mic and speaker over the surfaces of the metal instruments at different rates, resulting in various types of feedback. This initial section fades slowly into various recordings I made of activating almglocken with small metal chains, shaking them inside of the mouth of the almglocken. The metallic timbre from this grows out of the similar timbral profile of the feedback, however, pitch becomes a more prominent feature in the almglocken section, overtaking the timbral focus of the previous section. Following, a collection of harmonicas were utilized in long sustained tones that overlay the almglocken material, further heightening the sense of pitch and tone in the overall texture. Other instruments yet introduced in *WHEN* emerge throughout this particular work including glass pieces, galvanized nipple fittings,

plastic wrap, hand bells, whistles, squeaky chairs, and squeaky doors. This illustrates that, in addition to not having a preconceived template prior to this project, I also did not have a preconceived idea of instrumentation. Musical material was not created with a consideration of whether or not a sound originates from an object that could be considered an established musical object or just an (non-musical) object with residual sonic qualities. In *WHEN*, the ratchet bears no difference in value than the plastic wrap, the galvanized nipple fittings are no less of a musical item than the piano strings or vibraphone tones. These items are stripped of their conventional roles and established identities, only their sonic characteristics are pertinent, and it is here that they influence one another in their coming and going throughout the work. These items and sounds were employed in a largely intuitive way as I created musical material via the objects that I just happened to come across in my own passage through time or that I happened to already have via my past activities. It is in this manner that these performed sounds are united with the sounds heard in the various field recordings, *Time is weather*. In both cases, the sounds transmit the workings of their systems, the field recordings in which wind, rain, thunder, animal movement, trees, etc. are understood as “weather,” and the performed sounds which are understood as audible “time.” In many cases, it can be difficult to tell which sounds originate from which source. In both cases, musical development is slow as events fade slowly from one into the next. However, local textures consist of sounds that are often intricate in quality, undergoing subtle changes within their primary sound world. Take for example the whistling bamboo activated by strong winds at the end of “Albiero.” The overall texture consists of static and ongoing whistling, although when listened to closely, the whistling is constantly but subtly changing given the changing speed and direction of the wind.

WHEN is ultimately a synthesis of the various aspects of time that I have explored in the many pieces I have performed as a percussionist, studied, and collaborated on with other musicians. I do not mean that the musical materials of this composition are derived from musical aspects of other works. Rather, this work is a representation of my temporality, of my *time being*, of which I was only able to arrive at given my extensive and exploratory work in percussion. In devoting myself to these works, they have in return given me a particular kind of time, a particular way in which I move through time, conceive of time, spend time, and make time. There are no connecting motifs, harmonic progressions, or even formal structures that unify *WHEN*'s materials with any other work I have performed. It is in the moment of creation that the temporal experiences garnered from studying percussion—from the earliest notions of rhythm, pulse, and meter to the broadest instances of performed and experiential time seen in the works discussed—were funneled into a performative situation and then expanded back out via the listening process. It is here that musical time and ordinary time break down, that performed time and lived time capitulate their boundary lines, and that time is no longer a resource to be mined in the creation of the musical, but the distinct purpose of the musical situation altogether.

Bibliography

- Adler, Christopher. *Strata*. San Diego, CA: Christopher Adler, 2010.
- Barrett, Richard. *Abglanzbeladen/auseinandergeschrieben*. Bury St. Edmunds, England: UnitedMusic Publishers Ltd, 1992-96.
- Buckley, Daryl, and Richard Barrett. *Richard Barrett*, ELISION, Cikada, DAAD, Mar. 2003, <https://richardbarrettmusic.com/DARKMATTERinterview.html>. Accessed 2018.
- Barrett, Richard. *Urlicht*. Bury St. Edmunds, England: UnitedMusic Publishers Ltd, 2014.
- Barrett, Richard. "Portfolio of Original Compositions: Music of Possibility." *The University of Leeds School of Music, PVAC*, The University of Leeds and Richard John Barrett, 2017.
- Berio, Luciano. *Remembering the Future*. Harvard University Press, 2006.
- Bonus, Alexander. "The Metronomic Performance Practice: A History of Rhythm, Metronomes, and the Mechanization of Musicality." Case Western Reserve University, Case Western Reserve University, 2010.
- Kuhn, Robert Lawrence, and Craig Callendar. "Closer to the Truth." *Closer to Truth*, 2000, <https://www.closetotruth.com/series/what-time#video-1925>. Accessed 2018.
- Clark, Suzannah, et al. *Music in Time: Phenomenology, Perception, Performance*. Harvard University Department of Music, 2016.
- Hasty, Christopher. *Meter as Rhythm*. Oxford University Press, 2020.
- Hicks, Andrew J. *Composing the World: Harmony in the Medieval Platonic Cosmos*. Oxford University Press, 2017.
- Kramer, Jonathan D. *The Time of Music: New Meanings, New Temporalities, New Listening Strategies*. Schirmer, 1988.
- Kulenty, Hanna. *Arci*. Amsterdam: Stichting Donemus Beheer, 2017.
- Levine, Josh. *Les yeux ouverts*. Oberlin, OH: Josh Levine, 2010.
- Levine, Josh. *Shrinking world/expanding*. Cambridge, MA: Josh Levine, 2019.
- Toda, M. "The Boundries of the Notion of Time." *The Study of Time III*, 1978, pp. 370–390., https://doi.org/10.1007/978-1-4612-6287-9_17.

Nijs, Luc & Lesaffre, Micheline & leman, marc. *The musical instrument as a natural extension of the musician*. 2013.

Murphy-Mancini, Justin. *Sic Itur Ad Astra Questions*, 6 May 2019.

Murphy-Mancini, Justin. *Sic Itur Ad Astra*. San Diego: Justin Murphy-Mancini, 2018.

Oliveros, Pauline. *Deep Listening: A Composer's Sound Practice*. IUUniverse, 2005.

Pisaro, Michael. "Time's Underground." *Wandelweiser*, 1997,
https://www.wandelweiser.de/_michael-pisaro/texts.html#Times_Underground.

Rovelli, Carlo, et al. *The Order of Time*. Riverhead Books, 2019.

Russolo, Luigi. *The Art of Noises*. Pendragon Press, 1986.

Schaefer, John, and Marcus Gilmore. "Live in Studio: Marcus Gilmore." *Youtube, New Sounds*, 23 Aug. 2019, <https://www.youtube.com/watch?v=tNVZkfW52F0>. Accessed 2019.

Siddons, James. *Toru Takemitsu a Bio-Bibliography*. Greenwood, 2001.

Tacke, Daniel. *Einsamkeit*. New York: American Composers Alliance, 2009.

Tacke, Daniel. *Vorrücken*. New York: American Composers Alliance, 2019

Von Uexküll, Jakob. "The New Concept of Umwelt: A Link between Science and the Humanities." *Semiotica*, vol. 2001, no. 134, 2001.

Wehrle, Maren (2020). Being a body and having a body. The twofold temporality of embodied intentionality. *Phenomenology and the Cognitive Sciences* 19 (3):499-521.