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Contemporary Musical Alchemy:

Applying Medieval and Renaissance Artifacts to New Musical Compositions

A dissertation submitted in partial satisfaction of the  
requirements for the degree Doctor of Philosophy in Music

by

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March 2022

The supporting document of Matthew D. Owensby is approved.

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December 2021

Contemporary Musical Alchemy:  
Applying Medieval and Renaissance Artifacts to New Musical Compositions

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by

Matthew D. Owensby

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December 2021

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## ABSTRACT

Contemporary Musical Alchemy:  
Applying Medieval and Renaissance Artifacts to New Musical Compositions

by

Matthew D. Owensby

Historically-informed performance seeks to perform works as accurately as possible to the standards contemporary to when the works were originally composed. However, for medieval and early renaissance music, so little information survives that such interpretations are speculation at best. The gap between what is known and what is performed is of compositional interest to me in many of my works as they explore possible fantasy performances of ancient music as well as draw inspiration from the musical materials and instruments of the period to create uniquely contemporary compositions. This dissertation outlines the process by which I studied the surviving manuscripts to alchemize new works and how ancient aesthetics can be transformed for use in new music.

## TABLE OF CONTENTS

1. Introduction to Musical Alchemy.....	1
1.1. The Dissertation as Alchemy .....	11
2. Apprentice of Alchemy.....	14
2.1. Exploring Chainlink Harmonies in <i>Codex Tenebrarum</i> .....	19
2.2. Exploring Quartertonality in <i>Idafect II</i> .....	28
2.3. Exploring Medieval Instrumental Dance Music.....	36
3. The Unfinished Orpheus.....	42
3.1. Futile Goals in <i>Mockery Pursuit</i> .....	49
3.2. Tangled Memories in <i>Fantasy on Souvent Souspire</i> .....	55
3.2. Delusional History in <i>D’Auseil Codex</i> .....	58
4. Solo/Ensemble.....	65
5. Conclusion: Aqua vitae from the Recent Past.....	76
Bibliography.....	84



## List of Figures

1.1	Early notes from the <i>Viola Concerto</i>	2
1.2	<i>Idafect</i> “harpsichord ornament” motif	4
1.3	<i>Idafect</i> Chord Progression from early progression studies	5
1.4	“Whirlwind” scales from <i>Idafect</i>	6
1.5	<i>Idafect</i> Hocketed Chorale	7
1.6	Prima Pars from <i>Malphas</i>	8
1.7	<i>Tre fontane</i> as it appears in the <i>Viola Concerto</i> finale	9
1.8	<i>La Seconde Estampie Royal</i> as it appears in the <i>Viola Concerto</i>	9
1.9	<i>Ghaetta</i> as it appears in the <i>Viola Concerto</i>	10
2.1	Chainlink motif in <i>Hollow Elegies</i>	17
2.2	Chainlink harmony in <i>Ukobach</i>	18
2.3	Rhythm and bass motion in <i>Codex Tenebrarum</i> ’s “Nocturne”	20
2.4	“Nocturne” final measures in three distinct registers	21
2.5	“Digital Fog-Scape’s” pitch motion structure	22
2.6	Prima Pars from “Istampe”	24
2.7	Chainlink scales in the first movement of the <i>Sonata for Horn and Piano</i>	26
2.8	“Accordion” chords in the second movement	27
2.9	“Accordion” chords in Fantasy on <i>Souvent Souspire</i>	27
2.10	Passacaglia chords in the finale of the <i>Sonata for Horn and Piano</i>	28
2.11	Quartertunes in <i>NO ASYLUM</i>	29
2.12	Quarteritone chord progression in the “Liebestraum” from the <i>Viola Concerto</i>	29
2.13	Example of quarteritone counterpoint in the “Fugue” from <i>Idafect II</i>	31
2.14	Quarteritone flute melody from “Vocalise”	32
2.15	Impressionist orchestration of the “Vocalise” melody	33
2.16	Quarteritone clusters in “Cri horrible”	34
2.17	“Shouted” “Mass for Christmas Day” cluster in “Cri horrible	35
2.18	Quarteritone horn line from “Ephemera”	37
2.19	Choral rhythm of “La Quarte Estampie Royal” in <i>Hark of the Merrows</i>	39

2.20	Undulating chords in <i>Hark of the Merrows</i>	40
3.1	Metric modulation in the <i>Viola Concerto</i> finale	46-47
3.2	End of the introduction and start of Puncta 1 in <i>Mockery Pursuit</i>	51
3.3	“Lattice of Staircases” from <i>Mockery Pursuit</i>	52
3.4	Buildup to the first violin subharmonics	53
3.5	Subharmonics in the cello in the final measures	54
3.6	Echoes of the “Souvent Souspire” melody in the piano in <i>Fantasy on Souvent Souspire</i>	56
3.7	All instruments play in independent tempi	57
3.8	Sample of the dance melody manuscript for <i>D’Auseil Codex</i>	60
3.9	Sample of the “stuck” repetitions in movement six	62
3.10	Chart of microtonal scales used for the dances	63
3.11	Final chord progression of “Lamento di Sarnato”	64
4.1	Sample of the gamba writing from <i>An Theyr Thomasson Lais</i>	70
4.2	Introduction of the staccato material by the crumhorns	71
4.3	Climax of renaissance-inspired polyphony	72
4.4	“Organum” material from <i>Two Live Burials</i>	74
5.1	Screenshot from the <i>Beeknighted64</i> Prototype	79
5.2	Example of “mipmapped” melody in Prokofiev’s <i>Kije</i>	81
5.3	Honey bee movement pattern for signaling the distance of resources	83

## **1. Introduction to Musical Alchemy**

Each of the compositions included in the portfolio of scores for consideration for the PhD represents a moment in time. The moment they were conceived and committed to paper or digital record. All of them transforming but not all of them consistent or cohesive. They are not necessarily akin to a stream-of-consciousness, but invariably over the course of their composition did early plans dissolve into new ideas which, in turn, were accosted by spur-of-the-moment modifications. Each piece was born, evolved, and then, at some point, stopped evolving. And every piece, whether consciously or not, in some way recalls the past. Sometimes that past is ancient history, an imagined scene crafted from only a handful of ancient sources. Other times that past is the history of concert music, to which I am indebted and have had a relationship with for many years as a performing violinist and violist. Additionally and inevitably the past explored in my work is the recent past, a reaction, in part, to my own experiences and my relationship to the world around me. And while I have often considered revisiting older compositions, to adjust details, to adapt phrases, to inject new material, and I have done so on occasion, each time I did the results felt strange and alien. I, revisiting my own older works, was a different composer by that point, my goals and experiences so far removed. This is the aim of my alchemical process to composing music: to create works which synthesize disparate materials from the past into new sounds which are distinctly contemporary. Perhaps the most common use of “alchemy” is to refer to the process of transmuting base metals into gold, an ultimately impossible goal. However, the results of such experiments are not in-and-of-themselves worthless. In fact, quite the contrary. And so it is through this ancient process that I hope to find my own “philosopher’s

stone” of new sounds, toiling away at a process whose goal is ever out of reach but whose results have significance of their own. But by necessity not all experiments yield gold.

This was the case for the conclusion to my Viola Concerto, a piece which was started in 2013 but not revisited and completed until May of 2019.<sup>1</sup> The piece was written with a somewhat rigid formal structure in place, each movement had a dedicated affect and variations on a unifying numerical pattern provided the underlying durations of segments down to the measure. The harmonic language had been decided, each movement would incorporate a 13-note non-octave repeating scale and some of the motivic materials from the first movement (Figure 1.1).

Figure 1.1: Early notes from the *Viola Concerto*, the “Abyss” motif, and the three derivative materials: the “Zann” melody, the “Fear Noodles,” and the “Bach Chorale” as well as the 13-note scale and the 7656876 number pattern used in different contexts throughout the piece, and the form diagram for the first movement.

In a way, the *Viola Concerto* haunted me. Until then, I had thought it to be my most successful work and the most expressive form my compositional voice had taken to that

<sup>1</sup> The first two movements of the concerto were performed by violist Javier Chacon and the Chapman Orchestra conducted by Jesse Simons on November 3, 2013 (a third movement went unperformed due to its planned *attacca* into the unwritten fourth movement), after which all composition work on the concerto came to a halt with only one movement left to compose.

point. I had built highly restrictive background constraints and executed upon them, yet also was able to find enough freedom to embrace spontaneous expressive decisions in the surface-level musical materials. When the first movement called for the injection of elongated *habanera* dance rhythms, the process was flexible enough to accommodate. The finale I composed six years later was thinly orchestrated, though perhaps arguably better orchestrated than the suffocating scoring of the previous movements, heavily reliant on the existing material as a means of connecting it to the preexisting composition, and rushed in its execution. It is a ghastly shell of the movement that perhaps could have been, had it been composed in 2013.

The fourth movement may have been a failure in comparison to the rest of the work, but perhaps not in its own right. It too is a moment in my compositional progress. I cannot point to any one reason as to why I failed to complete the piece many years ago. The closest feeling I can muster is that, at the time, I did not think I was ready to compose a large orchestral work involving medieval musical inspirations when I had only just begun to explore the repertoire and performance practices of pre-Baroque music. Yet several years distance from that point in time did little to provide the confidence to finally conclude the work. All of the knowledge and experience I had gained did help me to produce a composition but, by themselves, they did not provide the satisfying feeling of closure.

In 2013, the sound of the fourth movement was an impression. With only a year's experience playing in an ensemble specializing in renaissance and baroque music, I had yet to truly be exposed to the surviving medieval repertoire outside of a handful of recordings from Ensemble Unicorn of estampies and troubadour songs.

Yet I knew, at that time, that the finale of the viola concerto required a uniquely medieval fantasy spirit to pair with the chosen affect of delusional excitement. It was to be an escapist response to the more horrific soundscapes prior where injections of motifs from previous movements threaten to dissolve the fantasy. Without the knowledge gained from years of studying recordings and surviving manuscripts and primary sources, the vision for the medieval sound was itself a blurry and intangible fantasy struggling to take shape.

Perhaps the closest remaining point of reference for what the viola concerto’s finale might have been is found in *Idafect* for Pierrot Ensemble from 2014. The piece was based entirely on the impression of an elaborate baroque harpsichord ornament: a spinning series of bridging notes in an improvisatory passage (Figure 1.2). The harmonic language of the work



Figure 1.2: The “Harpichord Ornament” motif from *Idafect*

is a *chaconne* built on one of a handful of chord progression experiments being used to test some new harmonies I had not used before, though none of them were tangibly used again outside of *Idafect* (Figure 1.3). Dario Castello’s highly imitative *Sonata Decima* was fresh under my fingers which was made evident in the form of *Idafect* taking that of an early baroque sonata built from four short sections of contrasting tempi (slow-fast-slow-fast) with a focus on passing materials equally between all the instruments of the ensemble and, on

## Idafect Chorale Studies

Transposed Score

II. Mysterious

M.D.Owensby

The image shows a musical score for six instruments: Flute, Clarinet in B $\flat$ , Toy Piano, Piano, Violin, and Cello. The score is in 4/4 time and begins with a tempo marking of  $\text{♩} = 50$ . Each instrument part starts with a dynamic marking of *p* (piano). The Flute, Clarinet in B $\flat$ , and Violin parts consist of melodic lines with various intervals and accidentals. The Toy Piano part features block chords, some marked with a double sharp symbol. The Piano part is a complex accompaniment with multiple voices in both hands, including some notes marked in red. The Cello part provides a bass line with sustained notes and some movement.

Figure 1.3: The experimental chorale used for Idafect

occasion, treating the piano and percussion as continuo instruments. The insistence on *non vibrato* throughout may have also been a consequence of the *impression* of early music in order to reinforce the distinctly unromantic character of the composition. While it contains many inspirations from pre-classical music, *Idafect* can hardly be defined as anything other than a contemporary work with its reliance on precise and articulate combinatorial rhythms to create the swirling sound masses in the uptempo sections (Figure 1.4). The hocketed chorale section has more in common with Xenakis than with medieval motets (Figure 1.5). The work uses non-octave-equivalent scales for melodic passages, a technique it shares with the *Viola Concerto*. *Idafect* relegates its ancient inspirations to background processes and

The image shows a musical score excerpt for the "whirlwind" scales section of *Idafect*. The score is arranged in a system with six staves: Flute (Fl.), B♭ Clarinet (B♭ Cl.), Percussion (Perc.), Piano (Pno.), Violin (Vln.), and Viola (Vc.). The music is written in a key signature of one flat (B♭ major or F minor) and a 2/4 time signature. The excerpt begins at measure 78. The Flute and B♭ Clarinet parts play a rapid, ascending scale with slurs. The Piano part features a complex, rhythmic accompaniment with slurs. The Violin and Viola parts also play rapid, ascending scales. Dynamic markings include *mf* (mezzo-forte) and *f* (forte). The Percussion part has a simple, rhythmic pattern.

Figure 1.4: Excerpt from the “whirlwind” scales section of *Idafect*

initial inspirations, while the guiding harmonies, motives, and resulting characters reside in the present. The viola concerto also shares these fundamental directions, and thus *Idafect* is a suitable source for imagining what the concerto’s finale might have been.

However, *Malphas* for solo viola (2015) more accurately reflects the reality of what transpired in the resulting work. *Malphas* marked a distinct turning point in my compositional goals: the piece was less concerned with vague impressions so much as studying and recreating the authentic medieval instrumental dances. It mimicked nearly every element of existing dance texts, from an opening and closing improvisatory segment, to a structure of varying melodic phrases, concluded by extensive repeated first- and



The image shows a musical score for an excerpt from 'Idafect'. The score is arranged in six staves: Flute (Fl.), Bass Clarinet (B♭ Cl.), Percussion (Perc.), Piano (Pno.), Violin (Vln.), and Viola (Vc.). The tempo is marked 'a tempo'. The key signature has one sharp (F#). The score begins at measure 63. The Flute and Bass Clarinet parts start with a forte (f) dynamic and feature a triplet of eighth notes. The Percussion part includes a Low Tom (soft mallet) and a wood stick. The Piano part features a forte (ff) dynamic with a piano (p) dynamic shift and a triplet of eighth notes. The Violin and Viola parts also start with a forte (f) dynamic and feature a forte (ff) dynamic shift and a triplet of eighth notes. The score includes various performance markings such as 'separato' and 'wood stick'.

Figure 1.5: Excerpt from the hocketed chorale in *Idafect*

second-endings.<sup>2</sup> The pitch content is significantly simplified from my earlier compositions, using mostly modal scalar materials with few accidentals placed deliberately to mark formal sections. The violist is encouraged to detune their instrument to relax the string tension and bring the C string up to a D (or equivalent for all detuned strings) bringing the instrument closer in sound to the medieval vielle which is commonly performed with common-tone string tunings such as those suggested by Jerome of Moravia in his *Tractatus de Musica*.<sup>3</sup> While the melodic material is not directly borrowed from any existing medieval dance, the structure and style were heavily influenced by two Italian *istampitta*: *Tre fontane* and

2 McGee, Timothy. *Medieval Instrumental Dances* (Bloomington, Indiana University Press, 1990). pp.8-10 describe the estampie and its forms.  
 3 Pittaway, Ian, 'The mysteries of the medieval fiddle: lifting the veil on the vielle,' *Early Music Muse*, 22 November 2015. <https://earlymusicmuse.com/lifting-the-veil-on-the-vielle/> describes a drone-based tuning system found in Jerome of Moravia's text.

*Isabella*.<sup>4</sup> The initial bounding rhythmic motif of *Tre fontane* is replicated in the first notes of the “Prima Pars” followed thereafter by the exaggerated passage of winding eighths which rests on harmonically significant pitches (Figure 1.6). The temporary change to compound meter in the final “Pars” is found in a number of medieval dances including *Isabella*.

**Spirito** ♩ = c. 120-148  
Prima Pars

7

17

26

36

46

55

Clos

1. Aperto

Figure 1.6: the *prima pars* from *Malphas*

4 McGee, 79-93. Contains transcriptions of the dance melodies.

Thus, the finale for the *Viola Concerto* was much more preoccupied with the factual materials of its historical inspirations than with the spirit of the work that came before. “The Hanged Man’s Estampie” uses the contrasting melodies from *Tre fontane* and *La Seconde Estampie Royal* with hints of *Ghaetta* to craft a distorted image of medieval music through the modern orchestra and the invasive and ever-present *accelerando* permeating the movement (Figures 1.7, 1.8, and 1.9). The instrumental techniques and orchestrations are

**E**  $\text{♩} = \text{♩} = \text{c.}128$

71 *f mezzo di voce*

75

80 *accel.*

85

Figure 1.7: the *Tre fontane* melody as it appears in the solo viola part in the *Viola Concerto*, IV.

**I**

125

130

Figure 1.8: *La Seconde Estampie Royal* as it appears in the solo viola part

Figure 1.9: *Ghaetta* as it appears in the solo viola part

used to associate with ancient instruments: trumpets employ kazoo mutes to mimic crumhorn choirs, the low winds and strings frequently provide the iconic open fifth and open fourth drone, and the soloist gradually detunes the viola over the course of the movement. This is perhaps the movement's greatest flaw: it is so concerned with presenting its historical fiction that it fails to establish itself as a work that *I* composed until its final moments when all movements of the concerto are compressed into a pointilistic race to the finish. The elements that made the other movements unique became relegated to background material, while the reverence for medieval melodies dominated the foreground. It is primarily concerned with planning, research, and evidence while the remainder of the work had built itself from affects and emotions and impulsive decisions. Yet the completion of “The Hanged Man’s Estampie” marks the conclusion of the Viola Concerto and the completed archive of that series of compositional moments.

## 1.1 The Dissertation as Alchemy

This dissertation too is just another compositional moment. It is tasked with outlining in words what my compositions say without language, to be like portrait of a house of mirrors reflecting my own experiences back at me for the reader. It too was born of lofty goals which were cut down by the passage of time and changing circumstances, supplanted by new ideas and inspirations, and finally by the words and images enclosed within. It will be rushed in execution, heavily reliant on preexisting material, and stop evolving when it is no longer permitted to evolve any further. Even though its aim is to elucidate the process by which I composed the works included in the accompanying portfolio, it will inevitably fail to thoroughly do so, as today I am not the composer I was when I composed the works within. Tomorrow I will not be the composer who wrote this dissertation. I have only the sparse written notes and vague memories and the scores themselves from the past, as well as the collected knowledge and analytical skills of the present to assist me in detailing the significant theoretical concepts, forms, historical references, and the amalgamated contemporary voices the compositions themselves attempt to convey.

In his own dissertation, “How to Compose a PhD Thesis in Music Composition,” composer David Picknee quotes David Lewis’s Methuselah thought experiment as justification for the through-line between his incredibly varied compositions:

“...when I answer the question: *What is the thing that connects all my works?* with: *I made them*, this isn’t just a glib and dismissive response, but an acknowledgement that despite my creative output’s stylistic, generic and media disparity, it is implicitly

connected in ways that are no more contingent than the unstable foundations of our ontology of self.”<sup>5</sup>

Picknee goes on to describe his compositional attitude as that of a product designer: “...each of my works attempts to be the answer to a question (has a different design specification). Each of these questions/specifications are different, and thus each of the results are different.”<sup>6</sup> I prefer to think of each of my works as a kind of archival record or like a diary entry, a snapshot of important experiences and emotions and ideas as I alone processed them, akin to a photograph only in that a two-dimensional image is not a physical clone of its subject but can capture useful information *about* its subject that simply viewing the subject directly could not. Sometimes the same subject is photographed from multiple angles or at different points in time or in different contexts, just as elements of my compositions carry from one to another, reinterpreting materials and ideas in new ways.

All of the works composed during the period of my PhD, in some manner, confront the fallibility of memory or the transformation of the old into the new. Frequently it surfaces in the use of ancient melodies and instruments or the imitations of performance practices which themselves are based on minimal surviving evidence not granting a fully accurate or realized portrait. My fascination with the ancient and unknowable is intrinsically tied to its transitory, half-remembered nature. Early instruments are only semi-accurate reproductions of relics from a time that no one will ever experience again and perhaps will never truly know, only recreating vague images from a half-remembered description of a sheared-off corner of a painting. These new images, with all of the artistic license injected into them into

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5 Pocknee, David Antony (2017) How to Compose a PhD Thesis in Music Composition. Doctoral thesis, University of Huddersfield, p21

6 Ibid.

unrecognizability, are a fantasy, like Tolkien's worlds of hobbits and dragons, borrowing similarities from history and warping them to my fancy. My compositions spin lies, weave alternate histories, and attempt to graft new meanings. The building blocks of my imagination are memories of the past and the objects of the present, imperfect as they are, which I mash together to alchemize into notes and sounds.

The following chapters elucidate the process by which I freely experiment with materials from the past and present, but not before first contextualizing the materials themselves as understood in my earlier work prior to beginning the PhD program. These materials were first birthed in earlier pieces, such as the "chainlink" harmonies of *Codex Tenebrarum*, then thoroughly examined for their characteristics and possibilities in relative isolation before being brought into more blended circumstances where they might be used more freely and resourcefully. Finally, the dissertation will display possibilities for how these ideas can be further developed in my future work, including in mediums outside of concert music, namely, in designing and composing music for a videogame.

## 2. Apprentice of Alchemy

In 1932, Howard Phillips Lovecraft, perhaps the premier author of “weird” fiction wrote to collaborator August Derlerth pleading “I wish there could be a single writer with the sheer genius of Poe, the imaginative scope of Blackwood, and the magical prose of Dunsany!”<sup>7</sup> meanwhile lamenting of his own work “I have my Poe stories and my Blackwood stories, but where are my *Lovecraft* stories?” H.P. Lovecraft both drew inspiration from and was haunted by the monumental legacy of his horror writing predecessors, yet he managed to synthesize a highly evocative and personal style that has ensured his works have enjoyed substantial popularity today.

The question of identity in relationship to the figures of the past is one that I have been particularly occupied with in the past few years. I found myself thinking “I have my Messiaen pieces: *Two Ancient Monuments* for flute, clarinet and piano (2013), which uses non-retrogradeable rhythms and a reference to the “statue theme”<sup>8</sup> from Messiaen’s *Turangalîla-Symphonie* in a lighter context, and *Variations* (2015) for alto flute and prepared piano, which contains harmonies and number patterns reminiscent of *Quatour pour la fin du temps*. I have my Xenakis pieces: *Ukobach* for large orchestra (2015) was heavily inspired by the complex, aggressive, and dissonant pitch clouds of works like *Jonchaies*, *Keqrops*, and *Roái*, while sections of *Hollow Elegies* for flute, viola, guitar, and marimba echo the cluster counterpoint of works like *Ergma* and *Tetora*. By the time I was beginning the PhD program, I had my pieces which imitated medieval music, most notably *Malphas* (2015). But where are *my* pieces? Where are my works which crucially relate to my contemporary experience

7 Lovecraft, H.P., Letter from Lovecraft to August Derlith. Accessed 29 November 2021. <https://www.hplovecraft.com/life/interest/authors.aspx>

8 Messiaen, Olivier. Liner notes for *Turangalîla-Symphonie* (Chung, Loriod, Deutsche Grammophon D 173941, CD, 1991).



foremost before being relegated to comparisons to the works of composers of different times and places?” In his first thesis on composing, Helmut Lachenmann outlines a condition of music necessarily reflected upon in the compositional process:

“Every element subjected to to compositional treatment is moulded in its material definition through our tradition, or at least stands in relation to it. Its requisites are: tonality with all its highly complex, polyvalent dialectics of consonance/dissonance, tonal/atonal, familiar/unfamiliar, homely/exotic, to name but a few areas of tension that constitute this aspect of its socio-historically based predisposition; also the traditional forms, tonal theories, as well as accompanying musical practice in all its richness.”<sup>9</sup>

It is this delicate balance of these “polyvalent dialectics,” particularly the balance of the familiar and the unfamiliar that are of key importance in my works, among others. To have my works contain elements drawn from the past without being identified themselves as objects of the past, or substance-less imitations thereof.

While I cannot say that I have yet answered the question, nor can I assume to truly be able answer the question myself, a task I think should be left to critics judging my work independently, I can explain the steps I have taken to attempt to realize that goal in examining my relationship to the great masterpieces that have inspired me to compose in the first place. Perhaps my previous judgment and disregard for my old works which were inspired by preexisting works was too dismissive, and rather than consider the question in its formulation in negative, instead consider how my references to the past have been reformed and have diverged in new directions. To this end I have taken two different approaches: first,

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<sup>9</sup> Lachenmann, Helmut. *Philosophy of Composition: Is There Such a Thing?* 58.

to invent new (to my knowledge or until proven otherwise) compositional techniques and test them against more conventional historical components, i.e. testing a new harmonic device while using traditional form and melodic techniques, and second, to pull from the discarded materials of the past and discover metaphors and connections to my contemporary experience.

To the first of these two approaches I must admit I pursue the invention of new techniques with a bit of trepidation. My hesitation, in part, comes from what Lachenmann described in his third thesis on composing: “composing does not mean ‘letting oneself go,’ but rather ‘letting oneself come.’” He explained further that this referred to the role of instinct and choice in composition as opposed to the relegation of choice to habit or to formula: “it reminds us of the creative impulse as a liberated, ‘contented’ phenomenon, i.e. one that does not suppress contradictions, but rather illuminates them, insofar as it exceeds what is rationally determinable.”<sup>10</sup> My resulting approach to creating systems which govern choices is to ensure that they do not simply make the choices for me, nor bind me to a limited set of options that I am dissatisfied with.

I first attempt to identify trends in my own music, desires to pull an element of a composition in one direction or another or habits of altering expectations in a consistent way, and building the structure of my new system around them. Essentially, this is simply a convoluted process of understanding and engaging with my own compositional habits, but it allows me the freedom of choice to follow the trends I have set up or to diverge consciously rather than as a result of comfort.

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<sup>10</sup> Lachenmann, Helmut. *Philosophy of Composition: Is There Such a Thing?* 56-57.

An early example of this process can be found once again in the Viola Concerto. The compositional process began with the invention of the four unifying motivic materials which serve as the fugal subject, two counter-subjects, and a bridge/episode material which birthed the other three (see Figure 1.1). From these materials there are identifiable similarities in pitch content from which the thirteen-note non-octave-equivalent scale was born and applied to give the first movement harmonic consistency.

In the early stages of developing more recently-used harmonic systems for 12-edo and 24-edo harmonies, I first experimented in relative isolation by implementing more traditional designs to the melodic, rhythmic, and structural designs, which may sometimes include my own invented traditions, in a sort of *ceteris paribus* approach. This testing space is not handled completely authentically, as elements from other preexisting traditions were fed into the works, not unlike the polystylism of Alfred Schnittke, to prevent the injected new material from simply sounding anomalous.

Of my first fully-structured harmonic system, an approach to 12-edo harmonies, I found that I was strongly attracted to the [0,1,5,6] and [0,1,6,7] pitch class sets which appeared in some of my earlier works, notably *Hollow Elegies* (2013) (Figure 2.1) and in the



Figure 2.1: chainlink in the flute motif in *Hollow Elegies*

middle section of *Ukobach* (2015) (Figure 2.2). Notes could be added or removed from the set to achieve a similar effect, such as [0,1,5], [0,1,6], and [0,1,5,6,7] sets, but my attraction could not so easily be defined by pitch classes alone. I arrived at these harmonies as a result

The image shows a musical score for a brass ensemble in the piece *Ukobach*. The score consists of six staves, each representing a different instrument: I/III (Trumpet I/III), II/IV (Trumpet II/IV), Tpt. I/II (Trumpet I/II), Tpt. III (Trumpet III), Tbn. (Trombone), and Tuba. The music is written in a complex, dissonant style, characteristic of chainlink harmony. The first measure shows a series of overlapping intervals, and the second measure shows a similar structure with some notes marked with accents (>). The overall effect is one of dense, layered dissonance.

Figure 2.2: chainlink harmony in the brass in *Ukobach*

of seeking thirdless harmonies, themselves a way of forcibly breaking from tonal tradition, not unlike Witold Lutoslawski, who also frequently uses these and other pitch sets based on non-third and -sixth intervals. Additionally, these harmonies were born from the aim of creating the feel of cluster-chord dissonance within a limited ensemble while also covering a broader interval range, particularly in *Hollow Elegies*, where the only instruments which could sustain pitches for extended periods without additional extended techniques were the viola and flute and to a lesser extent tremolos on marimba or guitar or bowed marimba notes, limiting the number of simultaneous sustained pitches which could contribute to a sense of cluster dissonance.

## 2.1 Exploring Chainlink Harmonies in *Codex Tenebrarum*

The results of studying these previous experiments was a system of connected dissonances that I described in my notes for *Codex Tenebrarum* for solo piano (2015) as interval “chainlinks” (not related to Lutoslawski’s technique of a similar name used in his *Chain* series).<sup>11</sup> Intervals of fourths and fifths are “chained” together by half step intervals, such as the ascending patterns C, G, Ab, Db, and C, F, E, B. From this I was able to create a hierarchical structure to such harmonies: chords which contained more “links” in the “chain” with fewer notes are given priority, with pitch collections such as the aforementioned two being seen as “consonant” and “stable” because they are linked both between neighbor notes linearly and by displacement. For example, in the case of C, F, Gb, Db, links occur between F and Gb as well as between C and Db. This is as opposed to chords such as C, F, E, A ascending, which, while containing two fourths “chained” by a half-step in the middle, does not connect the outer notes. Fifths and fourths present in the chains constituted the closest similarity to major and minor, respectively, which is consistent with historical temperaments which prioritized the fifth and frequently resulted in non-perfect fourths, another compositional element to the process of later works. From there, the uses of incidental intervals, such as the third from C to E in the pitch collection C, F, E, B ascending or the tritone between C and F# in C, F, F#, B ascending, for examples, are typically governed more by the context than by any hierarchy. The frequent use of fourth and fifth relationships naturally and intentionally draws comparisons to tonic-dominant and -subdominant relationships of functional tonality both for the sense of harmonic progression and for

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11 Rae, John Charles Bodman. *Pitch Organisation in the Music of Witold Lutoslawski Since 1979*. PhD diss., University of Leeds, 1992. p.249 onward gives more context for Lutoslawski’s material chaining technique.

signifying structural regions, as in early tonal works which relied on secondary themes/phrases/sections rooted in the dominant as a way of denoting their separation from the previous material.

*Codex Tenebrarum* explores the potential of this harmonic system through the filter of history in the form of miniature nocturnes, many of which make reference to specific historical works. The first movement attempts to channel parts of Edvard Grieg's *Notturmo Op.54 No.4* and the third of John Harbison's *Gatsby Etudes* for solo piano. The gentle rocking of the otherwise 9/8 meter is interrupted each bar by the additional eighth note to give the feeling of *rubato appassionato* so common in the performance of Grieg's work (and perhaps a bit by the tongue-and-cheek joke about pianists' playing downbeats late as a result), while also pulling the chromatic melodic motion from his bass line (albeit reversing it from descending to ascending) and applying it to the harmonic progression (Figure 2.3).

M.D.Owensby

I. Nocturne

Adagio ♩ = 38-46

The musical score for "I. Nocturne" is presented in two systems. The first system begins with a piano (*p*) dynamic. The right hand part consists of a series of chords, while the left hand features a chromatic descending bassline. The second system starts with a mezzo-piano (*mp*) dynamic. The right hand has a melodic line with a triplet of eighth notes, and the left hand continues the chromatic descending bassline. The score is marked "Adagio" with a tempo of 38-46 beats per minute.

Figure 2.3: rolling chords and chromatic descending bassline in "Nocturne" from *Codex Tenebrarum*

The ascending melodic line struggles against an ever-densifying accompaniment dragging it lower in register, until finally breaking free after the aggressive clusters (still built on the chain principle). This finale with the three lines broken into extreme registers echoes the rhythmically- counterpointed texture in the finale of “The Green Light” for a similar cadence but with different intent (Figure 2.4).



Figure 2.4: ending passage of “Nocturne split between three registers

The second movement, “Homunculus,” captures the intent of creating a tonal structure underneath the harmonies, albeit in a simplified and visually straightforward way through silently held chords outlining a diatonic scale which echoes after the aggressive, pointilistic ideas are cut off by the pedal, forming the alchemical homunculus of the scale beneath, inspired by the brief fragment works of György Kurtág such as *Signs, Games, and Messages*.

“Digital Fog-Scape,” however, references a much older source, as the movement borrows its structure from Chopin’s e minor *Prelude* with the melody absent and the whole piece digitally slowed down, dropping the pitch in the process. Chopin’s gradually sinking

and transforming harmonies through the heavy use of common-tone chord pairings are replicated in the slow adjustment of chains (Figure 2.5). It follows roughly the same dynamic

III - [Digital] Fog-Scape

	A				B				C															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Binary:	—	6	0	0	6	6	6	0	6	0	6	6	0	6	6	0	6	0	6	6	0	0	6	6
multis < 10	6	6	6	6	6	6	7	7	6	6	6	5	5	5	10	10	9	8	9	8	8	8	8	8
	0	0	0	0	1	1	1	1	2	2	2	2	2	4	4	4	4	5	5	5	5	5	7	7
	6	6	4	4	4	2	2	6	6	6	6	6	7	7	7	9	9	9	1	1	1	1	1	0
multis > 9	0	11	11	9	9	9	9	0	0	0	0	2	2	2	2	3	3	3	5	5	5	5	3	3
Digital Root	4	9	1	2	6	7	2	6	2	7	5	4	9	8	5	9	5	1	8	7	3	1	6	8

① Same voice cannot move twice in a row  
 ② If numbers are equal, odd = (-), even = (+)  
 ③ If same voice must move twice, reset cycle to 0, 6, 1, 7 where same voice multiplies

odd/even: 0 1 1 0 0 1 || 0 0 0 1 1 0 , 0 || 1 1 1 1 0 1 1 0 0  
 11 even, 13 odd

0 < c < 1: 0 1 0 0 1 1 || 0 1 0 1 0 0 1 1 || 0 1 0 0 1 1 0 0 1 1 melody rhythm

[B] melody: 1, 7, 0, 6, 6, 2, 7, 9 on odds in top voice

### III. Digital Fog-Scape

Lento  $\text{♩} = 52$

The musical score is written for piano and bass. The piano part features a series of chords in the right hand and a corresponding bass line in the left hand. The tempo is marked 'Lento' with a quarter note equal to 52 beats per minute. The score is divided into two systems. The first system consists of two measures, each in 5/4 time, with dynamic markings of *ppp*, *p*, and *ppp*. The second system consists of three measures, each in 12/4 time, with dynamic markings of *p* and *ppp*. A 'Ped. sempre' instruction is present in the first measure of the first system.

Figure 2.5: pitch transformation chart for the four voices in “Digital Fog-Scape” from *Codex Tenebrarum* and example of their usage in the movement



arc, growing in intensity by finally exposing a brief melodic fragment at its midpoint, before returning to the slow rolling chords. The harmonic structure is implemented in the most gradual way, with each voice moving one at a time, partially disguised by the indistinct boom of the lowest register, slowly shifting chords almost imperceptibly. When the chains can no longer proceed without repeating a previous pitch set, the process is reset through the introduction of the melodic sequence occurring in mm. 7-13 which moves voices to new starting positions to continue the lethargic rolling of the fog-sounds.

The center movement, “Istampe,” draws upon the most ancient source for the work, the medieval estampie jumping dance. The particular style of stately estampie in 3/4 meter recalls specifically the french royal estampies of the *Chansonnier du Roi*, one of the few surviving manuscripts of notated medieval dances.<sup>12</sup> These dances were typically accompanied by droning instruments such as bagpipes, hurdy-gurdy, or *ducaïne*, instruments that might sustain open fourths and fifths above or below the melody.<sup>13</sup> Thus this movement eschews the denser four- to six-part chain harmonies of the earlier movements and strips down to bare fifths, sustained relatively consistently, although rhythmically, underneath the dance melody, which is littered with the chain-intersection notes, chiefly F and C against the B and E in the left hand accompaniment (Figure 2.6). This movement is also the most distinct departure in melodic motion, remaining nearly entirely diatonic to a vaguely locrian focused scale with minimal accidentals except for the momentary departures characteristic of the harmonic development of medieval dances. Formally, this movement also adheres firmly to the structure of the estampie, similar to *Malphas*, except with significantly shorter *puncta*

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12 McGee, Timothy. *Medieval Instrumental Dances* (Bloomington, Indiana University Press, 1990). pp.56-70 provide transcriptions of the dances into modern notation.

13 McGee, 36-37.

## IV. Istampe

The image shows a musical score for a piece titled "IV. Istampe". The score is divided into two systems. The first system begins with the instruction "Senza misura" (without measure) and shows a single melodic line in the treble clef with a 3/2 time signature. This is followed by a double bar line and the section "Puncta I", which starts with a 3/4 time signature and a tempo marking of "Austere" with a quarter note equal to 68 (♩. = 68). The dynamics are marked "mf secco sempre". The second system starts at measure 6 and is divided into two sections: "Apertum" and "Clausum". The "Apertum" section continues the melodic line in the treble clef, while the "Clausum" section features a more complex texture with both treble and bass clefs.

Figure 2.6: the *Puncta I* from the “Istampe” in *Codex Tenebrarum*

and first and second endings, characteristic of the royal estampies. While some of the named estampies contain meter changes, the momentary meter change at mm.76-80 is a feature not characteristic of the royal estampies, marking the mixing of the two styles as implied by the intentional mixed spelling of the movement’s title as well as the mixing of pairs of fifths/fourths of the chainlink harmonies.<sup>14</sup>

“Repression/Obsession” is a hyper-romantic and expressionist Webernian miniature, reminiscent of the viola solo in the second of his *Funf Sätze, Op.5*, opening with the romantic leaping sixth of Wagner’s *Tristan und Isolde*. Its two brief motives consist of the longing, leaping sigh in various transformations and the nervous repeated pitch characters, first as a

<sup>14</sup> McGee, 88-93. Transcription of “Belicha.” which contains multiple meter changes in later *puncta*

deluded march, then a coming surge of violence, finished by an erratic and needlessly complex rhythm.

Like the “Istampe,” “Jigsaw” takes on a dancing quality, this time attempting to imitate the wild virtuosity of winding improvised jazz piano melodies over an angular rhythmic bass attempting to propel an aggressive bebop beat in 12 bar phrases. The melody chains together fifths and fourths with less rigidity and less regard for interconnected chains. The middle phrase slams the breaks with a heavy and dissonant blues melody over pounding alternations of low and high bass chords, recalling the cluster-based origins of the harmonic concept, but both times the melody falls away before it is silenced by a brief return of the chain melody in the coda. Two loud, brassy trilled chords bookend the movement like ensemble stings from a big band.

The piece concludes as quietly as it began with “Timidity,” a delicate homage to the slow, pulsing system of suspensions and releases in the accompaniment to the second movement of Erich Wolfgang Korngold’s *Violin Concerto* through the filter of the plucked metal pins on a music box. While seemingly straightforward, this movement perhaps best reflects the potential in the chain system through melody, harmony, and counterpoint, as the melody gradually transforms from hocketed chords to a two-part melodic line, then to melody with light accompaniment, to counterpoint reminiscent of the “Nocturne’s” undulations, and finally returning to the opening material after a modulation enacted by rising chains, now with the chord inverted and the cycle started again with a slightly altered character. While the changes in texture remain in place from the first half, the sequence of

harmonies the chains guide the melody through are vastly different, culminating in a brief coda in the extreme high register.

*Codex Tenebrarum* was designed to test the potential of the chainlink harmonic formula and the piece certainly generated new revelations about how to effectively use the resulting pitch sets. I have continued using this harmonic system sometimes, but rarely, for entire works but more often for segments of a larger work or sometimes simply as individual color-chords. The *Sonata for Horn and Piano* utilizes this technique melodically, specifically to create scales, in the prologue and first movement (Figure 2.7), while creating expanding and contracting accordion-like chords in the second (Figure 2.8). The accordion-chords also make an appearance in the piano entrances in *Fantasy on Souvent Soupire* (2019), transformed to serve the purpose of elucidating the parallel fifths of medieval chant (Figure 2.9). And in the third movement of the *Sonata*, the chains form an aggregate that functions as

I. Revolt

Agitato ♩ = c.128

The image shows a musical score for the first movement of the Sonata for Horn and Piano, titled "I. Revolt". The score is in 4/4 time and marked "Agitato" with a tempo of approximately 128 beats per minute. It features a Horn (Hn.) part and a Piano (Pno.) part. The Horn part is mostly silent, with a few notes in the first measure. The Piano part is the focus, showing a complex melodic line with triplets and a dynamic marking of "f articolato, urgente". The score is divided into two systems, with the first system starting at measure 1 and the second system starting at measure 6. The key signature has one flat (B-flat) and the time signature is 4/4.

Figure 2.7: Chainlink harmonies forming scales in the first movement of the *Sonata for Horn and Piano*

L'istesso tempo  $\text{♩} = 54$

Hn.  $8^{\text{va}}$

Pno.  $pp$  *lontano*  $mf$

Hn.  $15$  *senza sord.*  $D.^\circ$   $mf$   $p$   $mf$   $p$   $mf$   $p$   $mp$   $f$   $pp$

Pno.  $15$   $8^{\text{va}}$  *sub. p*  $pp$

Figure 2.8: Chainlink harmonies presented as “accordion chords” in the second movement

10 *as necessary*  $\text{♩} = 60$  **Fantasy on Souvent Soupire**

Vln.  $mf$  *if necessary*  $ff$  *non vib.*  $ff$   $f$   $sf$  *vibrato*

B♭ Cl.  $mf$  *if necessary*  $ff$   $ff$   $f$   $sf$

Vc.  $ff$  *non vib.*  $ff$  *non vib.*  $ff$   $f$   $sf$  *vibrato*

Pno.  $8^{\text{va}}$   $mf$   $ff$  *(loco)*

Figure 2.9: “Accordion chords” in *Fantasy on Souvent Soupire*

the bass melody of a *passacaglia*, gradually corrupted by the materials from the previous movements (Figure 2.10). But in no single composition is the chainlink concept pushed further than in the lattice structure created for the first movement of *Idaffect II* for wind quintet (2015).

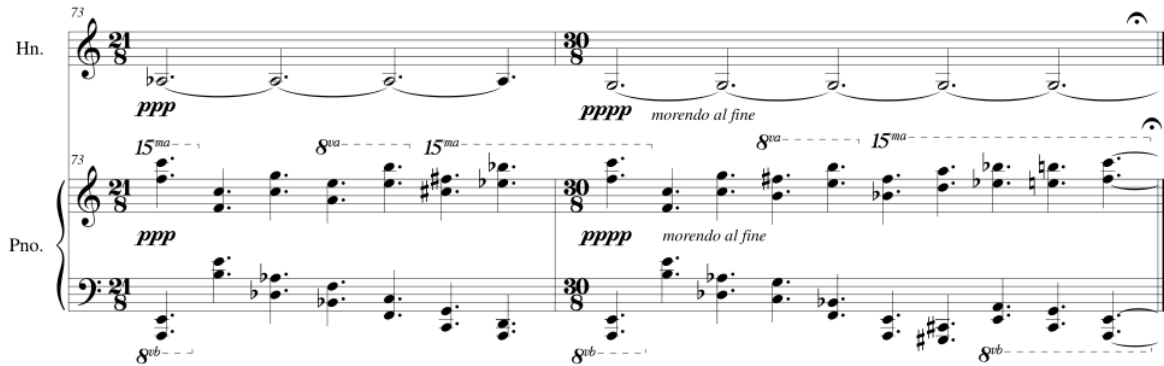


Figure 2.10: Chainlink chords form the passacaglia chord pattern in the finale of the *Sonata for Horn and Piano*

## 2.2 Exploring Quartertonality in *Idaffect II*

*Idaffect II* was also designed to test the potential of a new compositional technique I was trying to work into my musical vocabulary at the time: equal-tempered quartertones (24-edo). I had long felt the need to expand my harmonic potential beyond 12-tone equal temperament due to my time working in early music ensembles with just-intonation and I had experimented with quartertones previously in the second movement, “Liebestraum,” of my *Viola Concerto* as well as in *Hollow Elegies* for flute, viola, guitar (tuned in sixth-tones), and marimba, and also in the final section of my solo cello piece, *NO ASYLUM* (2013) (Figure 2.11). In the “Liebestraum,” the goal of the quartertones was explicitly expressive, creating lush and alien chords under which the soloist could sing in a distorted form of hyper-romanticism. Yet there was little structure to the use of quartertones. Their usage was almost

Figure 2.11: quartertones used as passing tones in *NO ASYLUM*

exclusively as passing tones or in the opening and closing sections as transition chords built as a result of their interval structure rather than from expressive need. The opening string harmonies begin on a unison, gradually expanding outward from clusters to tertian and quartal chords with quartertone variants in-between (Figure 2.12). *Idafect II* was then

Figure 2.12: quartertone harmonies from the opening of “II. Liebestraum” from the *Viola Concerto*

designed to select harmonies that might help develop a future quartertone language by sampling their use in five different expressive historical styles.

The first two movements form a prelude and fugue, however, they are somewhat distantly related in material to the point that I decided to separate them. The prelude is as close as any of my works have come to total serialism: the dynamics, number of notes, entrances and changes of each instrument, are all governed by a number pattern derived from the opening chain chord. From that point forward, the winds sputter repeated sixteenths like the melodically-stagnant rhythmic accompaniment of baroque concertos, but with the melody reduced to single interjections. Every pitch change, both vertical and horizontal, is governed by the rules of the chaining, forming a hyper-mechanized lattice of pitch material. At the structural points where the lattice can no longer function, either through too many unisons or by having no fourths, fifths, or seconds to leap to in order to maintain vertical chains, quartertones are introduced only as intermediate tones to prolong this breakdown of order. The resultant goal of the prelude was to retain enough inertia throughout the perpetual *klangfarbenmelodie* to maintain interest while creating a sense of progression and form through the careful placement of stabbing ensemble interjections and reuse of instrumentation in recapitulation sections during the brief duration. The use of quartertones is sparing to gradually acclimate the listener to their usage in upcoming movements.

The fugue subsequently strips away the complexities of the chain system to open quartal and quintal chords as the subject tests the ability of quartertones to act as intermediate tones in a more traditional melodic setting. Structurally, the fugue process retains its baroque origins, complete with a subject and answer, bridge, episodes consisting of more of the open



harmonies, middle entries that gradually elide and compress until the final statement where the upper three parts vocalize the subject in unison over the open chords of the horn and bassoon, followed by a tail entry of the bassoon to finish the movement. The quartertone usage in this movement is primarily contrapuntal, forming systems of suspensions and anticipations and exploring resulting harmonies with rhythmically simple accompaniment (Figure 2.13). The motion of the counterpoint is nearly “micro-chromatic,” relying primarily on downward stepwise motion rather than leaps, giving much of the movement a slurred feeling of glissando until the open quartal/quintal chords mark significant formal locations.

The listener is yet again warped to a different time and place with the “Vocalise,” a movement intended to experiment with the use of more direct quartertone harmonies to create warm chords and to gradually incorporate them into the melody without losing the brightness of mood. The movement is once again modeled after a combination of styles from

41

The musical score is for five instruments: Piccolo (Picc.), Oboe (Ob.), Bass Clarinet (B♭ Cl.), Horn (Hn.), and Bassoon (Bsn.). The time signature is 3/4. The Piccolo part starts with a *pp* dynamic and features a melodic line with quartertones and slurs. The Oboe part starts with a *p* dynamic and has a similar melodic line. The Bass Clarinet part is mostly silent, with a *pp* dynamic marking in the fourth measure. The Horn part starts with a *p* dynamic and has a melodic line with quartertones and slurs. The Bassoon part is mostly silent, with a *p* dynamic marking in the fourth measure. The score shows a complex interplay of quartertones and slurs across the instruments.

Figure 2.13: Example of quartertone counterpoint from the “Fugue” in *Idafect II*

the past: the very slow moving melodic flute line (Figure 2.14) recalls the eternally gentle tones of the cello solo from "Louange à l'Éternité de Jésus" and violin solo from "Louange à l'Immortalité de Jésus" from Olivier Messiaen's *Quatour pour la fin du temps* and the later

III. Vocalise

Flute **Vast, yet tender** ♩ = c. 52  
 (solo) (tutti)  
*p sempre, molto legato e dolce*

3 (solo) (tutti)  
 10/8 7/4 6/4 *poco cresc.*

Figure 2.14: The flute solo from the beginning of the “Vocalise”

development with the trills in the oboe and clarinet with horn *glissandi* (Figure 2.15) treat the melody to the colorful orchestrations of Debussy and Ravel. The harmonies in this movement attempt to modify Messiaen's own tendencies to use tritones not as dissonances by using the quartertone-lowered tritone, the natural 11<sup>th</sup> partial, largely as a consonance.

“Cri horrible” is a drastic departure from the long *legato* lines of the previous two movements. In the brutish and loud movement, quartertones are used more texturally to transform swirling cluster chords after violent outbursts by the ensemble (Figure 2.16). The aggressive and rhythmic shouting of the group, *sans* flute, again uses chain harmonies, now with a meterless rhythmic pattern not unlike the "Danse de la fureur, pour les sept trompettes" again from Messiaen's *Quatour* (Figure 2.17). However, the melodic content is instead derived from plainsong, specifically the introit from the mass for Christmas Day,

Idafect II

20 *poco rit.* **21** **Broadly** ♩ = 72

Fl. *mp*

Ob. *p*

B♭ Cl. *mp p*

Hn. *mp pp* quasi arpa \*

Bsn. *mp*

22

\* half depress all keys and lightly gliss. through the range. Pitches are approximate.

Figure 2.15: Impressionist orchestration of the “Vocalise” theme

31 Distant, almost without pulse ♩ = c. 38

Fl. *pp*

Ob. *pp*

B♭ Cl. *pp*

Hn. *pp*

Bsn. *pp*

36 *poco accel.*

Fl. *p poco a poco cresc.* *mp* *mf*

Ob. *p poco a poco cresc.* *mf*

B♭ Cl. *p poco a poco cresc.* *mp* *mf*

Hn. *poco a poco cresc.* *mp* *mf*

Bsn. *p* *p poco a poco cresc.* *mp* *mf*

Figure 2.16: gradually moving clusters from “Cri horrible”

23 Enraged ♩ = 196-240 (♩ = 98-120)

21

Fl.

Ob.

B♭ Cl.

Hn.

Bsn.

*ff feroce*

*ff feroce*

*ff feroce*

*ff feroce*

25

Fl.

Ob.

B♭ Cl.

Hn.

Bsn.

\* X noteheads signify foot stomps

Figure 2.17: “shouted” clusters roughly translated from the “Mass for Christmas Day” in a rhythm recalling Messiaen

though the choice to use the Christmas mass specifically was merely out of the convenience of its contour rather than any specific statement about the day. The static quartertone chords that follow gradually morph and undulate and over the course of the movement, incorporate more of the percussive cries from the opening. The quartertone inflection of the piccolo here is intended to mimic the shrill sound of the Noh stage whistle used in Japanese puppet theater.

The final movement, “Ephemera,” is again a Webernian miniature, this time briefly recapitulating the various uses of the quartertones and chain harmonies from the previous movements before drifting away. The focus of the movement is on subtlety, articulation, and the rhythmic interaction of voices to aid the expressionist gestures. Because no dynamic marking is higher than *piano*, the quartertones, particularly in the meandering horn line, contribute to a murky texture that is less concerned with pitch identity than with gesture (Figure 2.18).

### **2.3 Exploring Medieval Instrumental Dance Music**

While these various stylistic meetings serve to showcase how new materials interact with older aesthetics within my works, I have not indulged in transforming any other ancient musical materials into fresh, contemporary contexts to the extent that I have excavated pre-Baroque era music, particularly medieval instrumental music.

My time performing in the early music ensemble at Chapman University during my undergraduate studies as well as performing in the conservatory Baroque ensemble during my master’s program at the San Francisco Conservatory of Music had a profound effect on

## V. Ephemera

Tender, nearly inaudible ♩ = 38

Flute  
*pppp* *ppp* *pppp* *pp* *mfp*

Oboe  
*pp* *molto sostenuto, un poco vibrato* 3

Clarinet in B $\flat$   
*pppp* *ppp* *pppp* *pp* *mfp* *ppp*

Horn in F  
*con sord.* *ppp* *legatissimo* *pp* *morendo* *pppp*  
*senza sord.*

Bassoon  
*pppp* *ppp* *pp* *mfp*

4

Fl.  
*pppp* *gliss.* *pp* *pressando* *ppp* *pp* *p* *ppp* *rit.*

Ob.  
*ppp* *ppp* *ppp* *pp* *ppp*

B $\flat$  Cl.  
*pp* *ppp* *pp*

Hn.  
*con sord.* *ppp* *ppp*

Bsn.  
*ppp* *pp* *ppp* *pp* *p* *ppp*

Figure 2.18: Examples of quartertones used as noise clouds in “Ephemera”

my compositional and aesthetic development. Arguably my interest in early music stems even earlier in my life to my experiences playing fantasy videogames with medieval-inspired soundtracks like the *Legend of Zelda* series, *The Bard's Tale*, and the *Final Fantasy* games, and of course watching the western fantasy epic films of *The Lord of the Rings* trilogy, scored with the folk-flavored music of Howard Shore. And, in part, what I find so uniquely intriguing about medieval music in particular is how few scores and primary source documents survive from the period. Interpreting the melodies of the only 46<sup>15</sup> surviving instrumental dances is an escapist fantasy in-and-of-itself that has inspired me to imagine unconventional interpretations and arrangements.

Early in my study of the dances, I composed works more strictly connected to established period performance practice and faithful to the text of the dances. *Hark of the Merrows* for brass choir and percussion reinterprets *La quarte estampie royal*<sup>16</sup> as a fanfare of leaping voices each with a heterophonic approach to the rhythm, generating a choral echo effect of a dozen individual voices leaping out of the water and sounding their melody like unsynchronized dance swimmers, a heraldry of the sea (Figure 2.19). This is paired with light overtone-based microtonality creating the wobbling waves of chords (Figure 2.20). *Malphas* takes a more direct approach to the study of the material, where the piece mirrors the style of the original dances without duplicating material from them, while also arranging the dance by creating a slow prelude and postlude suggested by historical evidence of the practice and by accepted contemporary performance practices of medieval ensembles.

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15 McGee, 18 breaks down the number and regions of origin of each surviving dance type.

16 McGee, 62-63 provides a transcription of the dance into modern notation.





\**La Quarte Estampie Royal*

The musical score consists of the following parts:

- B♭ Tpt. 1:** *f* pointed, articulated
- B♭ Tpt. 2:** *f* pointed, articulated
- B♭ Tpt. 3:** *f* pointed, articulated
- Hn. 1:** *f* pointed, articulated
- Hn. 2:** *f* pointed, articulated
- Hn. 3:** *f* pointed, articulated
- Hn. 4:** (Empty staff)
- Tbn. 1:** (Empty staff)
- Tbn. 2:** (Empty staff)
- Tbn. 3:** (Empty staff)
- Tuba:** *mf* pointed, articulated; *inegal*
- Vbr./F.C.:** (Empty staff)
- B.D./L.T.:** (Empty staff)

\*The resulting sound of this section should be a choral unison with the Tuba part.

Figure 2.19: Choral rhythms on “La Quarte Estampie Royal” in *Hark of the Merrows*

The image shows a musical score for a brass and percussion ensemble. The score is divided into two systems. The first system includes parts for B♭ Trumpets 1, 2, and 3; Horns 1, 2, 3, and 4; Trombones 1, 2, and 3; and Tuba. The second system includes parts for Vibraphone and Bass Drum. The score begins at measure 14. The B♭ Trumpet 1 part features a melodic line with a triplet of eighth notes (E7, F#, G#) and a subsequent triplet of eighth notes (E10, F#, G#). The dynamic marking is *poco cresc.* followed by *f*. The Horns and Trombones play sustained chords with various articulations, including triplets and quintuplets. The Tuba part starts with a *mp* dynamic. The Vibraphone part begins at measure 14 with a *p* dynamic. The Bass Drum part begins at measure 14 with a *mf* dynamic.

Figure 2.20: Pulsing overtone chords from *Hark of the Merrows*

The *D'Auseil Codex* for two pianos tuned in quartertones is a set of imaginary dances initially described in program notes as having been transcribed from a long-lost and bizarre manuscript that washed up in a briefcase in Boston (a reference to the H.P. Lovecraft short

story “The Music of Erich Zann” which occurs at a hotel on the fictional *Rue d’Auseil*). These dances employ a gradually expanding set of quartertone pitches to test a variety of quartertone scales, from the initial hexatonic scale in the first dance through to the final dance using all 24 quartertone pitches. By the fourth dance, the pitch collection has expanded to the 13-note diatonicized chromaticism scale used by Ivan Wyschnegradsky, a scale which divides the octave around the lowered tritone to create a balanced scale with many of the same functional properties as the major scale.<sup>17</sup>

I have included less notable references to medieval music in a number of other works, such as the aforementioned “Istampe” in *Codex Tenebrarum*, as well as the “Gregoriana” chant melodies from the *Sonata for Horn and Piano*, a “Pavane” and “Bassadanca” in my incidental music for *A Midsummer Night’s Dream*, and a brief quotation from “Lamento di Tristano”<sup>18</sup> in my bassoon concerto, *Leanan Sídhé*. However, at the beginning of the PhD program, I began to reassess my relationship with medieval music. My goals were once again beginning to change: I became less concerned with studying, understanding, and orchestrating the contents of the existing dances and more interested in how the aesthetics of the melodies and their historical context could lead to new compositional methods resulting in more original works.

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17 Wyschnegradsky, Ivan. *Manual of Quarter-Tone Harmony* (Brooklyn, Underwolf Editions, 2017) p.18 gives a diagram of the 13-note diatonicized chromaticism scale as well as a background and case for its implementation.

18 McGee, 115.

### 3. The Unfinished Orpheus

In performing standard classical repertoire, I have come to associate a kind of consensus about how a work “should” be performed. In other words, I have often found that when someone has heard a piece performed one way, they have a tendency to resist wanting hearing it performed another way. All the while there exists a near religious devotion to the collectively-developed perception of the composer’s intent. Indeed, probably a great many crimes against interpretation were committed in the name of the good word of the manuscript. But the emphasis should be on the *perception* of composer’s intent as often a popular consensus seems to override the page or historical evidence to the contrary. After all, one simply does not conduct the first movement of Beethoven’s 5<sup>th</sup> Symphony at the composer-designated tempo of 108.<sup>19</sup> Mozart’s piano works are very rarely performed on a pianoforte and the original instrumentation of Ravel’s *Tzigane* is nearly impossible to accommodate due to the rarity of the *luthéal* piano attachment. Historically-*informed* performance is relegated to its own subcategory of performance practice.

While studying violin, I was taught to play primarily with a wide, vigorous, and consistent *vibrato* generated from pulling the left hand back using the lower arm in combination with the wrist, while being assured that this was the accepted way to play the repertoire which consisted primarily of late romantic concertos. I was assured that this was the “correct” way to play based on a long lineage of violinists using this vibrato method, from Joshau Bell, Itzhak Perlman, Mischa Elman, Jascha Heifetz, among others. Yet surviving recordings from as early as 1903 of Joseph Joachim seem to suggest an entirely

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19 Saving, Martin. ‘How Fast Shall We Play,’ Elias String Quartet, 3 March 2011. <http://thebeethovenproject.com/how-fast-shall-we-play/> discusses the myths surrounding Beethoven’s designated tempo markings and the performance tendency to ignore them.

different approach to *vibrato* and tone, as his recording of Brahms's first *Hungarian Dance* shows off a much more sparse use of *vibrato* which is much faster.<sup>20</sup> In fact, his performance sounds almost alien to many contemporary recordings of violinists and not for the quality of the source recording.

From countless historical sources, baroque music necessarily carries with it an expectation of a degree of improvisation and adaptation to generate ornaments expected of the period. Yet one can find countless recordings of Bach's *Cello Suites* without so much as an unwritten cadential trill. Even so many historically-informed performances of Bach's *Cello Suites* and *Sonatas and Partitas* for solo violin are done with few to no additional ornaments. Nearly every aspect of interpretation seems rife with debate over compositional and stylistic intent against modern sensibilities, be it in the subject of ornamentation, *vibrato*, articulation, dynamics, or even whether or not to adhere to the repeat signs marked in the music.<sup>21</sup> Tim Janof describes the divide between modern and historically-informed performance: "I think it's safe to say that Performers tend to place a higher emphasis upon inspiration, connecting with their own emotions and the audience, and the poetry of the music, whereas Scholars tend to emphasize historical and theoretical accuracy."<sup>22</sup> It is interesting then that historical-performance specialist Pieter Wispelwey's 2012 recording of the Bach Cello Suites is filled with ornamentation and near-constant small fluctuations in tempo which could be argued draw out the expressive "poetry" of the music by assisting the ear in parsing the many complex elements of the compositions.<sup>23</sup> Meanwhile, legendary

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20 <https://josephjoachim.com/2013/12/11/joachim-brahms-hungarian-dance-1/> Accessed 29 November 2021.

21 Janof, Tim. 'Interpretational Angst and the Bach Cello Suites,' Accessed 29 November 2021.

<https://www.cello.org/Newsletter/Articles/angst.htm>

22 Ibid.

23 Accessed 29 December 2021. <https://www.allmusic.com/album/bach-6-suites-for-cello-solo-2012-recording-mw0002428644?1638430115520>

cellist Mstislav Rostropovitch's 2004 recording of the same suites is nearly metronomic and almost entirely devoid of ornamentation, instead relying chiefly on dynamic contrast and sound quality to achieve expression.<sup>24</sup> As Janof goes on to say, "Both approaches to music are important, and could not, and should not, exist without the other."<sup>25</sup>

But my aim is not to study, survey, or even address a multitude of unsubstantiated claims of some broad consensus conspiracy against freedom of interpretation. It is merely to introduce the situational perception that I had (even if it can be proven to have been a delusion entirely) that led me to become interested in music whose historical evidence is so limited that there can be no perceived "definitive" interpretation at all. This notion was also highly stimulated by the overwhelming accessibility of recordings of standard repertoire, often dozens at a time per piece from all manner of professionals to amateurs, score-following videos, highly-edited video performances, and albums from decades past. Of hundreds of recordings of Bach's solo violin sonatas from nearly every major performing violinist of the past fifty years, what could my potential recordings offer but diminishing variation?

Thus discovering Timothy McGee's transcriptions of the 46 surviving medieval instrumental dances and the handful of related works contained in his book *Medieval Instrumental Dances* was a powerful moment of inspiration. So little primary source evidence exists which details the practice of music outside the medieval church that to perform the dances from the surviving manuscripts necessitates a degree of inventiveness and adaptation.<sup>26</sup> The dances survive as melodies alone without specified instrumentation or

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24 Accessed 29 November 2021. <https://www.discogs.com/release/1028872-Bach-Rostropovich-Cello-Suites>

25 Janof.

26 McGee, 1-7.

function. Grocheio's treatise *Ars Musicae* may be the only surviving theoretical text on medieval instrumental dance music and for all other music not mentioned within, McGee claims "there is little solid material on which to build a case."<sup>27</sup> 46 dances is hardly a sufficient sample size upon which to draw conclusions about compositional practice even before considering that the origins of the sources of the dances are spread all throughout Europe, further dividing the samples into mostly single-digit quantities.<sup>28</sup> Two documents alone make up nearly half of the surviving repertoire: ten dance melodies are found together in a single source, the *Chansonnier du Roi*, constituting two-thirds of the melodies from France, and fourteen are found in a manuscript held in the British Library, Additional 29987.<sup>29</sup> Both texts contain numerous other compositions, mostly troubadour and trouvère songs. In fact, the dances from the two texts are strikingly different. The estampies from the *Chansonnier du Roi* are stately dances in *tempus perfectum* which consist of short *pars* sections and endings while the Add 29987 document's contributions are dances in *tempus imperfectum* with long, winding melodies in both the *puncta* and endings. The conflict between the styles of estampie between the two sources became the source of the metric-modulation-driven *accelerando* in the finale of the *Viola Concerto*, where the overlapping shifts in focus from subdivision to primary metric division of *tempus perfectum* and *imperfectum* help to dispel the buildup of speed from the *accelerando* so that it can continue nearly indefinitely (Figure 3.1).

Because the surviving dances are only melodies, as was common in early notation, instrumentation and additional accompanying parts are left to interpretation, though some

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27 Ibid, 7.

28 Ibid, 18.

29 Ibid, 164-166.



Musical score for Viola Concerto, showing an accelerando-based metric modulation. The score includes parts for Percussion, Woodwinds (Flute, Oboe, Bassoon, Clarinets), Brass (Trumpets, Trombones, Tuba, Snare Drum, Cymbals), Strings (Violins, Violas, Cellos, Double Basses), and Percussion (Percussion 1 and 2). The score features dynamic markings such as *p*, *mf*, *f*, and *sf*, and includes performance instructions like "senza cord." and "con cord.". A specific instruction for the Viola part reads "Tutti A, D down half step G#k Ch". The score is marked with a tempo of quarter note = 130 and includes a rehearsal mark "accrit".

Figure 3.1: Example of the accelerando-based metric modulation early in the finale for the Viola Concerto

E  $\text{♩} = 126$

The musical score continues from the previous page, starting at measure 126. The key signature is E major. The score includes the following parts:

- Fl. 1:** Flute 1, playing a melodic line with a *mp* dynamic.
- Ob:** Oboe, playing a sustained note.
- B♭ Cl. 1:** Bass Clarinet 1, playing a melodic line.
- B. Cl.:** Bass Clarinet 2, playing a melodic line.
- Bsn:** Bassoon, playing a melodic line with a *mp* dynamic.
- Dbl. Bsn:** Double Bassoon, playing a sustained note.
- Hr. 1 & 2:** Horns 1 and 2, playing a rhythmic pattern with a *mp* dynamic.
- B. Tpt. 1 & 2:** Trumpets 1 and 2, playing a melodic line with a *mf* dynamic and *ritardando* marking.
- Tbn:** Trombone, playing a melodic line with a *mp* dynamic.
- Tuba:** Tuba, playing a rhythmic pattern.
- Trmp:** Snare Drum, playing a rhythmic pattern.
- Gk:** Cymbal, playing a rhythmic pattern.
- Perc. 1 & 2:** Percussion 1 and 2, playing rhythmic patterns.
- S. Vla. & Vla. II:** Violins I and II, playing a rhythmic pattern with a *f* dynamic.
- Vla.:** Viola, playing a rhythmic pattern with a *f* dynamic.
- Vc. & Cb.:** Violoncello and Contrabass, playing a rhythmic pattern with a *mf* dynamic.

Figure 3.1 continued.

historical and physical evidence provides suggestions. Grocheio writes about the *neupma*, an instrumental postlude to antiphons, which suggests the potential for improvisatory preludes and postludes in dance music similar to those found in many folk music traditions.<sup>30</sup> The presence of drones in medieval music is heavily implied by their existence on a number of instruments from the time, including bagpipes, hurdy-gurdy, organistrum, doucaine, double-recorder, and flat-bridged string instruments or vielles with sympathetic strings protruding from the neck.<sup>31</sup> Surviving artwork from the period gives hints of what ensembles of mixed instruments might look like, including groups mixing winds and strings.<sup>32</sup> A handful of written accounts survive as well which list instruments in entertainment scenarios. However, the totality of the evidence only provides a sliver of a glimpse into what an instrumental ensemble might play, and these composite images are crafted from sources of varying locations and times, adding to the fallibility of their authenticity. For instance, it is unclear what kinds of instruments might have been preferred for particular settings or combinations and what kinds of dances those instruments might have played. Instrumental instinct suggests that the naturally softer instruments such as harp or rebec might have been preferred indoors while louder bombastic instruments for outdoor play, such as the shawms and bagpipes, but artworks show all manner of instruments in all manner of locations, and the excavated collection of instruments from the Mary Rose ship which capsized in 1545, including two vielles, a doucaine, two taber pipes and a drum, suggest that perhaps multiples of quieter

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30 McGee, 36.

31 Praetorius, Michael. *Syntagma Musicum*. Contains detailed descriptions of instruments from medieval, renaissance, and early baroque periods.

32 Accessed 29 November 2021. <https://art.thewalters.org/browse/category/medieval-europe/>

instruments could have made up for a lack of dynamic reach, similar to modern orchestral doublings and string sections.<sup>33</sup>

All of this is to say that, with such a dearth of surviving evidence, it is very difficult to piece together how secular medieval instrumental music might have sounded. Yet the opportunity to imagine the sound of such music was an inspiration. To attempt to replicate the historical sound of medieval music is an impossible goal, which is part of the fantasy narrative concept behind *Mockery Pursuit* for violin and cello (2018).

### 3.1 Futile Goals in Mockery Pursuit

The A Bao A Qu is one of the creatures from Jorge Luis Borges's *Book of Imaginary Beings*. It rests at the bottom of an impossibly tall staircase at the Tower of Victory, waiting to follow a traveler as they journey upward. At the base of the stairs, it is formless, but as the traveler ascends, the A Bao A Qu gradually takes shape, but cannot become complete until the traveler reaches the top and achieves Nirvana.<sup>34</sup> *Mockery Pursuit* imagines the scenario of the traveler who fails to reach the top and is instead consumed by the A Bao A Qu and their obsessive goal. Two other fantasy narratives also inspired the premise of the work: the fatalistic robots from *NieR: Automata* who strive to achieve perfection in a niche skill, only to be bested and self-destruct,<sup>35</sup> and the story arc of the primary antagonist of Kentaro Miura's *Berserk*, Griffith, a ruthless leader willing to commit savage atrocities in the pursuit of a perfect kingdom.<sup>36</sup> Much of the art of *Berserk* was influenced by traditional art,

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33 <https://maryrose.org/the-artefacts/1/> contains images and descriptions of the instruments recovered from the Mary Rose. Accessed 29 November 2021.

34 Borges, Jorge Luis. *The Book of Imaginary Beings* (New York, Avon Books, 1970), pp.21-22.

35 *NieR: Automata* (Playstation 4 version) [Videogame]. 2017, Square Enix.

36 Miura, Kentaro. *Berserk*, Dark Horse Manga, Milwaukee, 2019-2021.

including obvious connections to M.C. Escher's non-euclidean staircases in its images of the realm of the God-Hand representing their infinite madness and otherworldly personages.<sup>37</sup>

*Mockery Pursuit's* structure is preoccupied with forms of mimicry and intervallic staircases, including imagining an interlinking lattice of interval cycles built around the primary structural notes of the piece.

The formal sections of the piece are delineated by the relationship between the violin and cello. Initially, the cello lays down the open fifth drone like Borges's *A Bao A Qu*, laying in wait, providing a self-contained image of the ancient music influence to come. The opening melodic interplay between the two instruments, pushing and pulling out of dance-like rhythmic characters, is the work's *neupma* improvisatory introduction, filled with hesitation to begin the long ascending journey. As many improvisatory introductions throughout various traditions do, the melodic material introduces the listener to the primary harmonic system the work engages with: overtone-based microtonality, or, the melodies in their most "grounded" natural tuning. Much of the material is scalar, or embellished scalar, and the momentary rhythmic acceleration and deceleration introduces the primary method through which the concept of "pursuit" is explored in the work. The cello and violin chase one another rhythmically and/or intervallically and the violin's primary method of escape is through register. The two instruments begin very near to each other, and gradually grow apart over the course of the work.

The introduction reaches its peak at m.17 where the violin and cello press tightly against each other in close imitation with mirrored rhythm, leading into the *prima puncta* of the piece at m.23 (Figure 3.2). At first, the two instruments are relatively benevolent, as the

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<sup>37</sup> Ibid.

Mockery Pursuit

The image displays a musical score for 'Mockery Pursuit'. It is divided into three sections: [B], [C], and [C].

- Section [B]:** Measures 17-20. It features a 'poco accel.' marking and a tempo of  $\text{♩} = c. 104$ . The music is in 3/4 time and includes dynamics such as *cresc.*, *mf*, and *f*. Fingerings of 5 are indicated for both violin and cello.
- Section [C]:** Measures 21-27. It begins with 'With energy' and a tempo of  $\text{♩} = c. 62$ . The time signature changes to 6/8. Dynamics include *f*, *p*, *pp*, and *fpp*. Performance instructions like 'pizz.' and 'arco' are present.
- Section [C]:** Measures 28-31. It continues with dynamics like *f p*, *p*, *mp*, *pp*, and *sub. pp*. It includes instructions for 'sul pont.' and 'ord.'.

Figure 3.2: *Mockery Pursuit*, end of the introduction [B] and start of the *prima punta* [C].

cello mostly homorhythmically pursues the violin at diminished intervals, though as the two become closer to matching, they accelerate in rhythm to increase tension. The beginning of the journey is fraught with small stumbles, the pair often dip in register or come to points of rest, such as the return of the *puncta*'s opening after the *aperto* ending at m.49. The *chiuso* ending relies on similar rhythmic acceleration material from the previous ending, but is instead extended through the pressing pursuit of the cello to match the violin's pitch through stepwise motion before the violinist repeatedly dashes away to a safer register.

Measure 91 begins the lattice of staircases marking the middle part of the journey where locations begin to blur together. The two instruments play in contrary motion, trading

off interval cycles at elongated common tones which themselves drive upward (see Figure 3.3). These staircases continue until they begin to unravel from lacking rhythmic connection points, at which time, the cello begins accelerating while propelling downward and the violin ascends at an ever-decreasing rate leading into the desperate struggle beginning at m.110.

The musical score consists of five systems of staves, each with a treble and bass clef. The tempo is marked as  $\text{♩} = c.68$ . The score includes the following markings and features:

- System 1 (measures 91-94):** Dynamics range from *mf molto legato* to *p* and *mp détaché*. Time signatures include 9/8, 10/8, 7/8, and 3/4.
- System 2 (measures 95-97):** Dynamics range from *mf poco a poco staccato* to *f*. Features triplets and a 5:3 interval.
- System 3 (measures 98-100):** Features complex rhythmic patterns with intervals of 5:4 and 7:4.
- System 4 (measures 101-103):** Dynamics range from *poco a poco legato* to *poco a poco legato*. Features intervals of 7:4, 9:8, and 5:4.
- System 5 (measures 104-106):** Dynamics range from *cresc.* to *ff*. Features intervals of 6, 7:4, 9, 10:8, and 11:8.

Figure 3.3: the “lattice of staircases”

The violin's upward-rocketing gestures diminish in volume and interval while the cello becomes gradually more forceful in its persistent domination of the lower register, ultimately dragging the violin down into the depths of subharmonics leading into m.116 (Figure 3.4).

110 non vib. → vib. non vib. → wide vib. → non vib. *piu f* *f > pp*  
**Suddenly slower**  $\text{♩} = 72$  *accel.*  $\text{♩} = c.98$  *accel.*  $\text{♩} = 144$   
*mf cresc.* *f cresc.* *ff cresc.*

113 *ff* *p* *ff* *p* *ff* *p*  
**Suddenly slower**  $\text{♩} = c.104$  *accel.*  $\text{♩} = c.132$  *accel.*  $\text{♩} = 160$

**J** **Unison tempo**  $\text{♩} = c.64$  *ff* *ff > ff* *cresc.* *cresc.* *6* *3*

119  $\text{♩} = 96$   $\text{♩} = 52$  (subharmonics) *fff cresc. molto!* *fff* *f dim. poco a poco* *mf*

**K** **Senza misura**  $\text{♩} = c.46$  *slow, wide vibrato* *f* **"La Rotta"**  $\text{♩} = c.72$  *poco sul pont.* *p* *mf* *f*

Figure 3.4: buildup to the first subharmonics in the violin



The coda to the work then is a delusion of success: the most authentic presentation of a medieval dance thus far yet twisted through the filter of quartertonality and frequently interrupted by momentary returns to reality with sharp glissandi recalling the previous pursuit. The violinist's final attempt to escape through the highest register is met with harmonics from the cello and ultimately ends with a crunched reprise of the *neupma* in the cello's subharmonics (Figure 3.5).



Figure 3.5: final subharmonics in the cello at the end of *Mockery Pursuit*

Beyond being a work which further explored the potential relationship between microtonality and medieval aesthetics, *Mockery Pursuit's* introduction of non-uniform tempi between instruments greatly influenced a subsequent work: *Fantasy on Souvent Souspire* for violin, cello, clarinet, and piano (2019).<sup>38</sup>

38 It is worth noting at this point that a near-essential facet of my compositional process until my most recent compositions has been an independence from technology. Many of my scores initially exist as handwritten manuscripts, with or without compositional notes, and I have been hesitant to compose directly into any software notation program. While both approaches have their advantages and disadvantages, I have found that when composing into notation programs, the ease of use of particular notation options often guides my creative output more than I am comfortable with. On paper, aside from the staff lines (which can be easily ignored), I can escape the challenges of implementing complex rhythms or meters electronically. On paper, scores are only limited by the dimensions of the paper. It is, in its own way, a kind of historical escapism into an increasingly bygone compositional method. Yet no work showcases the necessity of this process for me greater than *Fantasy on Souvent Souspire*. The piece is filled with momentary separations of instruments into their own local tempi and meters and gradual returns to coordinated ensemble playing whose calculations are troublesome at best to experiment with in notation programs. But in the realm of paper, this experimentation and iteration can thrive freely with the stroke of the pen.

### 3.2 Tangled Memories in *Fantasy on Souvent Souspire*

*Fantasy on Souvent Souspire* is perhaps the most recent work for which I have very few notes beyond the manuscript with which to explain the compositional process, though I suspect that may be due to the combination of the very short time frame in which the work was composed, just under a month, and the imprecise process by which individual instruments break away from the ensemble into their own tempi requiring a certain degree of structural leniency. One note that does remain is an early sketch titled “Joster” referring to jousting. The initial concept for the piece was to imitate a jousting match where two knights fly toward each other before splitting off before an audience. However, the placeholder material chosen for the slower material was the trouvère song “Souvent Souspire,” which became the basis for the entire work.<sup>39</sup> The melodic structure of “Souvent Souspire” bears similarities to the popular Raimbaut de Vaqueiras song “Kalenda Maya” and both are noted as “vocal dances” in McGee’s text as the earliest known examples of estampies, despite how much the melodies differ from the other surviving estampies.<sup>40</sup> The *Fantasy* plays with the similarities in developing the melody and expressing the mutability of the aural tradition of roaming musicians. In fact, the original melody of “Souvent Souspire” only appears as a distant echo in the piano near the end of the piece (Figure 3.6). The tempo scheme inverts the expected dance presentation, beginning and ending with abrasive and repetitive rhythms while the core of the piece is slow and improvisatory. These opening and closing sections are the lustful and tormentous heartbeat of courtly love described eponymously in the song, “souvent souspire mon cuer plein d’ire pour la plus bele de l’empire” (“Often my heart full of

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39 McGee, 52-53.

40 Ibid, 10-11.

The image displays a musical score for the piece "Fantasy on Souvent Souspire". It consists of four systems of staves, each representing a different instrument: Violin (Vln.), Bass Clarinet (B♭ Cl.), Cello (Vc.), and Piano (Pno.).

- System 1 (Measures 146-148):** The Violin part has a melodic line with sixteenth-note patterns. The Bass Clarinet part has a melodic line with a *ppp sempre* dynamic marking. The Cello part has a bass line with sustained notes. The Piano part has a bass line with triplets and a *p una corda* marking.
- System 2 (Measures 149-150):** The Violin part continues with a similar melodic pattern. The Bass Clarinet part has a melodic line with a *ppp* dynamic marking. The Cello part has a bass line with sustained notes. The Piano part has a bass line with triplets and a *p una corda* marking.

Figure 3.6: Echoes of the “Souvent Souspire” melody in the piano and cello in *Fantasy on Souvent Souspire*

grief sighs for the most beautiful one in the empire”)<sup>41</sup> Thus the soloistic emergence from the languid texture in a way represents the aggressively public displays of affection expected of suitors. Yet the harmonic language is not the raw modality of the medieval dances. Instead, it borrows the chainlink harmonies in much purer form, as slightly detuned backdrops for the solo melodies. Each of the violin, cello, and clarinet have their own moments of emergence with increasing force until they are all competing for dominance, all the while the piano remains a spectator, interjecting only cadential notes and brief echoes of the head motif

41 Ibid, 53.

(Figure 3.7). As best I can recall, the section beginning at m.142, constituting the “renouncing” of the “beloved” described in the *quinte pars*, was partly a veiled reference to the “Romance” from Sergei Prokofiev’s *Lieutenant Kije Suite, Op.60*, whose subject is a princess in love with an entirely fictional soldier. The cello very gradually spins out the “Souvent Sousepire” melody over a drone, much like the contrabass solo in *Kije*, while the clarinet and violin overlay a delicate *obligato* texture, similar to Prokofiev’s *obligato* flute solo, and the piano interjections present each motif from the first phrase of the theme in a pattern which foreshadows the return of the accordion chords from earlier in the piece (see Figure 3.6). It is possible that early in the compositional process, I considered the work to have been sung from the receiving end of courtly love, or else from that of a *trobairitz*, a female troubadour, as I was beginning to research the subject at the time, though, with so few precompositional notes from the time and an unfortunately hazy memory of the work, I can only speculate based on the connection to *Kije*.<sup>42</sup>

The image displays a musical score for four instruments: Violin (Vln.), B♭ Clarinet (B♭ Cl.), Violoncello (Vc.), and Piano (Pno.). Each instrument part is written on its own staff, indicating independent tempi. The Violin part starts with a tempo marking of  $\text{♩} = c.116$  and includes dynamics  $f$ , *cresc.*, and  $ff$ . The B♭ Clarinet part has a tempo marking of  $\text{♩} = c.100$  and includes dynamics  $ff$  and *molto rit.*. The Violoncello part includes dynamics  $f$ , *cresc.*,  $ff$ , and  $ffmf$ . The Piano part includes dynamics  $mp$  and  $f$ , and a marking *senza una corda*. A dashed line labeled  $15^{ma}$  spans across the Violoncello and Piano parts, with the instruction "(follow clarinet)" above it. The score is set in a key with one sharp (F#) and a common time signature (C).

Figure 3.7: all instruments in independent tempi

42 Morrison, Susan Signe. “Trobairitz or Women Troubadours,” Accessed 29 November 2021. <https://amedievalwomanscompanion.com/trobairitz/>

### 3.3 Delusional History in D’Auseil Codex

Mockery Pursuit and Fantasy on Souvent Souspire were both works intended to further develop my use of medieval inspirations in otherwise contemporary works. Both contain heavily blurred depictions of dance melodies interrupted and foiled by surrounding material as though they were discarded memories of the past. *D’Auseil Codex* for two pianos tuned in quartertones and composed between the two pieces takes an altogether different approach to tradition: the source of the *D’Auseil Codex*’s melodies itself is the fantasy.

*D’Auseil Codex* plays on the conventions of numerous medieval manuscripts, such as the Robertsbridge and Faenza codices. Many of the surviving medieval manuscripts are incomplete, frequently without covers, as is the case for the Add MS 29987, and with parts of pages cut away, likely illuminated lettering, as was likely the case for Chansonnier du Roi.<sup>43</sup> In some cases, such as the first few royal estampies from the Chansonnier du Roi, this leads to incomplete fragments of compositions. Additionally, some artworks contain samples of musical notation, such as the infamous “butt music” from the hellscape panel of Hieronymus Bosch’s *Garden of Earthly Delights* triptych.<sup>44</sup>

*D’Auseil Codex* imagines that one such incomplete collection of medieval manuscripts written in a strange variant of neumatic notation which surfaced in a briefcase in Boston, then scanned and uploaded anonymously to the internet. According to the fictional preface, after obtaining a copy of the scanned relics, I transcribed the dances as accurately as possible with sparse accompaniment into a set of seven dances, yet in order to accommodate the additional pitch indications, a quartertone harmonic system was required, itself inspired

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43 McGee, 164.

44 The Art Minute, Accessed 29 November 2021. <https://www.the-art-minute.com/hieronymus-boschs-butt-music/>

by the Vicentino chromatic *arcicembalo* capable of playing just-intuned thirds in every key (by using a form of extended quarter-comma-meantone tuning closely approximated by 31-TET), used by Carlo Gesualdo.<sup>45</sup> This fiction itself references H.P. Lovecraft’s “The Music of Erich Zann,” in which a university student living in a cheap apartment on the *Rue D’Auseil* has a chance encounter with a viol player performing otherworldly music to keep monsters at bay before the street itself is swallowed and any proof that it ever existed is erased from history. Boston and Arkham are frequent settings of Lovecraft’s works, and the imaginary medieval dances may have come from that very student’s briefcase as transcriptions of Erich Zann’s strange cacophonies. In order to make the resultant compositions appear as authentic as possible, the individual monophonic dance melodies were composed separately before being orchestrated and accompanied (Figure 3.8).

The resulting dances imagine what additional medieval instrument dances in each existing model might sound like through the filter of various 24-TET systems. The first dance, “La Pryme Danse Raial,” is an extension of the royal estampies from the *Chansonnier du Roi* and references the fact that the first dance “La Prime Estampie Royal” ends abruptly as a result of the incomplete manuscript. The “arranger’s note” indicates confusion as to whether “Raial” refers to “real” or “royal,” which immediately calls attention to the questionable authenticity of the dances, as it seems relatively obvious that the various spellings of “royal” within the *Chansonnier* clearly refer to the subject of the manuscript (“Roi”). In fact, the arranger’s notes themselves are an essential element of the musical composition, as they provide additional material linking the individual dances to a larger formal structure. They represent the unreliable narrator of many of Lovecraft’s stories.

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<sup>45</sup> *Early Music*, Volume 41, Issue 4, November 2013, Pages 657–664, <https://doi.org/10.1093/em/cat104>

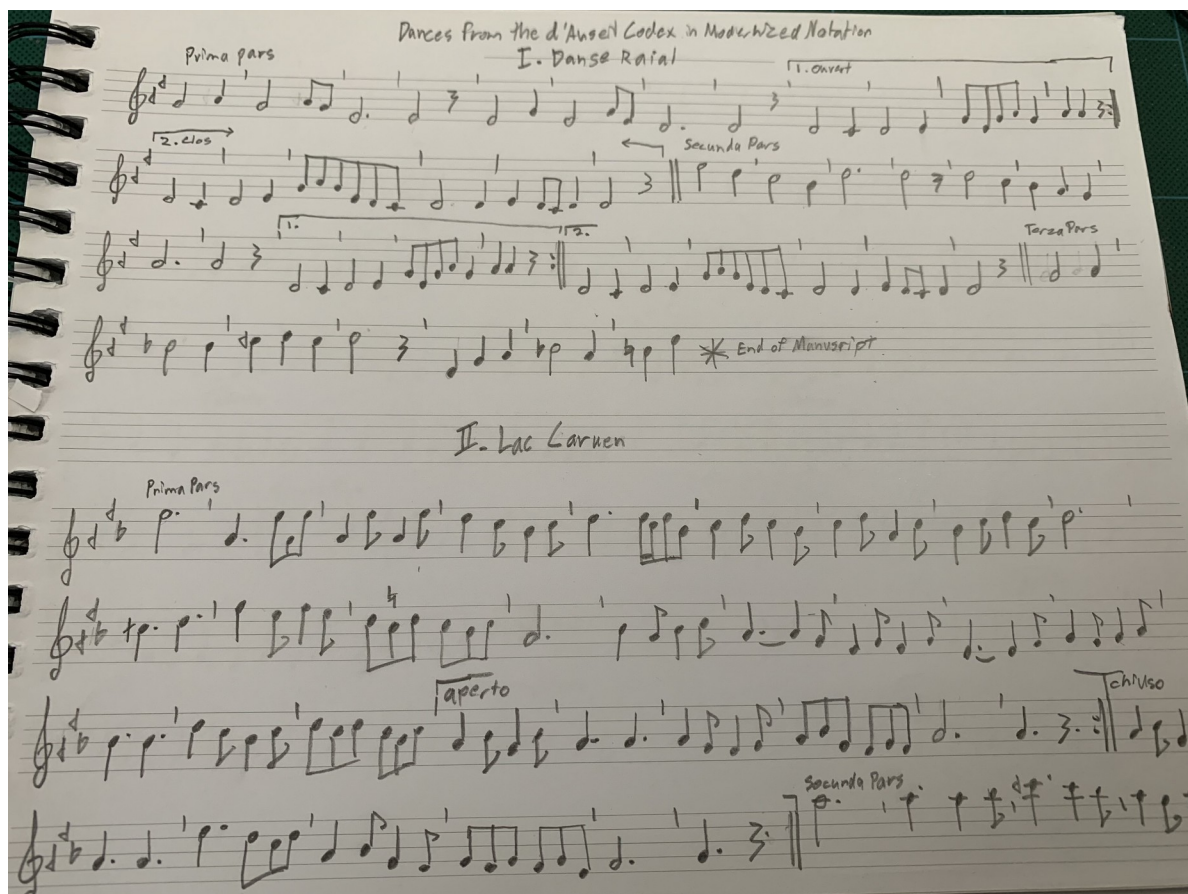


Figure 3.8: Sample of the manuscript dance melodies from *D'Auseil Codex*

The melody itself is relatively simple and unornamented, presented in a stately triple meter.

The accompaniment is sparse, only supplying the appropriate drone tones in a supplementary rhythm.

The first few dances in the set continue in the pattern established in the first dance. The second dance, “Lac Caruen” imitates the named estampies from Add MS 29987 in compound meter, *Ghaetta* and *Parlamento*,<sup>46</sup> with an upbeat and lightly ornamented melody supported again by mostly rhythmic drone accompaniment with the limited introduction of a second parallel melody voice doubling mostly at the fourth. The title is another Lovecraftian

<sup>46</sup> McGee, 71-73 (“*Ghaetta*”) and 94-97 (“*Parlamento*”).

allusion, translating from approximated Middle English to “Lake Crown,” resembling Lovecraft’s penchant for submerged monuments as well as the Arthurian Lady of the Lake. “La Undecime Estampie Royal” begins as another royal estampie in  $\frac{3}{4}$  time, but soon diverges when meter changes threaten to dissolve the continuity of the line and also ends abruptly and unfinished. The fourth dance is another like the named Italian *istampittae* but its presentation is unusually slow, gradually moving in and out of dance-like characters and more pensive improvisatory segments that focus on the ever-expanding harmonic language. A few of the surviving dances are more challenging to interpret because of their unusual rhythm, and the *D’Auseil*’s fourth dance takes its inspiration primarily from an interpretation of “Isabella” performed by Ensemble Unicorn.<sup>47</sup>

The final three dances in the “codex” depart more drastically from their inspirations. The fragments (movement “V.”) are hypercompressed forms of the previous four dances and the sixth dance but are presented as the only legible fragments from torn and scribbled out pages. The “Salterello” begins similarly to the second and fourth surviving *salterelli* from the Add MS 29987,<sup>48</sup> but quickly turns into a fictional melody more similar to the tunes composed for the Codex Buranus, specifically “Tempus est iocundum” in the event that the absurdity of the piece’s historical claim is not yet evident to the listener. The melody becomes increasingly obsessed with motivic fragments through its accelerating finale (Figure 3.9). The last movement is a set of conjoined dances resembling the dance pairs of Add MS 29987, “Lamento di Tristano” and “La Rotta,” and “La Manfredina” and “La Rotta della

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47 <https://www.discogs.com/master/1219009-Ensemble-Unicorn-Chominciamento-Di-Gioia-Virtuoso-Dance-Music-From-The-Time-Of-Boccaccios-Decamerone> Accessed 29 November 2021.

48 McGee, 110-114 provides transcriptions of the salterelli.



The image shows two systems of musical notation. Each system consists of a grand staff with a treble clef on top and a bass clef on the bottom. The top system has a melodic line in the treble clef and a bass line in the bass clef. The bottom system has a similar accompaniment. Both systems are marked 'cresc. molto' and 'voce ord.'

Figure 3.9: The dance is stuck in a melodic loop

Manfredina.”<sup>49</sup> The “Lamento di Sarnato” is a slow introductory melody whose name derives from Lovecraft’s “The Doom that came to Sarnath,” followed by a “Rotta” and concluded with a short coda, “La Dume” (The “Doom”).<sup>50</sup>

The overarching structure of the seven movements makes up a prototypical Lovecraftian tale: the nameless narrator (the “arranger”) begins on an eager quest for forbidden knowledge and is driven to madness by the contents of the forbidden melodies. As the piece progresses, the arranger’s notes become shorter and less accurate, until they are dispensed with entirely in the final movement. The fourth movement’s unusual tempo structure marks the point-of-no-return, after which the dances are fragments and rambling scribbles before the unnamed “Doom.” This trajectory is supplemented in the first half of the piece by a progression from thinly-textured accompaniments to gradually more dense

49 McGee, 115-117.

50 <https://www.hplovecraft.com/writings/texts/fiction/ds.aspx> Accessed 29 November 2021.

textures and parallel voices and ornaments, though the degree to which the two pianos can achieve this affect is admittedly slightly limited by the necessary ping-ponging of the melody between the two instruments.

The overarching form is more thoroughly supported by the quartertonal harmonic language. Each of the six dances, not counting the fragments, uses an increasing subset of pitches, beginning with six in the first movement, eight in “Lac Caruen”, eleven in the third (as indicated from the “Undecime” title), thirteen in the fourth movement, the “Salterello” begins with twelve pitches but quickly expands through chromatic parallel voices, and the finale encompasses all 24 available pitches (Figure 3.10). The scale used in the fourth movement is the 13-tone diatonicised chromatic scale developed by Ivan Wyschnegradsky as a suitable replacement for a major scale in the quartertone system.<sup>51</sup> Its structure is built

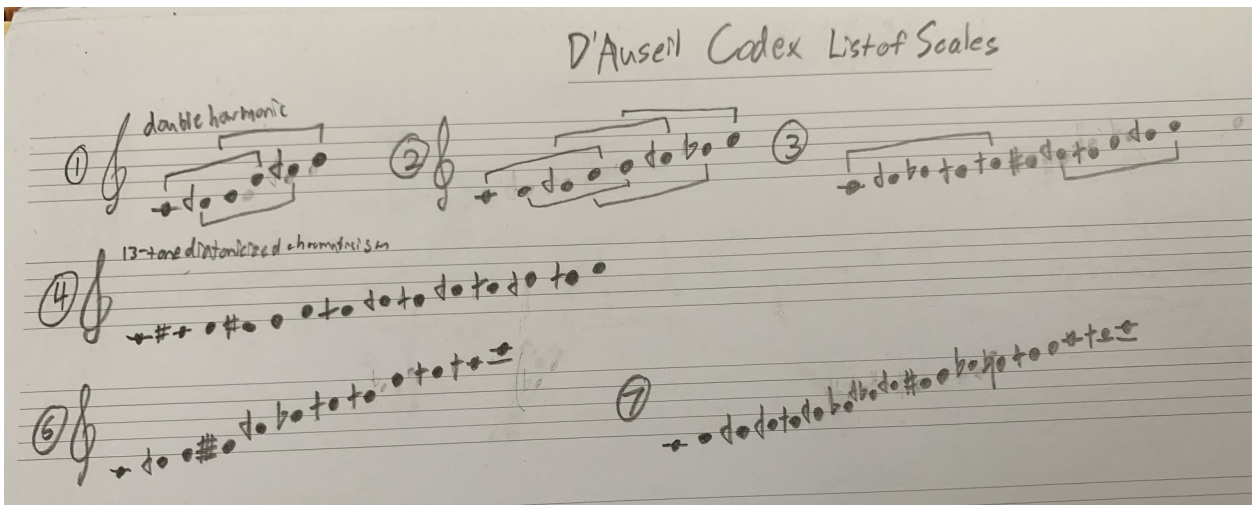


Figure 3.10: List of scales used in movements of *D'Auseil Codex*

<sup>51</sup> Wyschnegradsky, Ivan. *Manual of Quarter-Tone Harmony* (Brooklyn, Underwolf Editions, 2017) pp.19-23.

around the quartertone-lowered tritone, closely resembling the 11<sup>th</sup> partial, which is also the basis for the preceding scales in the *Codex*.<sup>52</sup> The closing harmonic progression of “La Dume” uses Wyschnegradsky’s rotational harmony with the melody outlining a quarter-chromatic scale (Figure 3.11).



Figure 3.11: final harmonic progression from “Lamento di Sarnato”

By the time I had completed the aforementioned three compositions, I was beginning to feel that my devotion to portraying medieval instrumental dances remotely within audible relation to the existing dances was becoming a hindering constraint. It was then in the isolation of the Covid-19 pandemic lockdowns that I began to seriously begin studying the medieval and renaissance instruments themselves to gain new insight into early music compositional options and contemporary orchestration possibilities.

<sup>52</sup> Ibid.

#### 4. Solo/Ensemble

Artist Genpei Akasegawa observed a series of man-made objects which had seemingly outlived any purpose they once had, yet were curiously preserved as art-like structures, such as staircases that had no entrance at the top, leading instead to a wall, or bridges over dry land, freestanding tunnels, overhangs with no door or window underneath, fences partially devoured by nature, among others.<sup>53</sup> In December 1980, American baseball player Gary Thomasson was signed by the Yomiuri Giants in Tokyo for a near record-breaking sum for what would be his final two seasons, where it was discovered he seemingly could not hit the ball.<sup>54</sup> Akasegawa humorously appropriated Thomasson's name to describe these useless yet maintained art-like objects, dubbed "Hyperart," and encouraged others to share their unique "Thomasson" discoveries.<sup>55</sup>

In the fall of 2019, I discovered a collection of Thomassons myself: a collection of baroque and renaissance instrument replicas in the possession of the UCSB music department that had not been used for perhaps nearly twenty years, yet neatly tucked away and catalogued. The collection consisted of nearly a dozen wood and plastic recorders, four crumhorns (a plastic soprano and tenor in various states of disrepair as well as a wood tenor and bass), an alto kortholt, a tenor cornamuse, a tenor sackbut, a Celtic harp, a bass viola da gamba, and an alto rebec missing a string and bow. No single group of instruments could form a functioning uniform SATB or ATTB consort, as the vital alto recorder was badly damaged, there was no alto crumhorn, and while the kortholt was in fact a similar capped reed to the crumhorns, its sound is so small that it could not balance with the others. Perhaps

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53 Akasegawa, Genpei. *Hyperart: Thomasson* (Los Angeles, Kaya Press, 2010).

54 [https://www.baseball-reference.com/bullpen/Gary\\_Thomasson](https://www.baseball-reference.com/bullpen/Gary_Thomasson), Accessed 29 November 2021.

55 <https://www.cehuntingdon.com/post/inspiration-part-ii-hyperart-thomasson>, Accessed 29 November 2021.

the most immediately useful instrument was the viola da gamba which could be used as a continuo instrument for chamber groups, which is naturally why it was the only instrument still in use when I discovered the collection.

Of particular interest to me were the crumhorns because their sound is unlike any other modern orchestral instrument. The sackbut has its analog in the trombone and recorders are still widely in use by educational programs. The closest relative of the capped reed family of instruments is the bagpipes or bladderpipes, as the cornamuse is simply the chanter reed pipe detached from the instrument and capped with a mouthpiece and the crumhorn is simply a cornamuse with the bell curved upward.<sup>56</sup> As a result of the cap not allowing direct manipulation of the reed, capped reed instruments are monodynamic, troublesome to tune, and cannot overblow, resulting in very limited range, which perhaps suggests why they quickly fell out of favor in the late renaissance and early baroque periods.<sup>57</sup> While a substantial number of renaissance crumhorns survive, many of them are missing caps and only one reed and staple from the period have survived.<sup>58</sup>

However, much like how the lack of primary sources made understanding medieval instrumental dance music a unique challenge, the severe technical limitations of the crumhorn were an opportunity to experiment. Despite the advertised range being limited to a major ninth, musicians and makers have developed methods to extract additional pitches from the instruments. With a nearly entirely open-hole fingering system, save for occasional lower extension keys to fit the hand better, *glissandi* across the range of the instrument are very simple to execute. Most crumhorns based on historical models are designed with

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56 <https://www.music.iastate.edu/antiqua/instrument/crumhorn> Accessed 2 December 2021.

57 Meyer, Kenton. *The Crumhorn: Its History, Design, Repertory, and Technique* (Ann Arbor, UMI Research Press, 1981), 162-164.

58 *Ibid*, 41.

renaissance fingerings in mind, however, some student-grade crumhorns designed by Moeck-Steinkopf utilize baroque recorder hole positioning to improve intonation.<sup>59</sup> Many modern crumhorn makers have experimented with the design of the crumhorn to expand its range through upper and lower extension keys. Through certain combinations of upper extension keys on certain instruments, the previously inaccessible overblown register is reachable, if somewhat unstable. Additionally, bass instruments and some tenors can be underblown to reach down as much as a fourth or fifth, again unstable, but in some cases negating the need for a lower pitched instrument, such as a great bass crumhorn.<sup>60</sup> Additional sounds and pitches can be accessed by removing the cap and playing directly on the reed, though because the instruments are usually played with the reed dry in the chamber, unlike other modern reed instruments, this technique is more accessible with modern plastic reeds, which produce a different tone from traditional cane reeds. The additional tone holes found on the curve of the instrument can also be closed to drop the pitch of the instrument further or access unique scales as a result, though without a key mechanism, they would likely have to be manually plugged with a stopper by the player for performance. With all of these options to adjust pitch naturally comes the ability to play microtones and, with the instruments already borrowing fingerings from recorders, many of the basic microtonal fingerings have already been charted.<sup>61</sup> Instrument maker Stefan Beck further expanded the tonal possibilities of the crumhorn with his *Milla* crumhorn bell designs which allow the player to easily swap bell shapes to achieve different tone colors.<sup>62</sup> Other common extended techniques for winds including multiphonics and advanced tonguing techniques may be possible as well.

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59 Ibid, 165.

60 <https://www.renwks.com/products/crumhorn/crumhorn.htm> Accessed 2 December 2021.

61 Hauwe, Walter van. *The Modern Recorder Player* (Mainz, Schott Musik, 1992), vol.3

62 <http://www.musikhandwerk.de/UK/renaissance.html> Accessed 2 December 2021.

The instrument does have a handful of downsides which are challenging to overcome: the inability to tune via the reed means tuning must rely on breath pressure, and the instrument already requires significant breath pressure to produce any sound. This makes playing fast articulations very difficult and limits how long the player can play without needed to stop to expel unused air and reset their embouchure. Additionally, the monodynamic nature of the instrument results in an articulation and ADSR curve more akin to a light switch with very short attack and release. Massaging the attack or release means adjusting the air pressure, resulting in pitch change, thus the expected sound of the instrument is highly articulate with separation between notes rather than slurs.<sup>63</sup>

However, despite these drawbacks, a handful of recent composers have managed to use the crumhorn to great effect. A consort of crumhorns makes a brief appearance in Mauricio Kagel's *Music for Renaissance Instruments* from 1966, a work which shows off the textural potential of large ensembles of all varieties of renaissance instruments. Per Nørgård also made use of the unique sound of the crumhorn in a solo passage for soprano crumhorn at the end of *Seadrift* to mimic a lonely bird's mating calls. Kumi Tanioka's soundtrack for *Final Fantasy Crystal Chronicles* also makes frequent use of crumhorns in live recordings from Roba Music Theater of various renaissance instruments across the soundtrack, relying on the quirky intonation to contribute to a folk song character.<sup>64</sup>

Learning the basics of how to play recorders and capped reeds led me to begin work on a composition for renaissance instruments. *An Theyr Thomasson Lais* was another victim of the Covid-19 pandemic, as to date only two movements have been completed, though

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63 Meyer, 103-106 goes into further detail of accounts of historical articulation on the crumhorn.

64 <https://www.nintendolife.com/news/2020/09/feature-behind-the-music-of-final-fantasy-crystal-chronicles-remastered-edition> Accessed 3 December 2021.

progress may resume in the future. The core ensemble of the work consists of duos of renaissance instruments and voices: soprano and baritone voices, two wind players doubling recorders and crumhorns, two viols (bass and treble), gothic harp, and percussion. This ensemble is an extension, or perhaps development, of the instrumentation that was to be used in the *Lovecraft Songs*, which themselves were built around the core trio from Debussy's Sonata for Flute, Viola, and Harp. The ensemble of flute, viola, harp, bass, percussion, and voice proved unwieldy in part due to the unusual combination and challenges finding musicians to form a unique ensemble for the work. The broken renaissance consort for the *Lais* borrows the pair of strings, harp, percussion, voice and wind player, but is much more suited to early music ensembles, many of whom regularly have members double on two or more instruments. Additionally, early in the process of determining the instrumentation, the makeup of the group was chosen for how it mirrors the Pierrot ensemble of two winds, two strings, voice, and piano, with percussion frequently added. The original intent was to produce two versions of the work: one for renaissance ensemble and the other for Pierrot, though the reliance on techniques idiomatic to the early instruments makes the later unlikely.

The first movement, a "Processional," is significantly less programmatic than previous works. The initial inspiration for the musical materials was the hellscape from Bosch's *Garden of Earthly Delights*, specifically the feast of the bird-headed monster feeding on humans and expurging them into a fishbowl-like chamber pot below. However, the resulting work was born primarily of experimentation with the natural idiomatic tendencies of the instruments.



Much of the viol writing focuses on swelling dynamics and held pitches which take advantage of the convex shape of the bow which has its strongest dynamic potential near the middle of the stroke as opposed to near the frog on modern bows. The viols have six strings tuned in fourths with a major third in the middle as well as frets, allowing the instruments to play perfect fourths and fifths with less difficulty than modern strings, so the few double-stops throughout take advantage of these conveniences as well as the resonant open strings (Figure 4.1). With frets largely dictating intonation in the middle and lower registers, the viols have less ability to play microtones through standard playing, so the players are asked to raise the fifth fret up a quarter step, allowing for six quartertone pitches a quartertone above the adjacent string.



Figure 4.1: passage of gamba parts emphasizing open strings and quartertones

By contrast, the crumhorn writing, and later recorder writing, primarily consists of short, loud, and quick noodling microtonal passages (Figure 4.2). While the recorders are also fairly limited in their dynamic range, the much less severe breath pressure required to sustain sound makes them much easier to pair with the viols and borrow from their materials. In fact, the doubling of the instruments compliments their use throughout the work, both to prevent the sound of the crumhorns from overpowering the ensemble, and to give the players a break from the intense embouchure.

The image shows a musical score for two crumhorns. The top staff is for the Alto Crumhorn and the bottom staff is for the Tenor Crumhorn. Both parts begin with a rest for six measures. At measure 7, they enter in 4/4 time with a staccato motif. The Alto Crumhorn part is marked 'Alto Crumhorn' and the Tenor Crumhorn part is marked 'Tenor Crumhorn'. The score ends with a fermata and the word 'Ah' above the final note.

Figure 4.2: Introduction of the staccato motif in the crumhorns

The harp and percussion serve to support both parties while providing essential structural pulses for the voice. The Gothic/bray harp is an instrument with wooden hook-like pieces near the soundboard which vibrate against the string when plucked, adding a twangy sustain to the sound unique to the instrument comparable perhaps to the sound of a sitar. In the lower register, notes can sustain the buzzing for much longer, while the sound is less perceivable in the upper register, allowing the instrument to support both the gambas and the crumhorns in their materials. Meanwhile the percussion relies on equally buzzy and imprecise instruments such as the vibraslap and talla bell which blend well when combined with the gritty gut strings of the viols or the buzzing crumhorn reeds. The combination of the rustic sound of the ensemble with open fourth/fifth harmonies and quartertones aim to give the soundworld a kind of twisted familiarity of ancient music tinged with the kind of easily-explained horror of medieval and renaissance monsters such as Bosch's birdman – creatures which combine distinctly human features with parts of animals and trees for unsettling results.

The vocal line helps to elucidate the flow of the musical narrative. Beyond the initial statement of material, the nascent voice is birthed from the depths with a growling glissando. The voice is like that of a newborn discovering the world, easily impressed by the bickering of the two distantly related motifs. The rest of the movement unfolds as a gradual

development intertwining the two ideas, adding sustained pitches to the harsh and rhythmic wind lines and introducing quick ornaments to the strings as they vie for dominance. The final buildup to the climax beginning in m.62 is the closest the work comes to displaying true renaissance inspired imitative polyphony between all lines (Figure 4.3). A victor is decided at the climax through the incessant marching of the *staccato* noodling microtonal figure, which dies away to echoes of the other theme and the return of the muddy talla bell roll.

The musical score for Figure 4.3 consists of seven staves, each representing a different instrument or voice part. The staves are labeled as follows: B (Bassoon), A. Crm. (Alto Clarinet), T. Crm. (Tenor Clarinet), Hp. (Harp), Perc. (Percussion), T. VdG. (Tenor Violin), and B. VdG. (Bass Violin). The score is written in 3/4 time and begins at measure 62. The music is characterized by a complex, polyphonic texture with various rhythmic patterns, including triplets and sixteenth-note runs. Dynamic markings of forte (f) and fortissimo (ff) are used throughout. The score includes vocal-like lyrics: 'to kay kay nah kay'. The music is a mixture of materials, resulting in a renaissance-inspired polyphony.

Figure 4.3: mixture of materials results in renaissance-inspired polyphony

The Processional movement was completed just before the start of Covid-19 lockdowns in March 2020, resulting in both the work and its performance being shelved for some time. While research about the effects of the Covid-19 pandemic on the performing arts

is beginning to come out, the full effects on the industry may not be understood for years or even decades, if ever, and so I can only speak to my own personal experiences during the time. The lockdowns completely eliminated all plans and possibilities for live performance for some time, and musicians were slow to adjust. Many musicians attempted to move forward with solo ventures such as live-streamed recitals, but the combination of low quality from compressed streamed audio with the fallibility of live performance created a less than ideal mingling of downsides from both live and pre-recorded performance. As a result, most of my time was spent further teaching myself to play the medieval and renaissance instruments at my disposal, as well as acquiring and repairing additional secondhand instruments to fill the registral and family gaps. From the fall of 2020 to summer of 2021 I focused particularly on the viola da gamba, taking private lessons to learn how to better write for the instrument. The degree to which these lessons aided my ability to write idiomatically for the instrument is tangible between the first and second movements of *An Theyr Thomasson Lais*.

In a way, the second movement, “Two Live Burials” contains many more than two burials. The title references the text of the work, two haiku by April Amante, written for the piece. The “live burial” Thomasson is any object partially submerged in concrete, such as the red handball of the first haiku.<sup>65</sup> The form of the piece recalls the expected *rubato*-development-*rubato* scheme expected of the medieval dance-inspired prior works but instead of an alternation of open and closed endings, the movement rocks between materials for the two haiku: first, a rhythmic and aggressive texture dominated by treble gamba tremolo and pointillist bass gamba and crumhorn lines recalling the *staccato* material from the previous

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65 Akasegawa.

movement, followed by a much more free-flowing *legato organum* line still driven by motion (Figure 4.4). The opening and closing sections recite each of the two haiku in their original forms while the joining development iterates and swaps words from haiku with the other until the words themselves begin to lose meaning to semantic satiation. This process is supported by the two warring harmonic settings: G Dorian mode for the first haiku and C# Dorian for the second. When combined, the two scales lose the resonant open qualities necessitated by the individual scales, but together the scales can form the chainlink chords from previous works and build harmonic tension through the bouncing chromatic shifts.

The musical score for Figure 4.4 is a multi-staff arrangement. It begins with a section labeled 'B' in a box. The Soprano part (S) has lyrics: "I didn't want to con-tem-pla - (ae) (ae)". The score includes dynamic markings like *mp*, *f*, *non vib.*, *mf*, *p*, and *subito p*. The instrumentation includes Soprano Recorder, Bassoon/Cornet, Trumpet/Piano, Harp, Trumpet/Violin/Guitar, and Bass/Violin/Guitar. The music features complex rhythmic patterns and chromatic shifts.

Figure 4.4: First entrance of the “Organum” material in *Two Live Burials*

In wrestling between the two materials in the middle development of the piece, the two key areas also begin to blend together. The *staccato* line from the first movement is relentless in its chromaticism, helping to destabilize the harmonies until m.52 when both scales have fully merged in a delirious madness while the voice begins repeating words with increasing frequency before the final statements of the two materials with the first left only as a fragment before bounding into the *organum*.

As evidenced by the impression of semantic satiation upon the text, one of the primary aesthetic goals of the movement was to highlight the absurdity of the piece's origins in a lighthearted way. The renaissance ensemble doesn't exist, after all. For the premier recording, each part was performed separately and alone and compiled digitally. Despite my past reservations about relying on software to compose, the pandemic forced me to pursue learning a variety of software if I was to continue producing music while in-person ensemble rehearsals were not possible. This was the case for *Two Live Burials*, and will certainly be the case for many works in the future, namely my work on music for a videogame, *Beeknighted64*. In the span of several months, I learned the basics of how to use multiple audio recording and mastering programs, video editing software, 3D modeling, and very basic programming for a new project and approach to composition. As I am merely a beginner with so many programs, when I decided to dabble in game development, I needed to choose a visual style which could be adapted by someone with minimal experience in digital art. Looking to the origins of 3D models used in videogames, I recalled the Nintendo 64 and Sony Playstation, the hardware restrictions of which required 3D models to be very simple for the consoles to render them properly, giving me inspiration for my game's visuals.

## 5. Conclusion: Aqua vitae from the Recent Past

The Nintendo 64 was, by many accounts, a miserable system to make games for. The oppressively small texture buffer and signature trilinear mipmap interpolation combined with a very low texture fill rate left characters and environments looking muddy and blurred.<sup>66</sup> The storage limitations of the cartridge-based delivery system meant shorter games with less room for complex and detailed 3D models and compressed audio and textures.<sup>67</sup> Inevitably very few games made it to market and even fewer were fondly remembered.

The console's direct competitor, Sony's Playstation, despite having no texture filtering, anti-aliasing, and having affine texture distortion, enjoyed relative success in part due to the capabilities of disc-based software allowing for expanded games across multiple discs such as *Riven*, *Koudelka*, and *Final Fantasy VII*. By the end of the Nintendo 64's life cycle in 2002, 393 software titles had been licensed compared to over 1000 licensed titles in North America alone on the Playstation. In recent years, the unique limitations of the two consoles and the resulting distorted visuals have inspired independent game developers to create games that use the visual style for new purposes. Puppet Combo's slasher flick inspired game, *Nun Massacre*, exaggerates the affine texture warping of the Playstation to contribute to the surreal and confusing visuals and feeling of nausea and dread.<sup>68</sup>

Because the Playstation's visual limitations and awkward handling of floating-point calculations, rather than attempt to create complexity in 3D environments through individual assets and textures, many developers employed pre-rendered static images of highly detailed scenes and overlaid invisible collision meshes for player navigation. This technique was

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66 <https://www.sgidepot.co.uk/sysdesc.html> Accessed 3 December 2021.

67 <https://www.videogameconsolelibrary.com/pg90-n64.htm#page=reviews> Accessed 3 December 2021.

68 *Nun Massacre* [Videogame]. 2017, Puppet Combo.

often used to great effect in horror games such as *Resident Evil*, *Parasite Eve*, and *Fear Effect*, where the suspense of transitioning from one environment image to another could hide dangers and disorient the player through radical perspective shifts and allowed for a degree of cinematic camera direction from unique perspective angles. Inspired by memories of the wealth of classic horror games on the original Playstation as well as the since-discontinued tradition of freely-distributed demo discs, a community of independent game developers calling themselves “Haunted PS1” created the *Haunted PS1 Demo Disc 2020*, a compilation game with 17 demos created by various developers inspired by the visual and technical limitations of the console.<sup>69</sup> While most of the games demoed would not actually run on an original Playstation, not having to wrestle with the actual limitations allows the developers to pick and choose the features necessary to achieve the desired effect of the essence of the visuals present in the memories of those who experienced the classic games in their day.

Recently, some independent developers have begun to turn their eye to the Nintendo 64 as a source of inspiration. Despite its many flaws, the Nintendo 64’s smeared visuals can be considered a style in their own right. Although the limited texture buffer meant that very small images had to be stretched over large surfaces, the console’s z-buffer system, which essentially calculated which points of surfaces would not be visible and thus, not consume resources to render, allowed for the console to render much larger environments than its competitor.<sup>70</sup> The cartridge system also had the advantage of near-instantaneous loading and the ability to seamlessly fade between audio files, a feature which composer Grant Kirkhope

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69 <https://hauntedps1.itch.io/> Accessed 3 December 2021.

70 <https://www.sgidepot.co.uk/z.html> Accessed 4 December 2021.



used to great effect to dynamically alter orchestrations of a single theme in the hub area in Banjo-Kazooie.<sup>71</sup>

With diminishing hopes of returning to in-person concerts as a result of the Covid pandemic, or, at the very least, with new appreciation for the fragility of the concert setting, I began to explore new opportunities to propagate my compositions. Medieval-inspired fantasy thrives in the realm of videogames, and thus I hypothesized that I might have some success finding a home for my music within independently-developed games which might be more accepting of experimental concert music trends. To this end, and with only a few weeks preparation, I joined the 32-Bit Game Jam 2021, a two-week intensive from September 12-26 with the goal of producing a short game within the time frame using one, both, or neither of two vague themes: “espionage” and “bees.”<sup>72</sup> While game development without a team and with very little programming knowledge is a challenging endeavor, to put it mildly, an abundance of free and open source software in combination with widely available tutorials has no doubt contributed to an explosion of game developer hobbyists. And so, armed with delusional goals and only a vague impression of how to accomplish them, I began work on a prototype for *Beeknighted64*, inspired by a handful of Nintendo 64 games, with the intent to discover how my compositional process might be able to take advantage of the necessary format of video game soundtracks. At the time of writing, many of the planned features have not yet been implemented, but much of the music is in progress.

*Beeknighted64* is set in a historically-informed vaguely-renaissance fantasy tinged with horror elements, with the player assuming the role of a honey bee sporting a handful of

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71 Rareware. Banjo-Kazooie [Videogame]. 1998, Nintendo.

72 <https://itch.io/jam/32bit-jam-2021> Accessed 10 September 2021

anthropomorphic characteristics. This setting allows my compositional tendencies to flourish, making medieval- and renaissance-inspired melodies, forms, and instrumentations mixed with vaguely unsettling developments and harmonies. Coincidentally, the player character bee pairs well with the buzzy sound of the crumhorn, which has become the focus of much of the soundtrack. The game mostly adheres to the visual limitations of the Nintendo 64, including very low-poly 3D models with very small texture resolutions, a reliance on vertex-based Gouraud shading, and mipmapping (Figure 5.1).



Figure 5.1: Screenshot of the low-poly environment and player character in the *Beeknighted64* prototype

Videogame music, unlike film music, has one feature which significantly separates it from traditional concert music: that the music often does not have dictated end points, instead, changes in the music are often a consequence of changes in the gameplay, which is the result of the player progressing through the game. Many games employ looping soundtracks to accompany long stretches of gameplay when the player's choices or abilities can result in a gameplay segment lasting an indeterminate amount of time.

In *Fantasy on Souvent Souspire*, individual instruments pull away from the ensemble and take the focus of the texture in their own independent tempi. This process can be adapted to interactions in a videogame setting as well. In *The Legend of Zelda: Ocarina of Time*, the standard soundtrack fades into a tense battle theme when the player character is in close proximity to an enemy monster.<sup>73</sup> This basic principle of altering elements of the composition based on proximity to objects in 3D space has the potential to accommodate the soloistic popouts of *Fantasy on Souvent Souspire* through looping two or more distinct audio files simultaneously and fading in and out the soloistic tracks, perhaps with a tempo ramp as well, based on the distance of the player character from the target. This can be achieved on a larger scale as well to elucidate musical/narrative form through adjusting elements of the composition depending on how far the player is from achieving a task, such as crossing an environment or level or defeating an extended challenge.

The process of mipmapping, using images of different resolutions based on relative size on screen, is not a feature unique to the Nintendo 64, but it is an iconic element of the visual style, and it can perhaps also supply some compositional inspiration.<sup>74</sup> As a

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<sup>73</sup> *The Legend of Zelda: Ocarina of Time* [Videogame]. 1997, Nintendo.

<sup>74</sup> <https://www.sgidepot.co.uk/tlmmi.html> Accessed 3 December 2021.

rudimentary example, the process of mipmaping might be applied to melodic ornamentation: when furthest removed, the line is simplified to structural pitches, and as it is brought into focus, the line is varied and ornamented. Prokofiev’s “Romance” from *Kije* provides an example of how this might work: The primary theme is stated in the contrabass, is embellished by the viola, and is fully transformed into a virtuosic obligato line in the flute near the end of the movement (Figure 5.2). This would also be consistent with early music ornamentation practices which place priority on the leading voice.



Figure 5.2: The contrabass melody from the “Romance” from Lt. Kije Suite, followed by the viola ornamentation, finally by the flute obligato variation.

The relationship between a videogame and its music does not necessarily have to be one where the music is subservient to the whims of the game. The level design and gameplay structure of *Beeknighted64*'s demo are themselves inspired by the medieval instrumental dance forms of my previous works: the beginning of the game allows the player to experiment freely with no risk of failure, accompanied by a free-flowing improvisatory crumhorn melody as the setting of the game is introduced, marking the opening *neupma* of a dance. The first segment of gameplay is exploration-based, which can be divided into two loops with endings resulting in the player finding an item needed to advance. This formula is repeated for the second and third gameplay segments of puzzle-solving and combat, respectively, essentially overlaying the *pars* and *aperto* and *chiuso* ending structure of the dances. The finale is a battle where the player must improvise with all of the gameplay devices learned in order to succeed, paralleling a closing improvisatory fragment in the musical form.

This design is supported by the natural dance patterns of bees, who move in loops to inform other bees about where to find resources. Each segment begins with a relatively linear passage which then loops back on itself to reach a new area, mirroring the dance bees perform to signify resources that are near to the hive (Figure 5.3).

In *Two Live Burials*, the text of the first haiku and its accompanying musical materials were first presented in their original forms, then gradually transformed into the materials and words of the second haiku. This compositional process can be adapted through mipmapping for the soundtrack to *Beeknighted64*: the area that the player begins in presents one musical material which is fully detailed and as they progress further through the

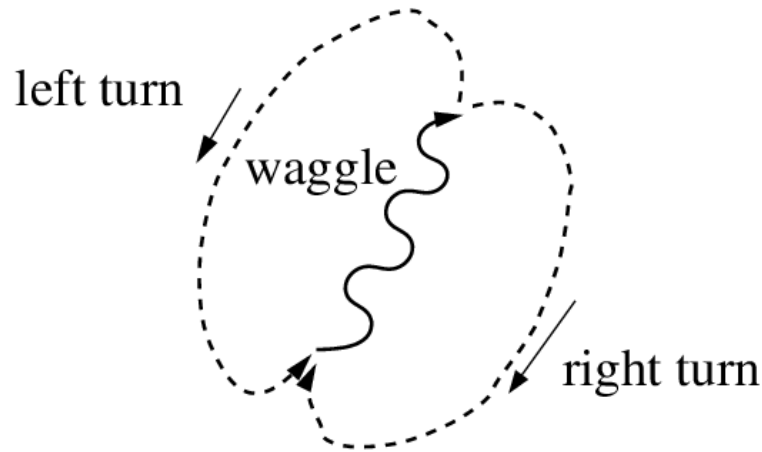


Figure 5.3: Honey bee communication dance to relay position of resources to the hive

challenges, the initial theme fades through losing complexity and focus and is instead gradually replaced with the closing musical material which grows more detailed the closer to the end the player gets, giving the player a sense of pacing to their actions.

As progress continues on the Beeknighted64 prototype and demo, I hope that the process of game development will elucidate further opportunities for new compositional techniques and uses of the ancient instruments which I have fully welcomed into my repertoire, and hopefully some of these new experiences will inform more traditional concert works as well, once the possibility of live performance returns.

## Bibliography

- Akasegawa, Genpei. *Hyperart: Thomasson*. Los Angeles, Kaya Press, 2010.
- The Art Minute. "Heironymus Bosch's Butt Music." <https://www.the-art-minute.com/hieronimus-boschs-butt-music/>
- Baseball Reference. "Gary Thomasson." [https://www.baseball-reference.com/bullpen/Gary\\_Thomasson](https://www.baseball-reference.com/bullpen/Gary_Thomasson)
- Baudrillard, Jean. *The Conspiracy of Art*. New York: Semiotext(e), 2005.
- Borges, Jorge Luis. *The Book of Imaginary Beings*, New York, Avon Books, 1970.
- CE Huntingdon. "Inspiration Part II: Hyperart Thomasson." <https://www.cehuntingdon.com/post/inspiration-part-ii-hyperart-thomasson>
- The Classic Review. "Review: "What's Next Vivaldi?" - Kopatchinskaja, Antonini." <https://theclassicreview.com/album-reviews/review-whats-next-vivaldi-kopatchinskaja-antonini/>
- TheGamer. "10 Nintendo 64 Games That Were Held Back By The Hardware." <https://www.thegamer.com/nintendo-64-games-better-hardware/>
- Gann, Kyle. "Twelve-Based Equal Temperaments" from *The Arithmetic of Listening*. Champaign: University of Illinois Press, 2019.
- Gann, Kyle. "Some Quarter-Tone Impressions (Haba, Ives, Wyschnegradsky)" from *The Arithmetic of Listening*. Champaign: University of Illinois Press, 2019.
- Hauwe, Walter van. *The Modern Recorder Player*, Mainz, Schott Musik, 1992, vol.3.
- Hurford, E. M. (2009). *Gender and Sexuality in Shoujo Manga: Undoing Heteronormative Expectations in Utena, Pet Shop of Horrors, and Angel Sanctuary* [Master's thesis, Bowling Green State University]. OhioLINK Electronic Theses and Dissertations Center. [http://rave.ohiolink.edu/etdc/view?acc\\_num=bgsu1250882984](http://rave.ohiolink.edu/etdc/view?acc_num=bgsu1250882984)
- Iowa State University. "Crumhorn." <https://www.music.iastate.edu/antiqua/instrument/crumhorn>
- Lachemann, Helmut. "Philosophy of Composition: Is There Such a Thing?" in *Essays on Music, Language and Time*. Leuven: Leuven University Press, 2004.

- The Legend of Zelda: Ocarina of Time* [Videogame]. 1997, Nintendo.
- Level 2 Game Development. “A2 Task 3 Video Game Evolution: Mario Series.”  
<https://bradh2002.wordpress.com/a2-task-3-video-game-history/>
- Marshall, David. *Mass market medieval: essays on the Middle Ages in popular culture*.  
 Jefferson: cFarland & Co., 2007.
- The Mary Rose. “The Artifacts.” <https://maryrose.org/the-artefacts/1/>
- McGee, Timothy. *Medieval Instrumental Dances*. Bloomington: Indiana University Press, 1990.
- Meyer, Kenton. *The Crumhorn: Its History, Design, Repertory, and Technique*, Ann Arbor, UMI Research Press, 1981.
- Miura, Kentaro. *Berserk*, Dark Horse Manga, Milwaukie, 2019-2021.
- Musikhandwerk. “The MILLA Crumhorn.”  
<https://www.musikhandwerk.de/UK/renaissance.html>
- NieR: Automata* (Playstation 4 version) [Videogame]. 2017, Square Enix.
- Nintendo Life. “Feature: Behind the Music of Final Fantasy: Crystal Chronicles Remastered Edition.”  
[https://www.nintendolife.com/news/2020/09/feature\\_behind\\_the\\_music\\_of\\_final\\_fantasy\\_crystal\\_chronicles\\_remastered\\_edition](https://www.nintendolife.com/news/2020/09/feature_behind_the_music_of_final_fantasy_crystal_chronicles_remastered_edition)
- Nun Massacre* [Videogame]. 2017, Puppet Combo.
- Oxford Music Online. “Prelude.” <https://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000043302>.
- Pittaway, Ian, Early Music Muse. “The mysteries of the medieval fiddle: lifting the veil on the vielle.” <https://earlymusicmuse.com/lifting-the-veil-on-the-vielle/>
- Pocknee, David Antony (2017) *How to Compose a PhD Thesis in Music Composition*.  
 Doctoral thesis, University of Huddersfield.
- Rae, John Charles Bodman. *Pitch Organisation in the Music of Witold Lutoslawski Since 1979*. PhD dissertation, University of Leeds, 1992.
- Rareware. *Banjo-Kazooie* [Videogame]. 1998, Nintendo.



- The Renaissance Workshop Company “Crumhorn.”  
<https://www.renwks.com/products/crumhorn/crumhorn.htm>
- SGI Depot. “Nintendo 64 System Description.” <https://www.sgidepot.co.uk/sysdesc.html>
- SGI Depot. “Trilinear Mipmapped Interpolation (TLMMI).”  
<https://www.sgidepot.co.uk/tlmmi.html>
- SGI Depot. “Texture Mapping.” <https://www.sgidepot.co.uk/tex.html>
- SGI Depot. “Z-Buffering.” <https://www.sgidepot.co.uk/z.html>
- Shepherd, Jay. “Gesualdo: Chromatic Harmony and Microtonal Systems in Early Music.”  
<https://www.youtube.com/watch?v=JRF1vZiYB70>
- Super Mario Boards. “A Close Look at Mario Models Throughout the Years.”  
<https://www.marioboards.com/threads/38871/>
- Video Game Console Library. “Nintendo 64.”  
<https://www.videogameconsolelibrary.com/pg90n64.htm#page=reviews>
- The Walters Art Museum. “Medieval Europe.”  
<https://art.thewalters.org/browse/category/medieval-europe/>
- Wood, James. “On reconstructing Gesualdo’s *Sacre Cantiones, libre secundus*.” *Early Music*,  
Volume 41, Issue 4, November 2013, Pages 657–664
- Wyschnegradsky, Ivan. *Manual of Quarter-Tone Harmony*. Brooklyn: Underwolf Editions,  
2017