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The Sound of Adventure: Two Original Compositions That Combine Music, Sound Design, and Post-production, Inspired by Outdoor Experiences

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THE SOUND OF ADVENTURE: TWO ORIGINAL COMPOSITIONS THAT COMBINE MUSIC, SOUND DESIGN, AND POST-PRODUCTION, INSPIRED BY OUTDOOR EXPERIENCES.

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ABSTRACT

Composers have been inspired by nature for centuries, but writing music about nature is becoming more popular in our day. Now, under titles like “Landscape Music” and “Environmental Music,” many composers seek to embody the feeling of nature in music. What has yet to be fully developed is how electronic music and landscape music can overlap in the chamber music world. This project culminates in two original compositions, *Natural Opposition (ca. six min),* and *Giants at Night (ca. 15 min),* that seek to satisfy the requirements of both realms by combining naturally inspired music with electronic influences. The compositions themselves contain principles of minimalism and spectralism, elctroacoustic music, impulse response and digital reverberation, and live manipulation of sound through post production techniques.

In this way, this project builds unity between the worlds of landscape chamber music and electronic music in new and intriguing ways.

ACKNOWLEDGEMENTS

I would like to extend a special thanks to Dr. Stephen Lias for his help in organizing and putting together this thesis project. Without his guidance this thesis may have never made it to fruition. I would also like to thank the graduate school at Stephen F. Austin State University for supplying me with scholarship money to complete my research as well as allowing me to present my research at the school. I would be remiss if I did not also recognize my wife Leslie Gibson for her help in proof reading and helping me to make sense of my ideas.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

CHAPTER 1 - INTRODUCTION

Music is an artform that often finds its inspiration in the natural world. Composers throughout most of recorded history have drawn some of their most potent ideas from nature. Notable examples of this include works such as *The Rite of Spring* by Stravinsky,[1] *Four Seasons* by Vivaldi,[2] and *The Planets* by Holst.[3]

Music today is no different. There are movements within the composition community whose sole purpose is to try to capture the essence of nature in a musical sense. In modern times many works by John Luther Adams, Stephen Lias, Alex Shapiro, and Justin Ralls (among others) stand out as examples of this movement. In addition, the Landscape Music Network was established by Nell Shaw Cohen to "deepen public awareness and appreciation of the natural world by exploring and celebrating the work of contemporary composers and musicians who evoke

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[1] Igor Stravinsky. 1912. The Rite of Spring. Philharmonia Orchestra, conducted by Robert Craft. Released June 1, 2007. Naxos Music Library. https://sfasu-nml3-naxosmusiclibrary-com.steenproxy.sfasu.edu/catalogue/8.557508

[2] Antonio Vivaldi. 1723. Four Seasons. Budapest Strings, conducted by Bela Banfalvi. Recorded January 1, 2004. https://www.youtube.com/watch?v=GRxofEmo3HA.

[3] Gustav Holst. 1916. The Planets. CSR Symphony Orchestra, Bratislava, conducted by Adrian Leaper. Released December 15, 1989. https://sfasu-nml3-naxosmusiclibrary-com.steenproxy.sfasu.edu/catalogue/8.550193

landscape, nature, and place through music."[4] Clearly there is interest in the important work of exploring the natural world through music.

Concurrent to this movement is the development of electronic music in a chamber setting. Throughout the twentieth and twenty first centuries, there have been great changes in the technology affecting music. Electronic music projects have been in existence since the early 1900s and continue to expand in innumerable ways through all genres of music. Because of the vast technological advances included in this time period, the term 'electronic music' has become rather broad. In the last several decades, the technology related to music has expanded so quickly that there have been many technological advances that have yet to be fully fleshed out within concert music. An example of this is in the use of digital reverberation. In the beginning of the 20th century, to preserve the sound of music in a concert hall, it had to be recorded on location. In the 1950s "plate reverb – essentially a vibrating metal plate in a box"[5] was introduced. Spring reverberation, although invented in the 1930s became popular in the 1960s and was a more mobile reverberation created by

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[4] "About," About the Landscape Music Composers Network, http://landscapemusic.org/about/

[5] Justin Sandercoe. "Reverb: What, How and History" JustinGuitar.com, accessed October 10, 2019. https://www.justinguitar.com/guitar-lessons/reverb-what-how-history-fx-201

playing sound across a spring.[6] This produced a generalized sense of reverberation for electronic instruments such as the organ or electric guitar. Digital reverberation began as a studio-bound effect in the 1970s, followed by analog electronic reverberation pedals in the 80s. Now there is a technique using a recording of a range of frequencies in a space (impulse response), applied through a convolution reverberation plug-in (a mathematical computer program that converts an impulse response into a reverberation effect), that allows the digital creation of the sound of a space. That is, a reverberation effect which mimics a specific space.[7]

Some work has been previously done in attempting to combine electronic music and landscape music. For example, John Luther Adams is famous for an electronic installation in the Museum of the North at the University of Alaska, Fairbanks, called *The Place Where You go to Listen*.[8] In this piece, natural events such as weather patterns and seismic activity are transformed into musical events and played in real time. This project took years to assemble because it is so vast and

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[6] "Soundbridge Academy," Resources, Time-based FX, Spring Reverb, last modified November 8, 2017. https://soundbridge.io/spring-reverb/.

[7] Martin Walker. "Convolution Processing with Impulse Responses" Sound on Sound. Last Modified April 2005. https://www.soundonsound.com/techniques/convolution-processing-impulse-responses.

[8] The Place Where You go to Listen is a sound installation at the Museum of the North at the University of Alaska in Fairbanks. It is a room in which you sit and listen to the sounds produced by the transformation of natural phenomenon into audio.

innovative. As a small example of the scope of this project, John Luther Adams states:

> Debi-Lee Wilkinson translates the never-ending dance of the magnetosphere into galaxies of numbers and elegant constellations of graphs. Debi has graciously shared her work to be translated into music, allowing listeners in *The Place* to hear the aurora borealis, even when the sun is up or the sky is cloudy.[9]

This is a great example of how electronics and music can be combined in this genre, but it is only one illustration. In other instances, Adams has travelled to many different locations to record a piece to gather the reverberation of each place.[10] As will be explored later, and in greater detail, there are other ways to achieve a similar effect, which have not been explored in depth.

The compositions and writings found in this thesis are primarily about merging these two, seemingly juxtaposed, worlds. Although both exist side by side, and there have been some connections between the two, it is starkly clear that more research can be done in how to combine these ideas and how each might enhance the other. By blending principles of post-production and sound design with music written to invoke a sense of place, this project stands at a crossroads of cutting-edge technology and nature-inspired composition. Through field research in Denali

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[9] John Luther Adams, The Place Where You Go to Listen (Middletown, CT: Wesleyan University Press, 2009), xiv.

[10] John Luther Adams. "The Mathematics of Resonant Bodies" http://johnlutheradams.net/the-mathematics-of-resonant-bodies/ (Accessed October 11, 2019).

National Park (Alaska) and Arches National Park (Utah), I have collected sound samples of nature such as wildlife, water, wind, etc. and later combined them into a sonic design, representative of the places they were recorded, and worked them into two compositions. I have also collected an aural fingerprint (distinctive sound pattern unique to the area) of different spaces along the way by recording impulse responses at key locations. These impulse responses were then engineered to digitally represent what a musical event would sound like if it were to be performed in each space.

The inspiration for this project always comes from experiences in nature, but the execution of the performance can contain a myriad of post-production and sound design techniques. Some of these techniques may include the use of plugins such as MaxxBass[11] to boost the bass tones of a recording, a multi-band parametric equalizer to emphasize certain frequencies, or a low pass filter to creatively alter sounds. This process will aid in the expression of the music and help to provide a sense of the overall outdoor experience for the auditor.

The project began with preliminary research about compositional techniques such as minimalism, spectralism, electroacoustic music, field recording techniques, and applicable post-production techniques. The second stage included field research

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[11] MaxxBass. https://www.waves.com/plugins/maxxbass#adding-deep-low-frequencies-with-maxxbass

and asset gathering in Denali and Arches National Parks. Finally, the project resulted in two compositions about these experiences and provides an exegesis on how each technique was utilized in the compositional process.

These compositions could be performed live, or recorded in a studio and played back as a finished product. If they were performed live the sound would be slightly different, as the intrinsic reverberation in the composition may react with the natural reverberation of the space in which it is performed. This will be discussed later in more detail.

The five compositional approaches most relevant to this project are spectralism, minimalism, electroacoustic music, impulse response, and post-production manipulation of live sound. Although some of the things on this list may not appear at first sight to be compositional techniques, each is treated in a compositional way, as an instrument rather than technique added as an afterthought. Before explaining how each is used, it will be informative to briefly discuss the techniques. Although a summary of each of these is provided below, this is not intended to be a complete examination of the techniques (which would be beyond the scope of this thesis), but simply to provide the reader with a general understanding of how each approach applies to this project.

CHAPTER 2: COMPOSITIONAL TECHNIQUES

Spectralism

"Spectralism is a tendency in contemporary art music that takes the material attributes of sound as the point of departure for composition."[12] In the early twentieth century many Western composers were fascinated by serialism and other mathematical composition techniques which, other composers felt, took control away from the composer. Many also felt that this music was unnatural and mechanical in nature. Composers began searching for a more "natural" compositional style, a style which allowed the composer to regain control and which applied sound in the way we commonly experience it. So spectralism was born.

> One sense in which spectralism can be conceived of as 'natural' is indeed described in its opposition to serialism and other highly 'structural' approaches to composition. Murail identified the need for an 'antidote to the structuralist trend in music'. Grisey outlined his conception of musical time in opposition to the durational approach of 'Messiaen and the serial school' wherein a micro-pulse 'only exists as a way of working and has no perceptual reality'.[13]

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[12] Eric Drott. "Spectralism," Routledge Encyclopedia of Modernism (2016) https://doi.org/10.4324/9781135000356-REM1010-1

[13] James O'Callaghan. "Spectralism and the Appeal to the Natural," Twentieth-Century Music 15, no. 1 (2018): 60. https://doi.org/10.1017/S1478572218000063.

Spectralism is a compositional technique in which the composer uses "the sound spectrum as their creative material."[14] Sound is perceived by our ears interpreting pressure waves, usually through the air. Our ear gathers information about the sound's frequency, amplitude, etc. and translates that into signals that we perceive as pitch, volume, and timbre. Each sound can be broken into a few distinguished parts. The first is called the fundamental pitch. The fundamental pitch is the pitch that we hear when a sound is played and is generally the loudest and lowest of the pitches that occur when sound is produced. The rest of the sound waves are termed its partials. Partials can be broken up into two parts called harmonics and inharmonics. Harmonics are a group of tones based on the harmonic series (overtone series) that occurs when a wave is divided evenly by ½, ⅓, ¼, etc. as shown in musical example 1.

[14] Iuliana Porcos. "Spectralism. Spectral Composition Techniques," Bulletin of the Transilvania University of Brasov 10, no. 2 (2017): 90.

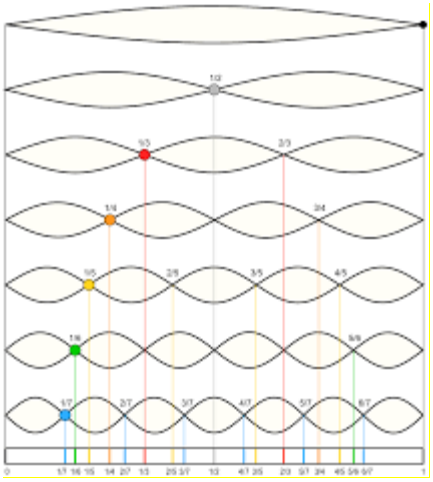

Illustration 1 – Division of Sound Waves

The pitches can be expressed with relative accuracy within our current tonal system. The following graph shows the harmonic series based on a fundamental pitch of C up to the 12th harmonic. The notes with arrows represent notes that are significantly lower than the written note. For example, the note Bb is written based on equal temperament but the actual note in the harmonic series is 31 cents lower than is written. That is a third of the way from Bb to A. The F# on harmonic 11 is actually 51 cents lower than the written note, or approximately a quarter tone lower.

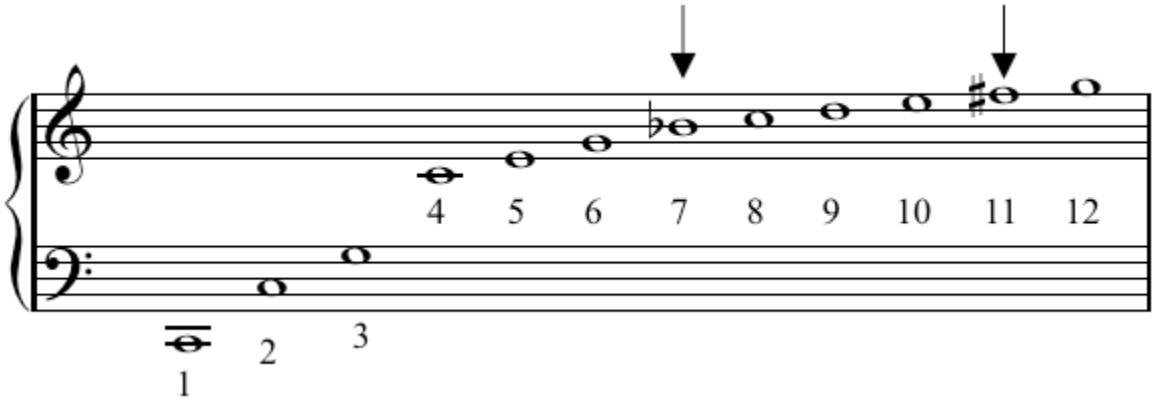

Illustration 2 – The Overtone Series

All other partials found within a sound are called inharmonic partials, and are found at varying intensities. Every sound has a variety of inharmonic partials that determine the sonic timbre of a sound. The timbre of each sound is created by "the mix of the fundamental sound (in varying proportions) with its harmonics as well as their intensity or quality resulting from the way they are produced."[15]

These things are the elements of the sound spectrum mentioned earlier. As such, composers of original spectralism used the tones of the overtone series as the basis for the notes in their creative material.

In the early days of spectralism, composers, mainly in Europe, began experimenting with the sound spectrum as had recently become easier to measure

[15] Porcos, 91.

and calculate because of the invention of the spectrogram. Perhaps the most influential work on the subject is Grisey's *Partiels* from *Les Espaces Acoustiques.*[16] In it, Grisey opens with a simple usage of pure spectralism, having each instrument represent a tone of the harmonic series. *Partiels* employs spectralism in its most basic form. As John Croft States:

> Nobody now, of course, would present the harmonic series so starkly as in the opening of *Partiels*; we have more sophisticated and subtle techniques . . . There is a sense in which *Les espaces acoustiques* is the one and only spectral work; anything composed since this cycle might, of course, be informed by it in many ways, but one cannot go beyond it.[17]

Another well-known composer that was contemporary to Grisey who was informed by these works, as well as a pioneer in his own right, is Tristan Murail. Speaking of the origins of spectralism he says,

> The initial goal, which motivated our extensive timbral and harmonic research, was the desire to develop the capacity to control the finest possible degrees of change. Having achieved this, however, we began to feel that the music had perhaps become too directional and predictable; we then had to find a way to re-introduce surprise, contrast and rupture. Contrary to the widely held view, they were never truly absent; even in the earliest pieces, like *Partiels*, there are quite a few unexpected turning points. In [Murail's] *Gondwana* (1980) for orchestra, which is considered a typical piece from this

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[16] Julian Anderson. "Grisey, Gerard," *Grove Music Online*, Published online 2001, https://doi-org.steenproxy.sfasu.edu/10.1093/gmo/9781561592630.article.45479.

[17] John Croft. "The Spectral Legacy," *Journal of the Royal Music Association,* 135 no. 1, (2010): 195. https://www.jstor.org/stable/43741611.

> period, there is continuity, but there are also ruptures and many other types of transition.[18]

The goal for spectralism now, is to find new and intriguing ways to employ spectralist principles, and that is one of the things that this project addresses. Specifically, how the natural phenomena of sound can be used to represent the natural world.

Alongside the creation of spectralist music, the Institute for Research and Coordination in Acoustics/Music (IRCAM) was created by Pierre Boulez to combine the study of acoustics and the study of music. Since that time, spectralism as it was created has evolved to include anything "which uses the acoustic properties of sound itself (or sound spectra) as the basis of its compositional material."[19]

Using this definition as a springboard, I have created a unique approach to spectral music by using the acoustic properties of the space itself (or objects from that space) as compositional tools. An example of this is taking impulse responses (which will be covered in greater detail later in this chapter) of canyons, caves, and the like, and writing music which highlights their resonant frequencies.

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[18] Tristan Murial. "After-thoughts," *Contemporary Music Review,* 19 no. 3 (2000): 7. https://doi.org/10.1080/07494460000640321

[19] Julian Anderson. "Spectral Music," *Grove Music Online,* (2001). https://doi-org.steenproxy.sfasu.edu/10.1093/gmo/9781561592630.article.50982

One way in which I have made the application of spectral principles unique is by applying these principles by electronic means. Parametric equalizers have proven particularly useful in achieving this. A parametric equalizer is an electronic plug-in which allows the amplifying or diminution of a specific frequency. In this way, one can pick out frequencies they want to enhance or diminish along the range of frequencies. One of the great difficulties of presenting the sounds of a place in a live setting and making them sound like they are actually in that place is that each sound is heard through the acoustics of the place in which they are listening. That is to say that a bird call played through a reverberation plugin will be heard as though it were in the space it was originally heard, as well as being heard in the concert hall in which that sound is played. One specific issue that this presents is the use of reverberation as a compositional tool. If a band is playing the music live, and having it recorded and played back through a convolution reverberation plugin, the effect could be obscured by the natural reverberation of the space in which it is being played. To combat this phenomenon, I have applied a multi-band parametric equalizer, placed at the specific frequencies I am trying to get the space to reverberate, and in this manner I am able to amplify the effect.

Minimalism

Minimalism is "a term borrowed from the visual arts to describe a style of composition characterized by an intentionally simplified rhythmic, melodic, and harmonic vocabulary."[20] Minimalism is often characterized by slow-moving harmonies and prolonged notes or repeated passages. It is often described with words such as "harmonic texture" rather than melody. "The Americans La Monte Young, Terry Riley, Steve Reich, and [Philip] Glass, all born within 18 months of each other from 1935 to 1937, are widely considered pioneers in the evolution of musical minimalism."[21]

Examples of minimalist music include *Violin Phase* by Steve Reich[22] which uses a tape recording played at slightly different speeds so that they get out of phase, and *Glassworks* by Philip Glass[23] which uses repetitive instrumental structures.

Minimalism as a technique can be used in the context of this project in several ways. Some ways in which minimalism could be used is through slow-

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[20] Keith Potter. "Minimalism," *Grove Music Online*, (January 31, 2014) https://doi-org.steenproxy.sfasu.edu/10.1093/gmo/9781561592630.article.A2257002

[21] Potter, 1.

[22] Steve Reich. Composer. 2016. "Violin Phase" released on September 30, 2016 by ECM Records. Track 3 on *The ECM Recordings.*

[23] Philip Glass. Composer. 2016. "Glassworks" released on December 9, 2016 by Sony Classical.

moving chord progressions, repetitions which represent elements of the landscape, or having lots of space between sounds to represent the space of the landscape.

The principle of being "intentionally simplified" fits well with the simplicity often associated with nature. Thus, the use of minimalism fits well within the compositions.

Electroacoustic Music

Electroacoustic music is a term used for music that is played live through a loud speaker instead of being played by an instrument. Examples of this are included in the musique concrete movement during the 1940's. In this movement, sounds were recorded from various places and then used as musical material. These found sounds (as they were called) were altered or used in such a way so as to mask their identity or location. In this way they differ from simple field recording. That being said, a field recording played back as part of a live performance is also considered electroacoustic music. This is part of the way that electroacoustic music can apply to the performance of the compositions associated with this project.

As field recordings are taken, manipulated and combined into a soundscape, they can be played back as a musical element of the composition. In this way, live performers may play alongside a prerecorded or preprogrammed soundscape which would be played through loudspeakers during the performance.

Another way that electroacoustic music may be used is by playing electronic manipulations and effects through a speaker. In this manner the reverberation effect referenced earlier can be played through speakers alongside live music.

Impulse Response

According to the Institute for Telecommunication Sciences an impulse response is defined as "The waveform that results at the output of a device when the input is excited by a unit impulse."[24] This phenomenon can be explained as the sound that results as the echoes of another sound. For example, if a sound is played in a cave, the reverberation of that sound (not including the initial sound itself) is the impulse response. There are essentially two ways to create an impulse response. First, by playing a range of frequencies that spans the audible spectrum of sound (sine frequency sweep), recording the sound that results, and putting that sound into a convolution reverberation plugin. Second, by creating a spike of sound (impulse) such as that created by hitting boards together or creating some other broadband noise, and using the same process of inputting the resultant sound into a convolution reverberation plugin. Recording a frequency sweep is considered the more professional method and tends to result in a better reverberation effect. Both

[24] Institute for Telecommunication Sciences. "Impulse Response." Last updated August 23, 1996. Accessed October 12, 2019. https://www.its.bldrdoc.gov/fs-1037/dir-018/_2686.htm

methods are relatively easy to perform in a controlled environment, but in the wild, creating a quality sound sweep presents many difficulties which will be addressed in more detail later.

An impulse response, gathered in the field, can then be applied into a convolution reverberation plug-in to create a unique reverberation effect that represents places on the journey. This reverberation effect can then be used either on a prerecorded track or placed on a microphoned track of a live performance to make the music sound more like it is being played in the place that the impulse response was taken. It can also be applied either on a section of the piece or the entire piece depending on the desired effect.

Manipulation of live sound.

Although at the time of this writing, neither piece has been performed live with electronics, one of the innovative concepts of this project is the idea of utilization of sound processing in a live setting. There are several ways in which this can be performed. One way to apply this concept will be the use of a parametric equalizer in a live performance. This can be used in conjunction with principles of spectralism. In this manner, a parametric equalizer can be placed to boost a frequency that is a common partial of several notes in a chord to boost the higher frequency, which is present but not heard as a fundamental pitch. In this way a melody can be created which sounds unearthly. An example of this principle can be

found in the song “Past Life Melodies” by Sarah Hopkins.[25] In this piece, Hopkins creates a series of harmonic “melodies” which sound much higher than the fundamental pitches being sung. By utilizing throat singing and harmonic manipulation in the human voice, choirs are able to produce clearly audible sounds, octaves above the fundamental pitches. To do this with an instrumental ensemble creates a unique difficulty because it is much more difficult to manipulate the timbre of the instruments in the same way that the human voice can be. However, the same principles apply in that these partials are included in every note that is played. The idea, then, is to bring out those frequencies by electronic manipulation, i.e. a parametric equalizer. As a sound is played, it can be picked up by a microphone and then played back in real time with a parametric equalizer applied to it and in this manner produce a more pronounced overtone.

Another way that sound manipulation in real-time can be applied is with the use of a custom-made reverberation. As impulse responses are gathered on location while adventuring, they can be used in a convolution reverberation plugin for a live performance. Again, as sound is picked up by a microphone during a live performance, it can be passed through this reverberation plugin and then played

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[25] Sarah Hopkins. 2010. “Past Life Melodies” Sung by the Iowa State Singers. March 2, 2010. Accessed October 12, 2019. https://www.youtube.com/watch?v=G7NzvNH9Me8

back with the live audio with little to no latency. In this way the audience can hear the sound in a similar way to how it would sound were it played in the environment of the impulse response.

The last way in which live sound may be manipulated during a performance of these pieces, is through the use of another plugin called MaxxBass. This plugin uses principles of psychoacoustics to make lower pitches sound louder and fuller. This is done, again, using techniques related to spectralism. As each fundamental sound has a series of partials associated with it, the brain can be tricked into "hearing" a sound that is not present by playing the associated partials. This principle is called a phantom fundamental. In the same manner, low tones can be made to sound more prominent. By using this technique in a live performance, through the same microphone and speaker technique spoken of above, specific notes in the live performance can be manipulated electronically

CHAPTER 3: THE ADVENTURE

Arches

Because I live so close to Arches National Park, the experience there was split into two adventures. A precursory adventure in which I was able to explore as a tourist, and an in-depth adventure, in which I spent time hiking, gathering resources etc.

During my first visit I brought my family. We spent two days driving around the area, experiencing the views inside and outside the park. Several themes emerged, some more quickly than I had expected. The first was the sense of struggle. There is very little water in the area. Although we went to the park right after a long bout of rain storms, there was hardly a trace. The plants that do grow are the hardiest varieties. We didn't see a single animal the entire time we were there, not even a lizard, (although I'm sure there were lizards nearby), and no animal droppings.

As part of this visit we decided to hike up to Utah's most famous landmark, delicate arch. The hike is only one and a half miles and there were hundreds of people hiking it, so we thought it would be a fairly easy hike. The hike was different than we expected. A significant portion of the hike is on a steep incline over smooth rock. There were people stopped everywhere you go, stopped to catch their breath. About half way up we spotted a puddle, shrinking and filled with dirt and grime and

what looked like moss. As we neared the top, there was a narrow pass that allowed us to maneuver around a smaller arch, which was banked by a tall cliff. As we negotiated our way around, a group came down, carrying a woman who looked to have sprained her ankle. We squeezed to the side in hopes of not pushing anyone off the cliffs. Finally we reached the top. We were soaked in sweat, tired, our legs were burning, but the view was spectacular. The arch was magnificent. There was a line of people over to the arch where each person was trying to get their picture alone with the arch. I snapped some photos with my 360 camera. We got a few more pictures and then headed back down to meet our ride; (we were woefully behind schedule.) As we made our way back down, I could see in my shadow that my sound equipment was hanging out and dangling by its wires. My wife stuffed it back in for me. As we neared the bottom we stopped briefly by the site of the old Wolfe Ranch, and I pondered about the treacherous landscape and lack of water and how difficult it must have been to farm here, to ranch here, to do much of anything here. As we got back to the car, I packed my gear into the back of the car and suddenly realized, my camera was missing. It was the really nice 360 camera that I had at the top, and it was gone. We racked our brains. Where could it be? When did we last see it? And then we realized - the swinging sound gear - It must have fallen out then. After speaking to other hikers, checking with the rangers, and later talking to the welcome center we realized it was gone. Lost to the desert. And so a theme emerged. A theme of loss, of struggle, of endurance. The arches themselves stand as a testimony to

enduring the ever-blowing wind. The plants survive, though there is not much water. Everything in this place seems to say, “we’re still here, no matter the struggle, we’re still here.”

During this time of discovery, I also discovered the flaw in my original thought of using two condenser microphones to record impulse responses and field sounds, i.e. the power needs of my microphones. After having recorded for a total of about two minutes, my Tascam Dr-40 didn’t have enough power to run the microphones any longer. The resulting recordings ended up being just fuzz. As a result, I did some testing of the internal microphones which use significantly less power. They were a little more “tinny” and lacked some of the power in the bass frequencies, but I was later able to boost the bass with my MaxxBass plugin.

I also discovered that, in order to gather a clean impulse response, I would have to return when there were not so many people. We were at the park during Memorial Day weekend – the busiest of the year for the park. We were also there during peak hours. Trying to gather an impulse response over the wind, crying babies, people testing out the echoes, foreign languages being spoken nearby etc. was challenging at best. Through the hustle and bustle of the tourists in the natural world I developed another idea. It would be, perhaps, a disservice to my attempt to portray life in the park to ignore the tourism altogether. For this purpose, I decided to consider writing a movement that attempts to represent the exploration of

Arches. I also decided to consider the use of an impulse response that contains the artifacts mentioned above.

By making a few changes, my second trip ended up a very different experience. First, I returned on a Monday and Tuesday, not around any holidays. This improved the experience because I was not surrounded by so many people. Secondly, I obtained a hiking permit to be able to delve deep into the Fiery Furnace area of the park. This allowed me to be truly alone for the first time in the park. Lastly, I stayed in the park until 11pm which allowed me to be alone again and experience the park from a night perspective.

I spent most of the first day in the Devil's Garden. This area contains a seven-mile loop with a well-maintained path that leads to several different arches and other attractions. One of my favorites was a sand hill going up a small canyon. The sound in this area was incredible. It caught and amplified every sound from the opening of the canyon. I could hear footsteps and conversations of hikers hundreds of feet away. I gathered an impulse response and some sound recordings.

From this sand dune, it was a short hike to Tunnel Arch and Pine Tree Arch. Pine Tree Arch was perhaps my favorite destination on this hike. There were very few people and the path lead directly to the base of the arch, allowing me to walk underneath and record impulse responses on each side of the arch and underneath the arch. The best sound, however, was just before the entrance to the arch. There were nice canyon walls that bounced sound in a fun and unique way. There was also

a sandy area there, back in the trees, which allowed me to record the sound of the sand falling and being moved around. The canyon walls also served as a decent wind break, although there was still wind that I had to work around.

I returned to the park that evening because I decided that I wanted to get some recordings of double arch during the night. I had tried to get some recordings on my first trip to the park, but the foot traffic was just too heavy. At night I was one of three people on the trail and the other two were silent and respectful of my desire to record the uninterrupted sounds of the arches. Double arch is one of my favorite places in Arches National Park. The sound during the day was great, but at night it seemed to be amplified even more. The echoes and impulse responses were fantastic. I recorded some just outside of the arches and some directly underneath. The air was cool, which was a nice change from the heat of the day, but my favorite part was the stars. They were spectacular. I sat for quite some time just gazing at them, watching the Milky Way, which is visible to the naked eye. I also heard some of the first wildlife that I saw in the park, crickets. It was a great quiet time to record sounds. I gathered some footsteps and cricket sounds.

On the second day, I got up and spent a few hours hiking through the Fiery Furnace. The Fiery Furnace is an area full of "fins" (large flat mountainous boulders that create a feel similar to a slot canyon). It is one of the most beautiful areas of the park and it is protected from large amounts of foot traffic by requiring a permit to explore it. This area had so much to offer visually and sonically. I felt that every few

steps I had to get out my sound equipment again because the sound changed so sharply from space to space. There were some small spaces that gave a very short impulse response, and some large spaces that echoed with each clap. The Fiery Furnace is kind of a maze of fins and rocks. Small arrows every now and again point the way for a better maintained path, but exploration is allowed. About midday I found myself off the path, scrambling up ravines and even going through spaces so narrow that I had to straddle the walls because there was literally no footpath. The striation of the rocks was impressive and every turn offered a new and fantastic view. I even found a little arch off the beaten path with a cave behind it that offered an amazing echo. After hours of hiking in the hot sun, getting a little bit lost, and running out of water I decided it was time to retrace my steps and find my way back to my car.

Arches: Musical Thoughts

There were several ideas from this trip that made it into my notes. The first, as mentioned above, was the idea of struggle. I can imagine the ranchers struggling to survive, to find water, etc. Along with this idea is the concept of perseverance. Although getting the ranch going must have been a struggle, once it was going it took some serious grit to keep it going, but that is just what they did. The plants are another testament to these themes. Although it is difficult to get a seed started, once

a plant is growing, the harsh conditions of the desert seem to be not enough to stop this life.

The second theme was a night theme. Night at Double Arch was one of the most fantastic parts of the whole trip. I loved the cool fresh air, it was a nice change from the heat of the day. The lack of foot traffic, conversation, and cars was very peaceful. Even though the noise of the crickets was quite loud in the otherwise silent space, it seemed, at times, almost imperceptible, more like a soft hum that blended into the background than thousands of bugs calling to one another. The stars were beautiful. The sky was so large that the stars seemed to envelop me in their soft glow. The peace from this experience was incredible.

Other possible themes include the striation of the rocks, which would nicely work as a stratification of music as Stravinsky composed. The sound in the rocks made me think of the possibility of adding reverberation to a recording or a live performance and also an echoing theme. Lastly, the arches themselves suggest perhaps a theme that rises and falls like an arch.

Denali

My trip to Denali National Park was part of a summer composing program called “Composing in the Wilderness.” This program was offered by the Fairbanks Summer Arts Festival in collaboration with Alaska Geographic and the National Park Service and was geared specifically toward wilderness-minded composers. It

began with a flight to Fairbanks Alaska. When I arrived it was fairly dark and very smoky. I caught a cab to Sven's Basecamp hostel, where, unbeknownst to me, I slept in the same dwelling as Louie, another Composing in the Wilderness participant. The next morning I took a cab back to the airport where I met with all of the other participants and our group leader. On the first day we drove down to Denali in a big van. This allowed us a few hours to start to get to know each other. We stashed some of our gear in the Murie Science and Learning Center, changed vans, drove to our camp, and got settled in. It was very smoky and everyone was just trying to get to know each other a little bit. We weren't allowed fires because of the dry conditions and forest fires nearby.

That night we walked down by the river and listened to the sounds. One of the scientists with us asked us to take some time to really experience the river, to try to experience it with all of our senses. It was the first of many experiences that allowed my mind to clear and my soul to find peace. I sat by the river and listened to the trickling sounds, it was very calming. I felt the water on my fingertips, smelled the cool wet air and allowed my thoughts to be still. I didn't expect the peace that it brought; I didn't realize I had been so uptight before. When we were done at the river, we gathered together again and hiked back through the forest. There was no trail, so in essence we bush-whacked our way back to the road. It was a surprise to be allowed to walk where there is no trail, especially in comparison with every other national park that I've been to where staying on the trail is emphasized. I didn't

expect to sleep much that night because of the bright night sky and all of the thoughts buzzing through my head, but I no sooner closed my eyes than I was asleep.

On the second day we arose early and had some breakfast. The smoke was still thick so we decided not to push ourselves too hard physically that day. We drove to a dirt parking lot near Igloo Mountain and started our hike on the park road. After a short while we simply veered into the bush. Because of the lack of visibility from the smoke and our desire not to overdo it physically we spent a lot of time looking and talking about things that we saw along the way; various plants, bits of animal tracks, (skat, antlers, hoof prints, etc.), and small wildlife. I learned about witches broom, which is a bacterial disease that causes a tree to grow more rapidly in some areas by producing a chemical that mimics tree growth hormones. I learned about dung moss that is carried from dung pile to dung pile by visiting insects. I learned about fireweed, which is prevalent in the area, and how it can be eaten. At lunchtime we found our way to a small knoll that we found to be marked with wolf skat. After I had eaten I took some time to go off by myself and clear my mind. Once again, I didn't expect anything abnormal, but found myself deeply pondering the significance, or insignificance of myself and my life. I have always felt that I needed to change the world, and yet here I was in a grandiose place that had been unchanged for thousands of years. Whether anyone knows my name makes no difference to the trees in Denali. Denali is greater than I am, and is unaffected by my

ability or inability to write music. And yet, at the same moment I felt like my choices perhaps could impact Denali and its future. Even in some small way I might affect others and their vision of what Denali is. It was quite a profound moment sitting on a bald spot in the woods.

After our moment of reflection we found our way down to a small lake nearby and proceeded to take off our shoes and wade in. We quickly made friends with a water beetle and participants snapped some pictures of each other. We spent some time in perfect stillness and quietness, which was quite difficult to maintain. Afterwards, we made our way back to the road, back to the van, and rode back to our camp.

On day three we hiked near Cathedral Mountain. We drove to the base of a wash and followed the river upstream. As we walked we noticed that the rocks in the river seemed to have an orange tint. We hypothesized about what would cause that discoloration. After a while hiking, the stream split into two, one inlet that had discoloration, and the other which looked fresh and clear. At this point we stopped to have lunch. We hiked up a small hill to get a better view of the area, ate lunch, and then I recorded an impulse response because the echo in the area was very unique. After lunch we took some time to just reflect. I walked to a more secluded place away from the group to sit and ponder. While I was sitting I began hearing the sound of rocks falling, but not a lot of rocks at once, more like one or two at a time. As I looked around I saw one of the other participants throwing rocks up onto a

rocky hill. The reverberation of the area was so active that from where I was, I could hear the sound as though it were right next to me. Later I used that active sound to communicate across the valley with my natural voice and was able to be heard and understood. It was quite incredible.

After our reflection time we hiked farther up the canyon and headed uphill, leaving the wash. As we neared the top of the nearest hill, we spotted a Dall Sheep in a crag of the nearby mountains. We paused to watch until it walked out of sight. When we heard thunder, we decided it was a good time to head down the hill and start making our way out of the mountains. On the way down, we spotted a golden eagle and a large bull caribou that we paused to appreciate, then made our way out of the mountains and back to our van.

On the fourth day, we took a break from our more intense hikes and drove to the Eielson visitor center. Before we left, we were joined by the Denali artist in residence, who happened to be a composer. He spoke to us of the residency program and what his plans were. It was a great learning experience to see someone living the experience that I've dreamed of. After breakfast we made our way to the vans and started the long drive. During the trip to Eielson we spotted three bears running full speed through a meadow. It was fantastic to see them, even though they were at a great distance, but as they ran we realized that they were running toward the road, right where we would cross. After a very short time the bears were nearly upon us. It was a mother bear and her two cubs. The cubs played while their mom grazed

nearby berries. It was an amazing experience to see them so close. After some time we continued on our journey.

When we arrived at Eielson Visitor Center, the smoke and fog was so thick we couldn't even see the visitor center from the parking lot. We made our way inside and looked out the window toward where Denali should be, but saw nothing other than fog. We ate lunch in the visitor center and as we ate the fog miraculously lifted and gave us a view that extended to the base of the mountain. It was breathtaking. In fact, it was so awe inspiring that a few of the other composers on the trip decided to base their compositions on this experience. We went for a short hike while at Eielson and talked about the mountain, the glaciers, and the formations of the valleys that we could see.

As we made our way back to camp we saw a large herd of caribou. The bears that we had seen earlier were not far behind the caribou and I wondered if the bears would cause any trouble with them. We stopped on the way back to drop off our composer in residence and discovered that his mother (who had joined him on the trip) had made blueberry cobbler for us all. We stayed and talked for a while and then made our way back to camp. We arrived just in time to start making dinner.

On day five we hiked up Tattler Creek. This was, perhaps, my favorite hike of the whole excursion. The river meandered back and forth throughout the valley that we were hiking in, which allowed for several small stream crossings. The air was finally clear and fresh. The views as we hiked up the wash were beautiful.

There were areas that forced us to help one another to climb up. We found several blueberry bushes, and, though it was early in the season, we found some ripe berries and ate them. We also found wild raspberry bushes and partook of their fruit as well.

When we reached the limit of distance that our timeframe would allow we stopped to eat lunch. After we had eaten, we took some time to explore the rocks of the area and found a few fossilized dinosaur footprints. It was exciting to see, and brought a different feeling to the area, knowing that dinosaurs had roamed that wild space. After some time there, we made our way back to the van and back to camp. It was a wonderful day, with beautiful views, good laughs with friends, and a good hike; not too strenuous, not too easy.

Denali Musical Thoughts

After our final hike, I knew that it was time to really start thinking about composing, but as of yet I hadn't come up with any really serious thoughts about what I wanted to write. I tried not to stress about it and just let my mind be free and clear. I spent the evening playing games with some of the other composers and the time slipped away from me. The sun tricked me into thinking it wasn't as late as it was. I wanted to go to bed, but I wasn't feeling tired, so I grabbed my notebook and a pencil and headed down to the Teklanika river.

I sat by the river and just let the view soak in. I spent some time in prayer and meditation, and then picked up my notebook and started to write the ideas that

came to my mind. What came out was probably gibberish to anyone else, but it was illuminating to me. It looked like this:

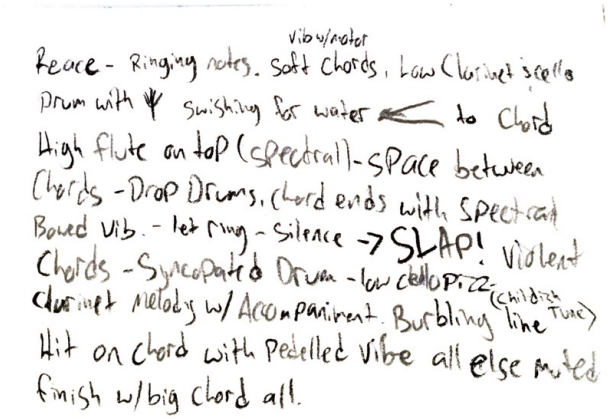

Illustration 3 – Musical Ideas from Denali

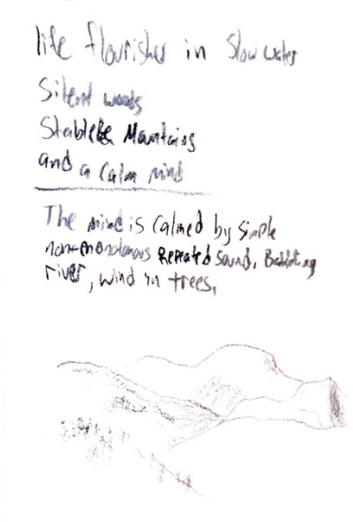

Illustration 4 – Notes from a Denali Hilltop

Technical Considerations

One of the greatest difficulties of this project was recording quality impulse responses, and gather clear recordings in the most uncontrolled environment, that is, the wild. Because of the nature of the research and asset gathering for this project, (i.e. hiking in wilderness environments) it was difficult to bring along all of the necessary equipment for a frequency sweep, such as a speaker. To bring a speaker powerful enough to produce a quality sine sweep brings up the issues of battery life, electronics in inclement weather, portability, the need of a device to store the sound file, and many others. I decided to work with a more primitive impulse response and brought two boards connected by a door hinge as my impulse generator.

Recording in a natural environment creates many difficulties. In the dissertation "Model Based Signal Enhancement for Impulse Response Measurement," Xun Wang explains, "if the measurement is performed in the field, . . . the accuracy is highly susceptible to environmental variances, such as the presence of noise, wind fluctuation and temperature drifts."[26] This leads to many considerations which affect the recording of impulse responses.

First, equipment. The equipment used in a field recording environment, as is the case in this project, demands careful equipment choices. Following the signal

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[26] Xun Wang. "Model Based Signal Enhancement for Impulse Response Measurement" PhD diss., Institute of Technical Acoustics, 2014.

flow of the sound, the first step that needs to be addressed is where the sound wave meets the equipment, that is, the microphone. Microphone choice is very important as it pertains to field recording. Directionality of a microphone is one of the first things to consider. Many field recordists use what is termed a shotgun microphone. This is a great option because it is small, and not prone to drastic reactions to pressure differences. The biggest problem with this kind of microphone in that it records in a single direction, which is great for recording a specific sound from a specific source, but does not allow the microphone to record a quality impulse response with reflections from many directions. Another consideration for the microphone that should be used is its sensitivity to pressure change. Wind and temperature change are both detrimental to a very sensitive microphone because they create a significant amount of noise. Although equipment such as a windscreen, and techniques such as microphone placement and finding a windbreak can help to reduce some of this noise, some noise does persist. Much of this noise can be removed in post-production, but this process also removes some of the desired broadband noise from an impulse response. For this reason, it is preferred to use a dynamic microphone, which is less sensitive to pressure change, instead of a more sensitive condenser microphone. Dynamic microphones are also preferred because they require no external power (called phantom power) like a condenser microphone. In short-term situations with a quality windscreen these conditions may

prove false, but for a long-term camping situation with no power source, it is necessary to conserve power as much as possible.

After numerous tests with a Tascam DR-40, I have found that the internal microphones provide a little less bass and a more “tinny” sound as compared to studio condenser microphones. This produces impulse responses of slightly lower quality, but by combining this treble-heavy recording with a plugin to boost the bass of the sound, I am able to produce a similar impulse response.

The second consideration for field recording is the technique used. The first stage of recording technique is preparation. It is important, especially for a remote recording location such as this project offers, to be prepared for every condition imaginable. In Alaska there is a good chance of rain, so I brought a plastic bag to store my recording device in, a rain cover for my backpack, and a rain jacket with water resistant pockets. Because there is likely to be wind in both environments, I brought a few different wind screens, a dense foam windscreen and a “dead cat” windscreen. Because I was planning a lot of hiking, it was important to plan for space and weight so I decided to bring just my Tascam D-40 and leave behind other microphones and cables. There are many examples of such preparation that won’t be discussed in detail.

The second stage of field recording preparation is planning what kinds of sounds will be gathered. I wanted to get a few specific sounds for the ideas I had for the compositions. First were percussive sounds; sticks breaking, rocks hitting,

footsteps, bushes brushing, etc. I also had to be prepared for any other percussive sounds that could arise. Second, were atmospheric sounds. These included wind, water, animal sounds, and general sounds of a space. These two different kinds of sound need to be treated in different ways. For example, overmodulation is a key concern for percussive sounds. Overmodulation refers to when the sound signal is too strong (loud) for the electronics of the microphone to process into an electrical signal. This causes distortion and negatively affects the clarity of the sound. This is especially a concern when using a loud clap of boards to create an impulse and impulse response. It was important to be able to set the microphones in a place that would gather a great response, but be far enough away that the slap of the boards did not create any distortion or clipping. It was also important to minimize wind and atmospheric noise for a percussive sound. Although it may be hard to perceive the source of noise in such a short percussive sound, it does affect the overall clarity of the sound. I had to use a wind break and a windscreen to reduce wind noise for these sounds. It was also helpful to record such sounds at night when the wind was often less forceful, and there was less foot traffic, which was primarily a concern for recording in Arches. For other percussive sounds it was important to find the sweet spot of distance from the microphone and loudness of the sound. I needed to be able to capture the sound as clearly and focused as possible, which led me to want to place the microphone near the source of the sound, but also to avoid overmodulation, which caused me to move the microphone farther away.

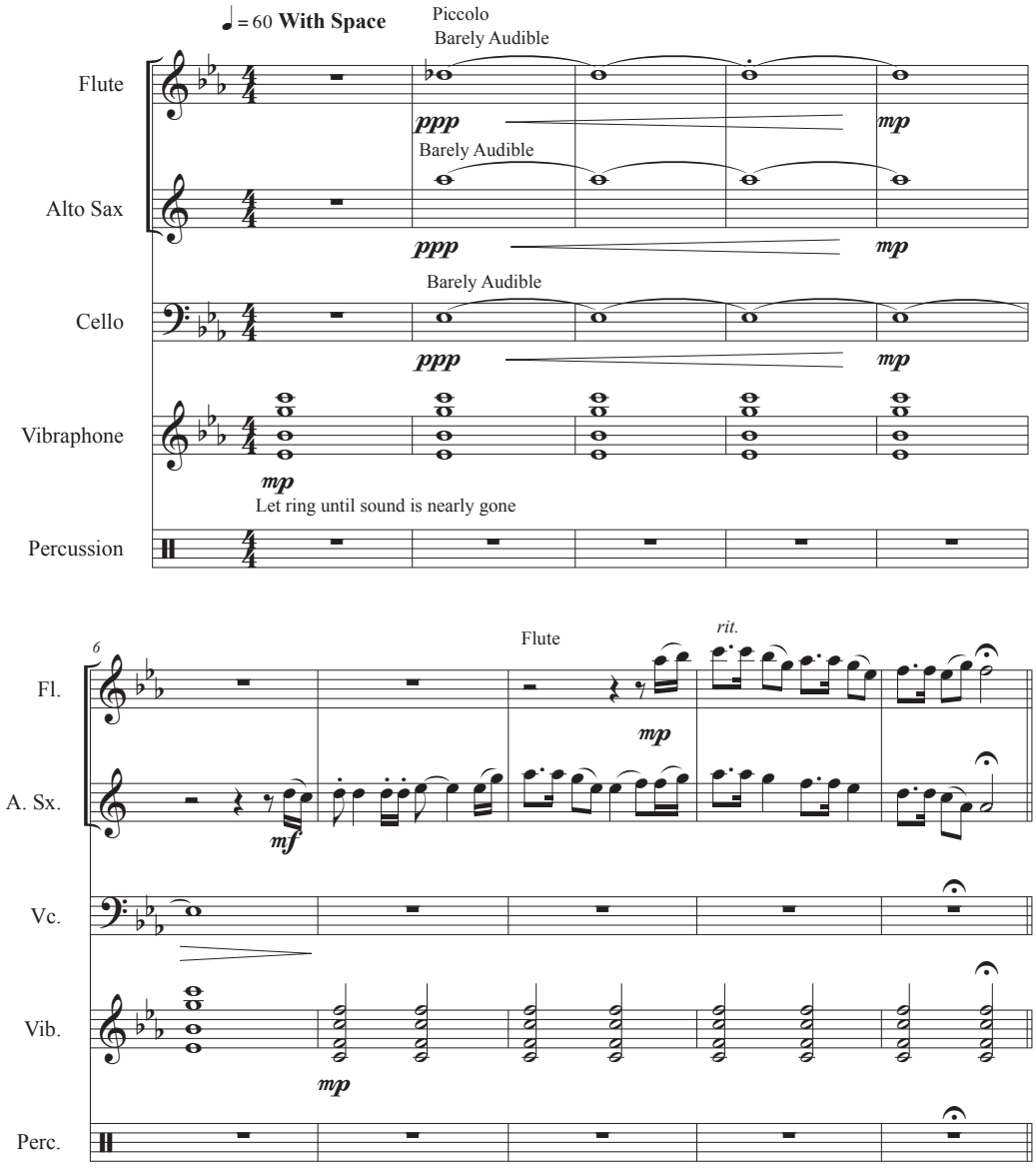
Recording atmospheric sounds required a much different technique. In this case I wanted the sound of the wind to be heard, but not to overwhelm the sounds of other things. I often found myself recording the rustling of branches or other things being moved by the wind. I also placed the microphone directly in the path of the wind, although I still used a windscreen to lessen its effect, and turned the microphone to face the same direction as the wind flow, so as not to have the wind pressure entering directly into the microphone. Sometimes I wanted the sound of a stream so I had to place the microphones near the water, other times I wanted to record the sound of a stream in the atmosphere so I had to place the microphones farther away.

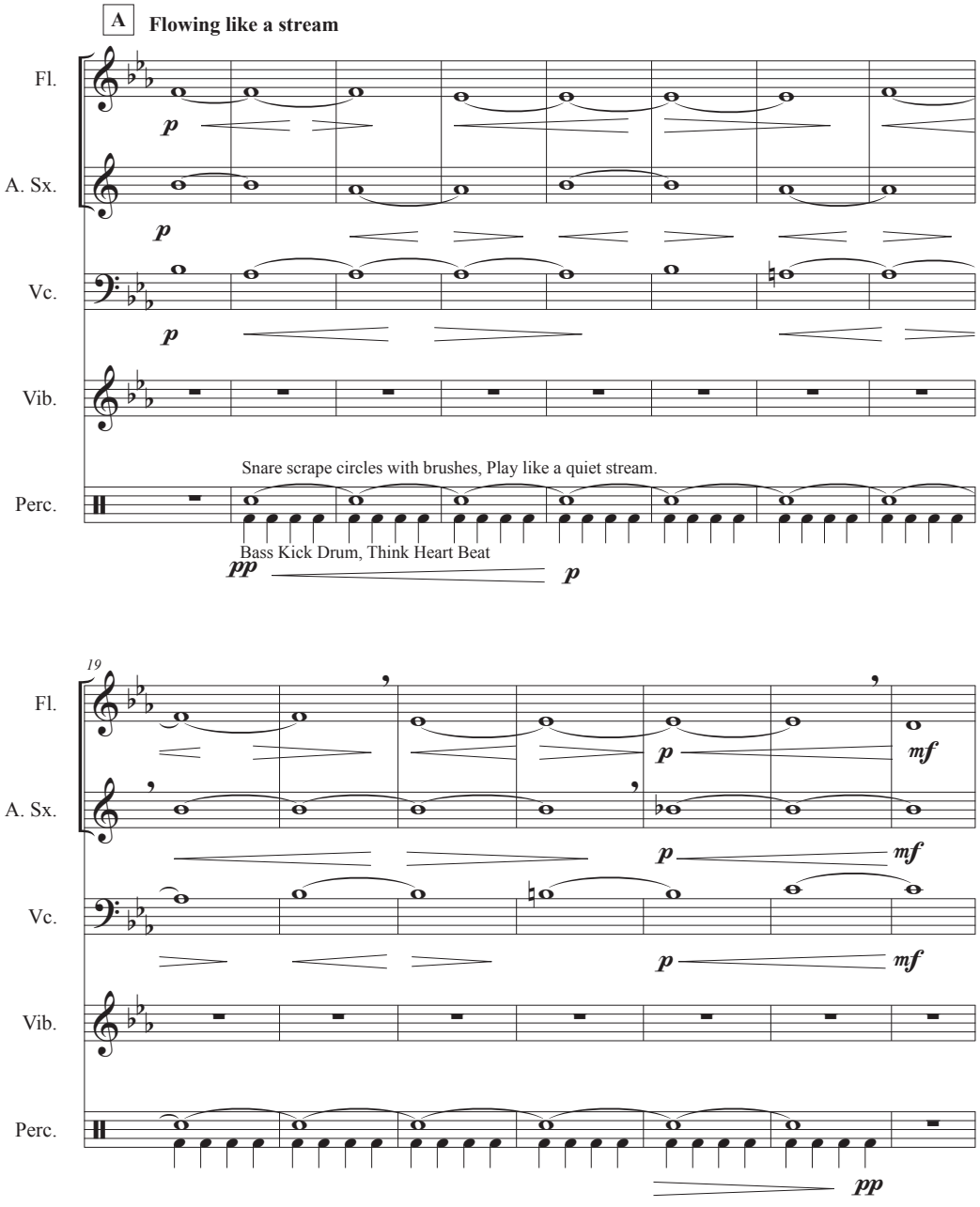
CHAPTER 4 – COMPOSITIONS

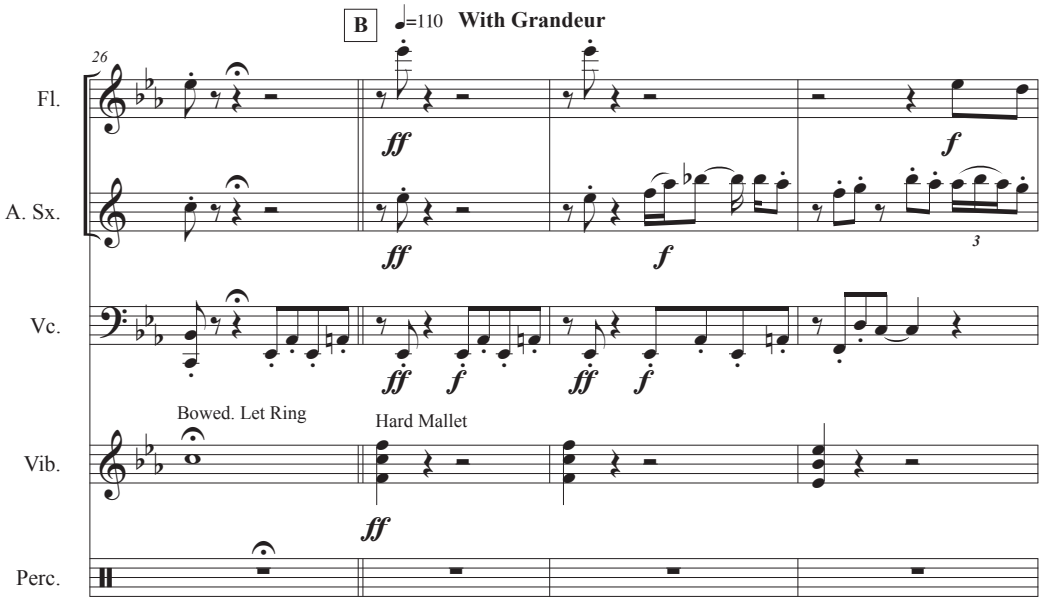
Score

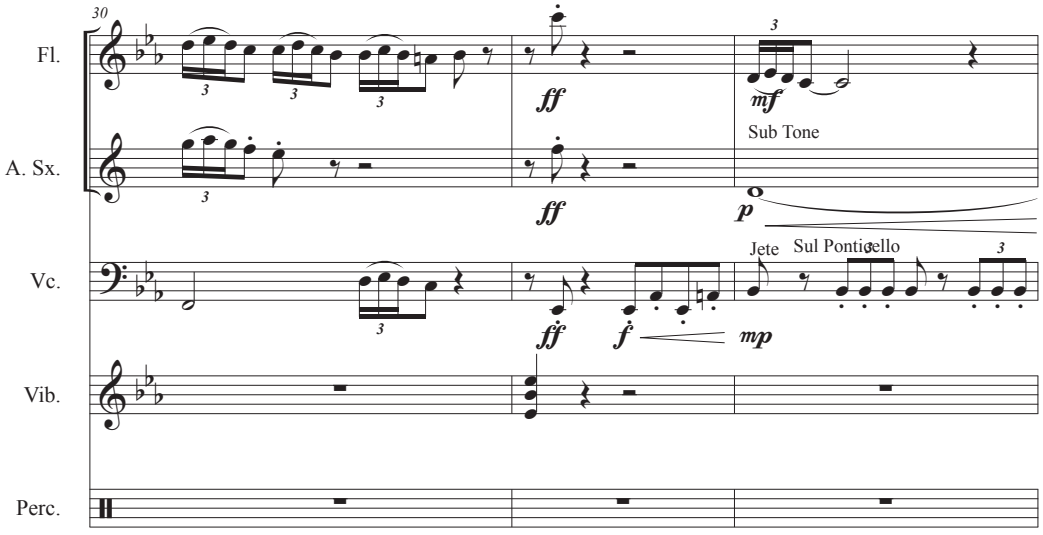
Natural Opposition

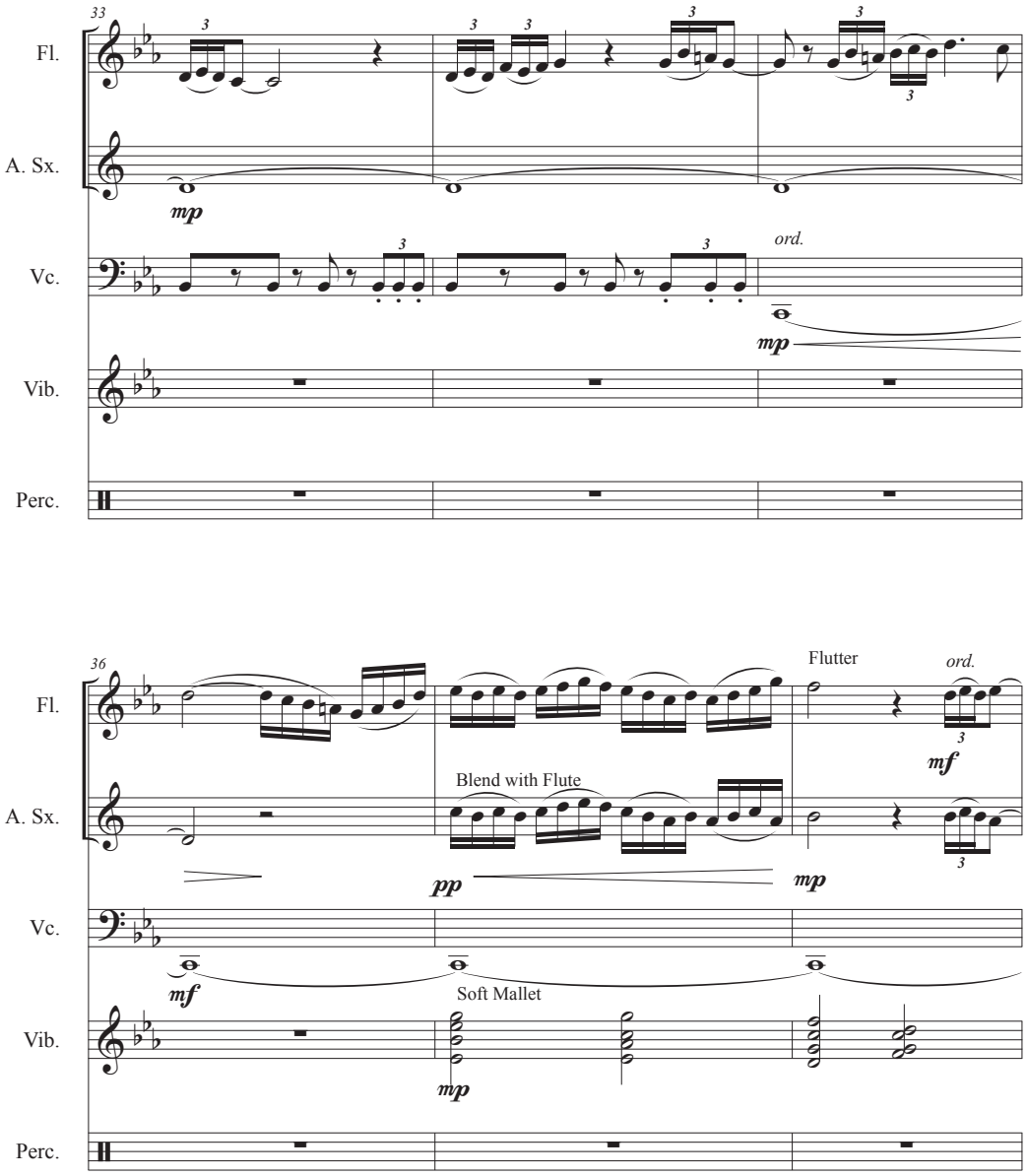
Jason K Gibson

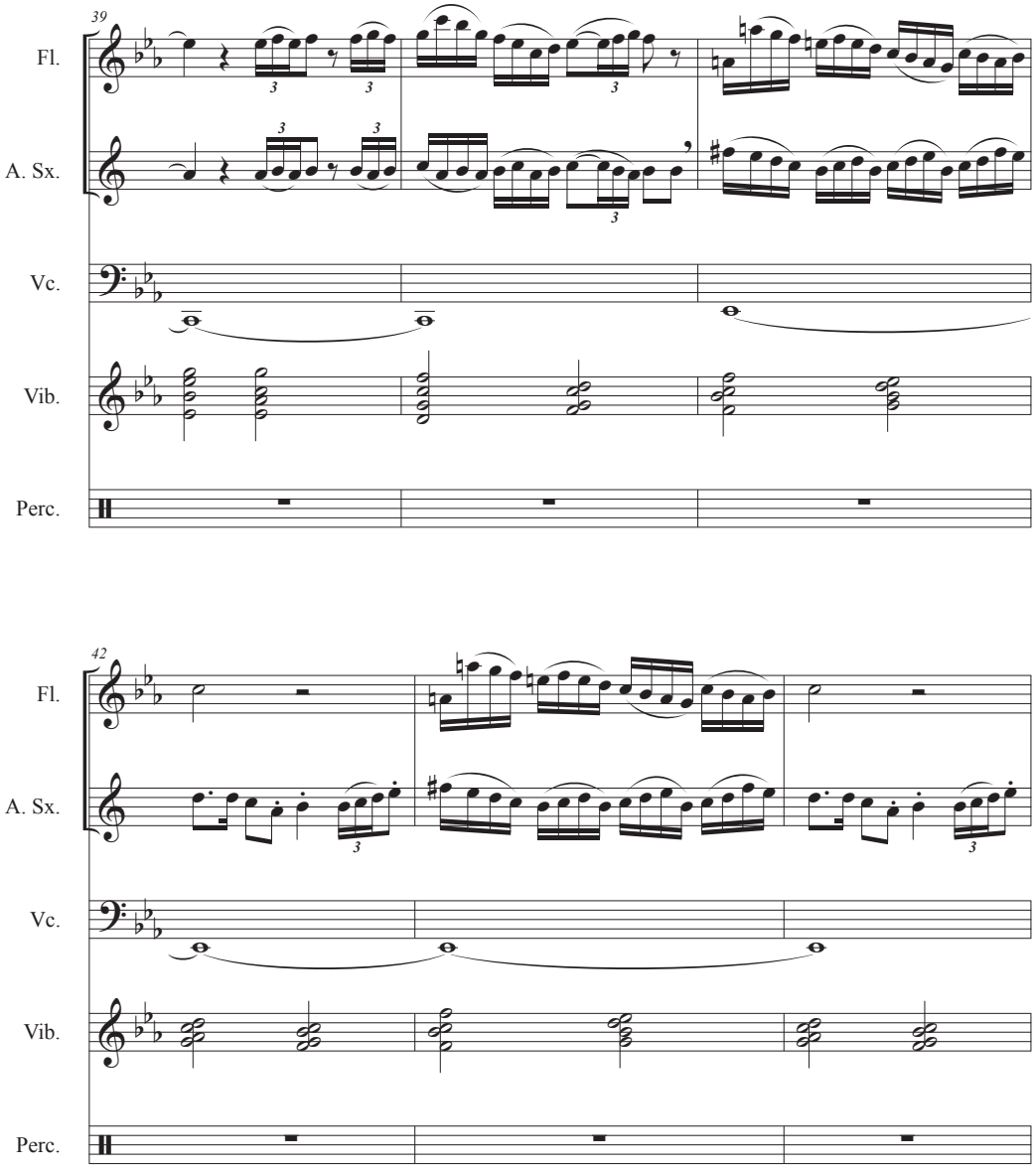


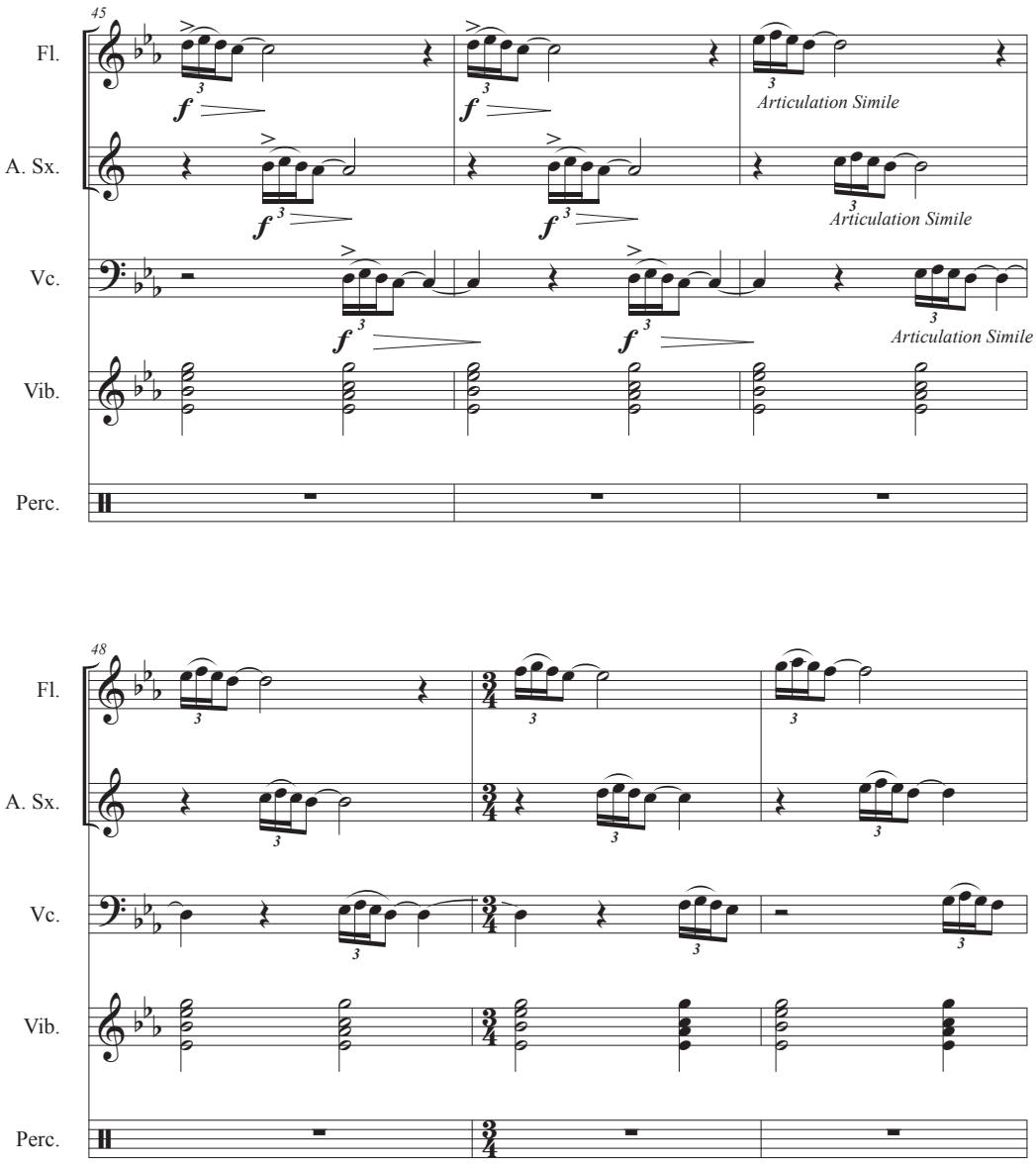

A
Flowing like a stream
Fl.
A. Sx.
Vc.
Vib.
Perc.
p
Snare scrape circles with brushes, Play like a quiet stream.
Bass Kick Drum, Think Heart Beat
pp
19
mf
pp

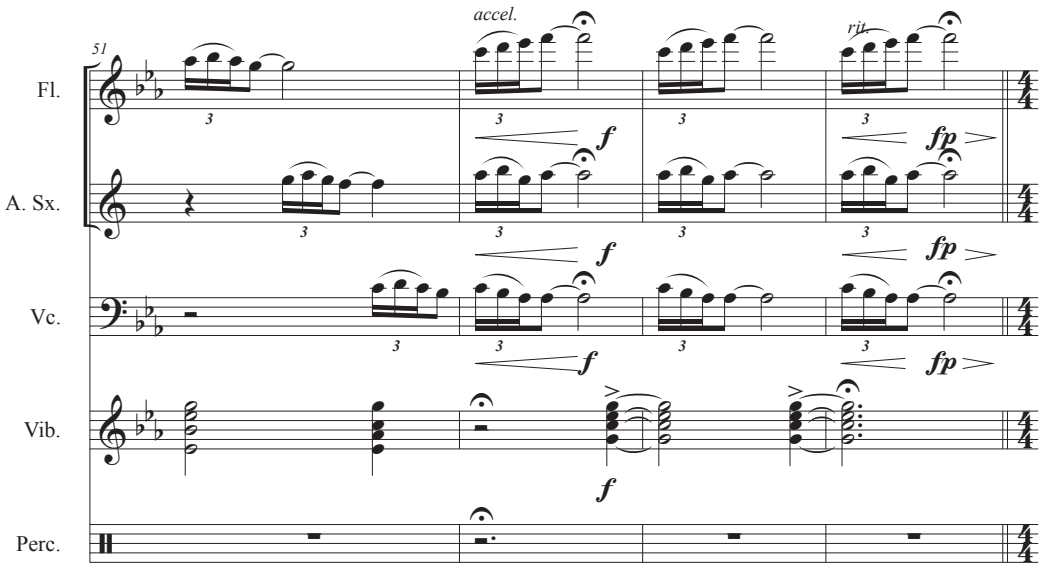

B
♩=110 With Grandeur
26
Fl.
A. Sx.
Vc.
Vib.
Perc.
Bowed. Let Ring
Hard Mallet
ff
f

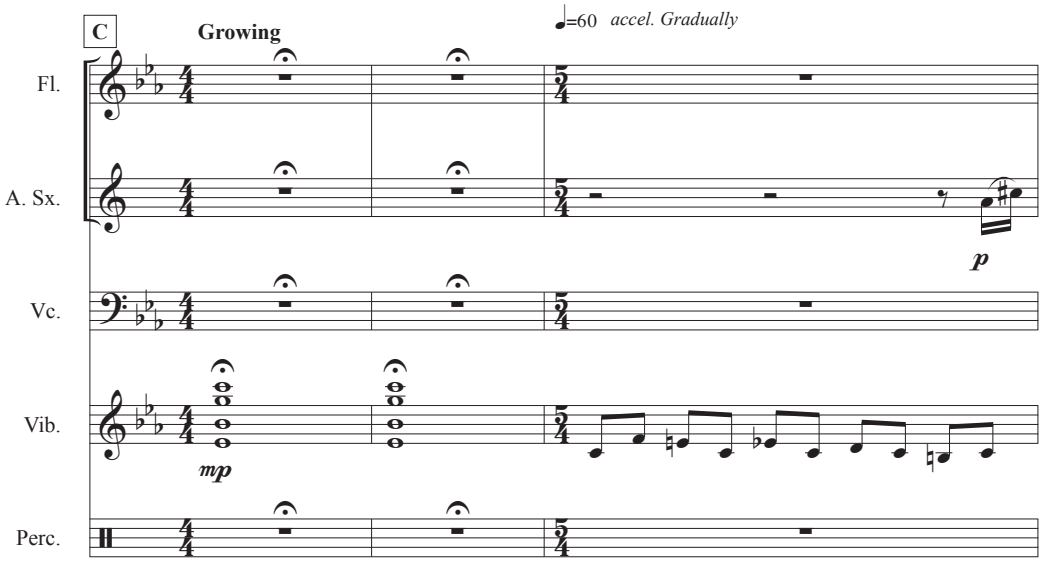

30
Fl.
A. Sx.
Vc.
Vib.
Perc.
mf
Sub Tone
p
Jete
Sul Ponticello
mp
ff
f

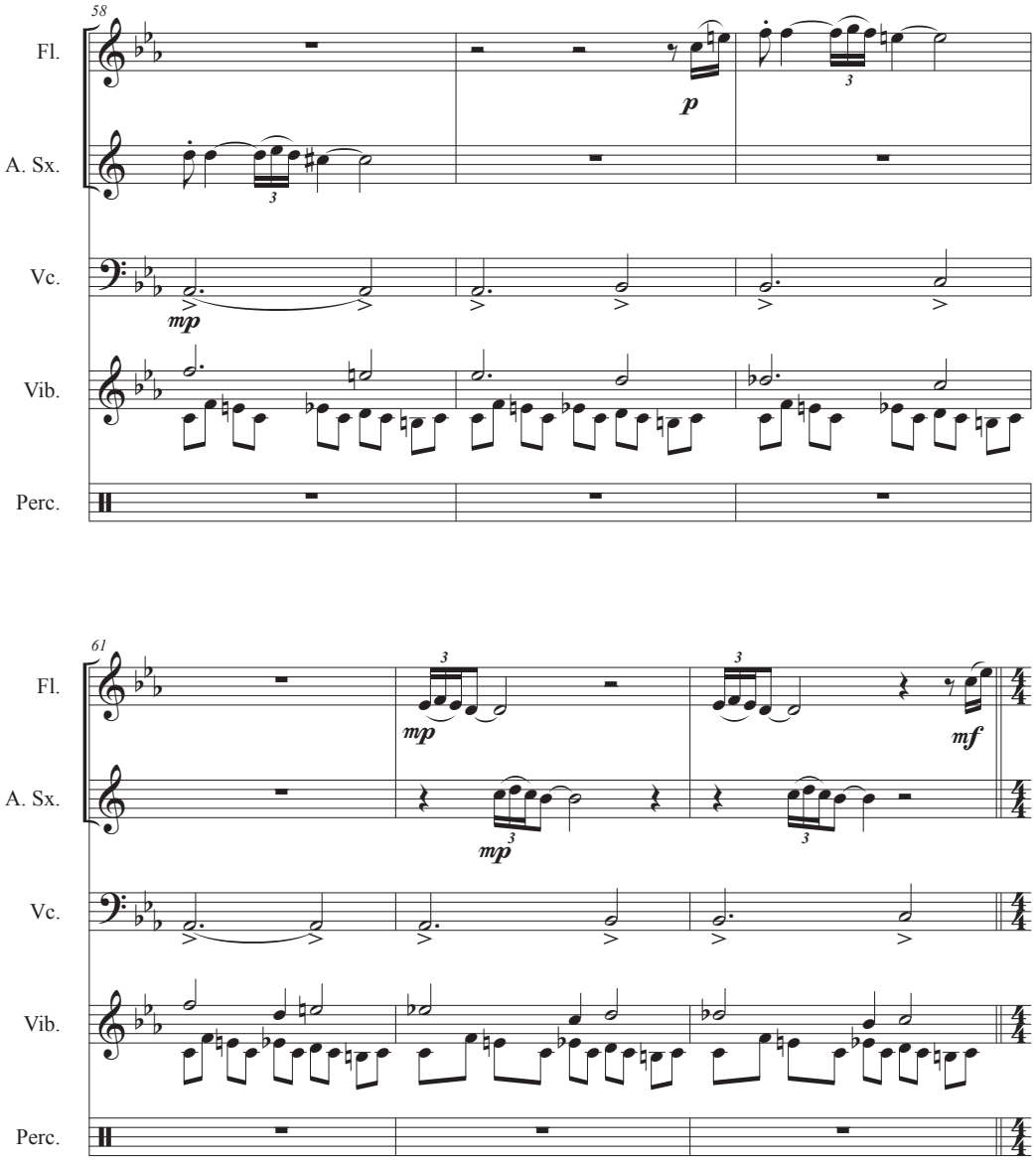

33
Fl.
A. Sx.
Vc.
Vib.
Perc.
mp
ord.
mp
36
Flutter
ord.
mf
Blend with Flute
pp
mp
mf
Soft Mallet
mp

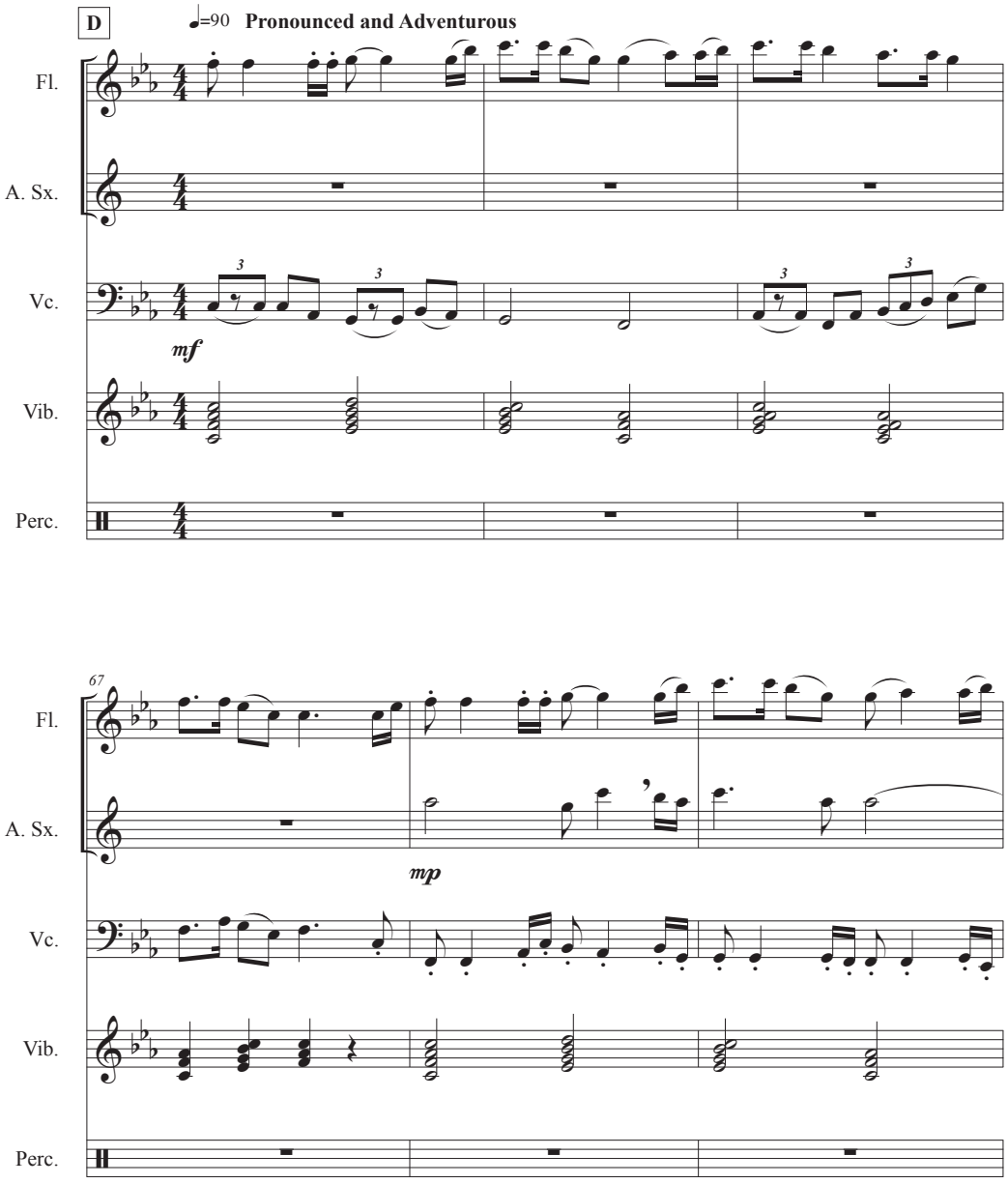

39
Fl.
A. Sx.
Vc.
Vib.
Perc.
42
Fl.
A. Sx.
Vc.
Vib.
Perc.

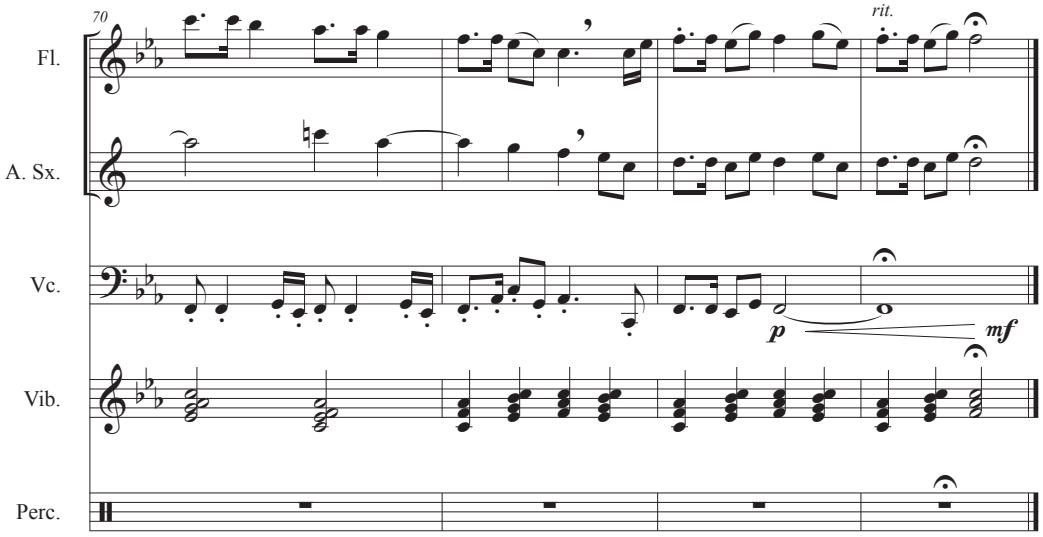

45
Fl.
A. Sx.
Vc.
Vib.
Perc.
f
Articulation Simile
48


accel.
rit.
51
Fl.
A. Sx.
Vc.
Vib.
Perc.
f
fp
3


C
Growing
♩=60 accel. Gradually
Fl.
A. Sx.
Vc.
Vib.
Perc.
mp
p

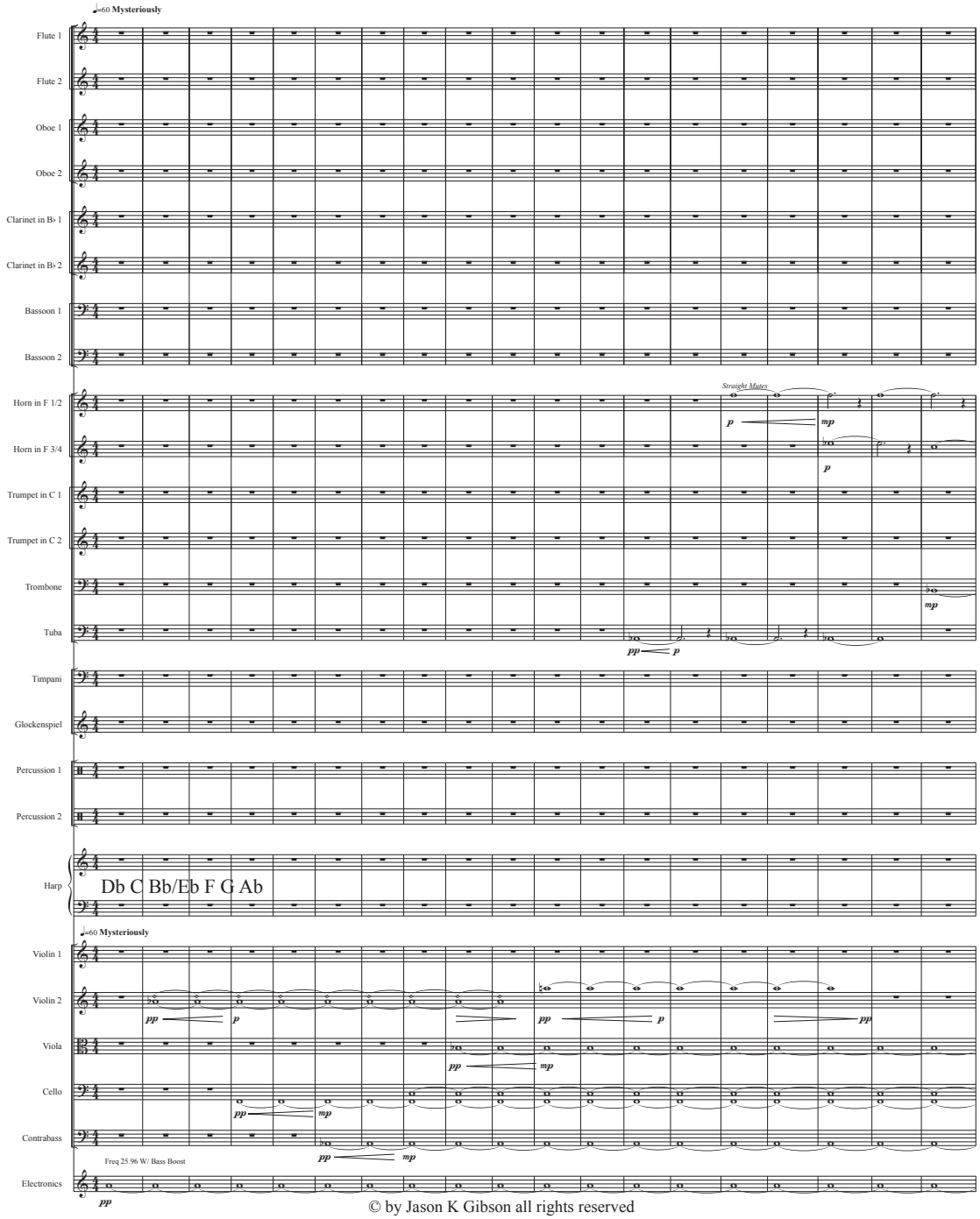

58
Fl.
A. Sx.
Vc.
Vib.
Perc.
p
mp
61
mp
mp
mf

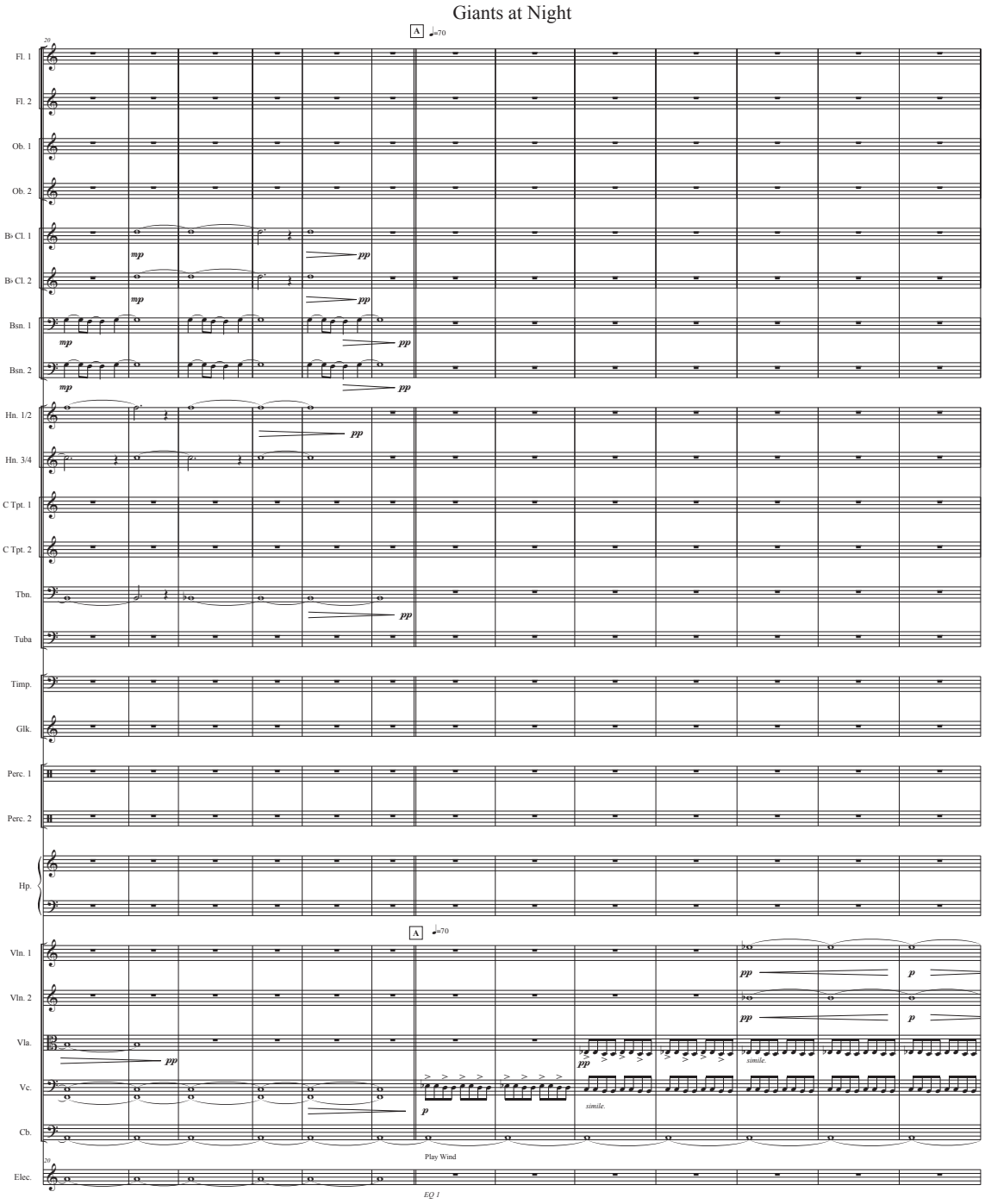

D
♩=90 Pronounced and Adventurous
Fl.
A. Sx.
Vc.
mf
Vib.
Perc.
67
Fl.
A. Sx.
mp
Vc.
Vib.
Perc.

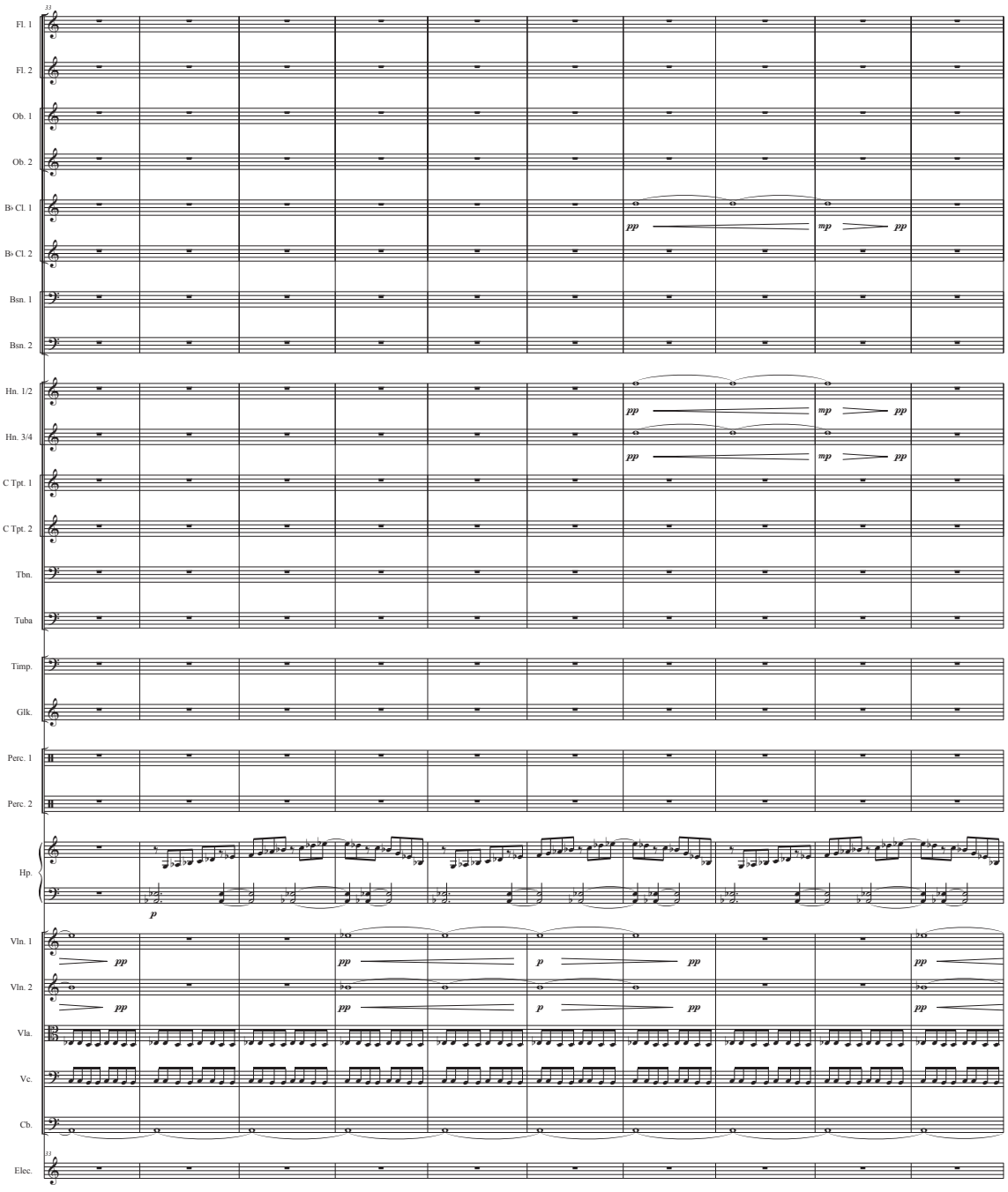

70
rit.
Fl.
A. Sx.
Vc.
p
mf
Vib.
Perc.

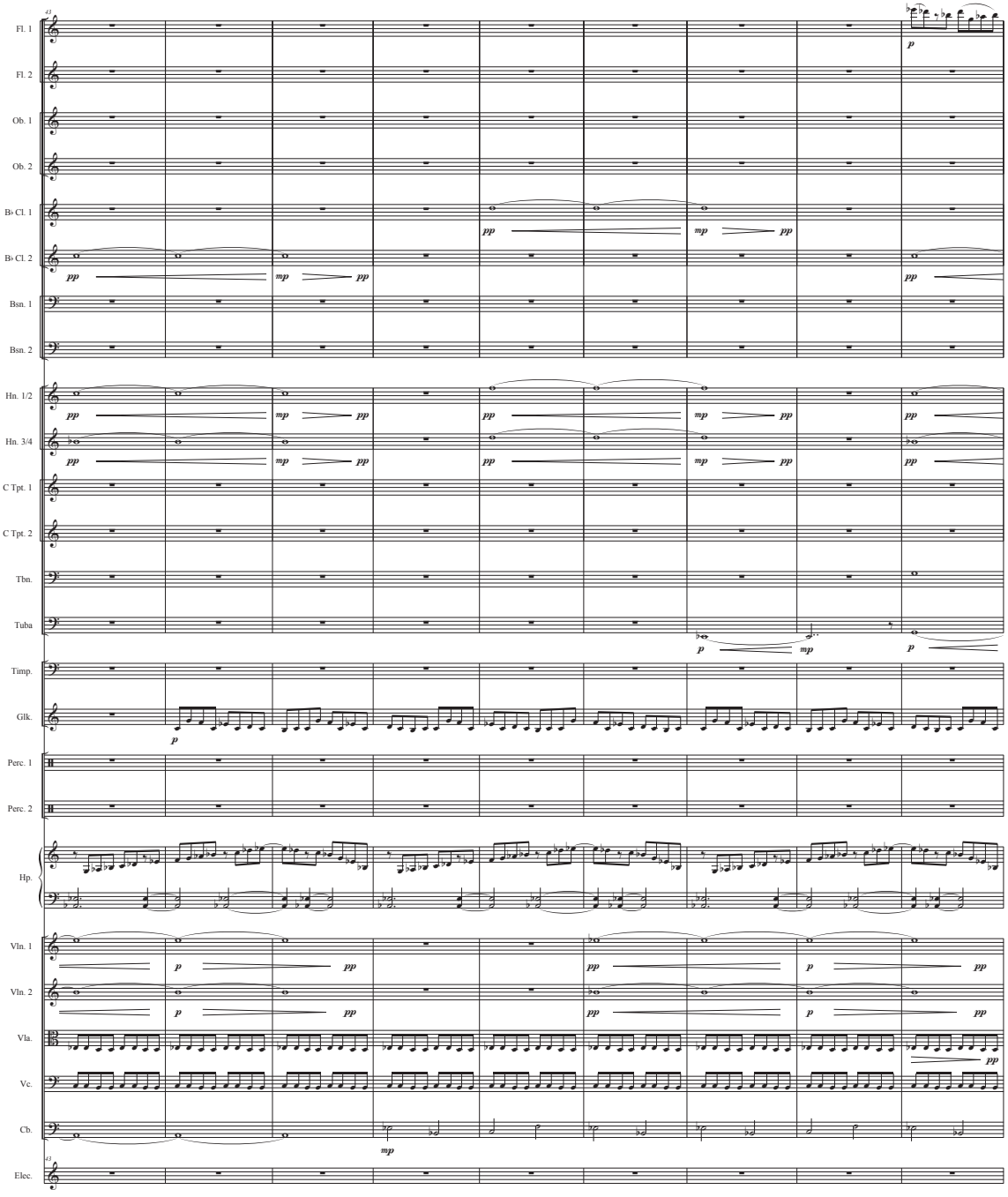
Giants at Night

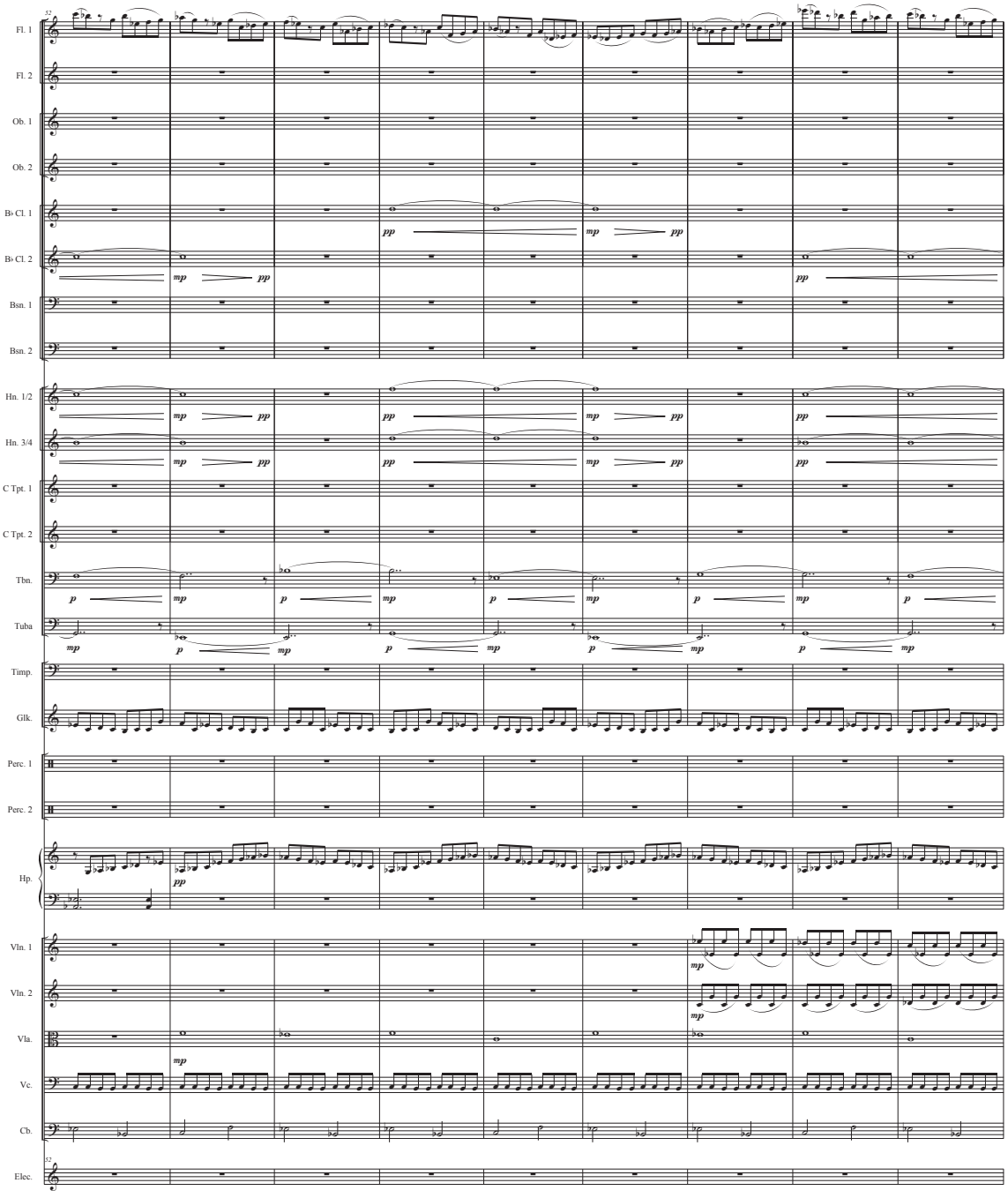
Jason K Gibson

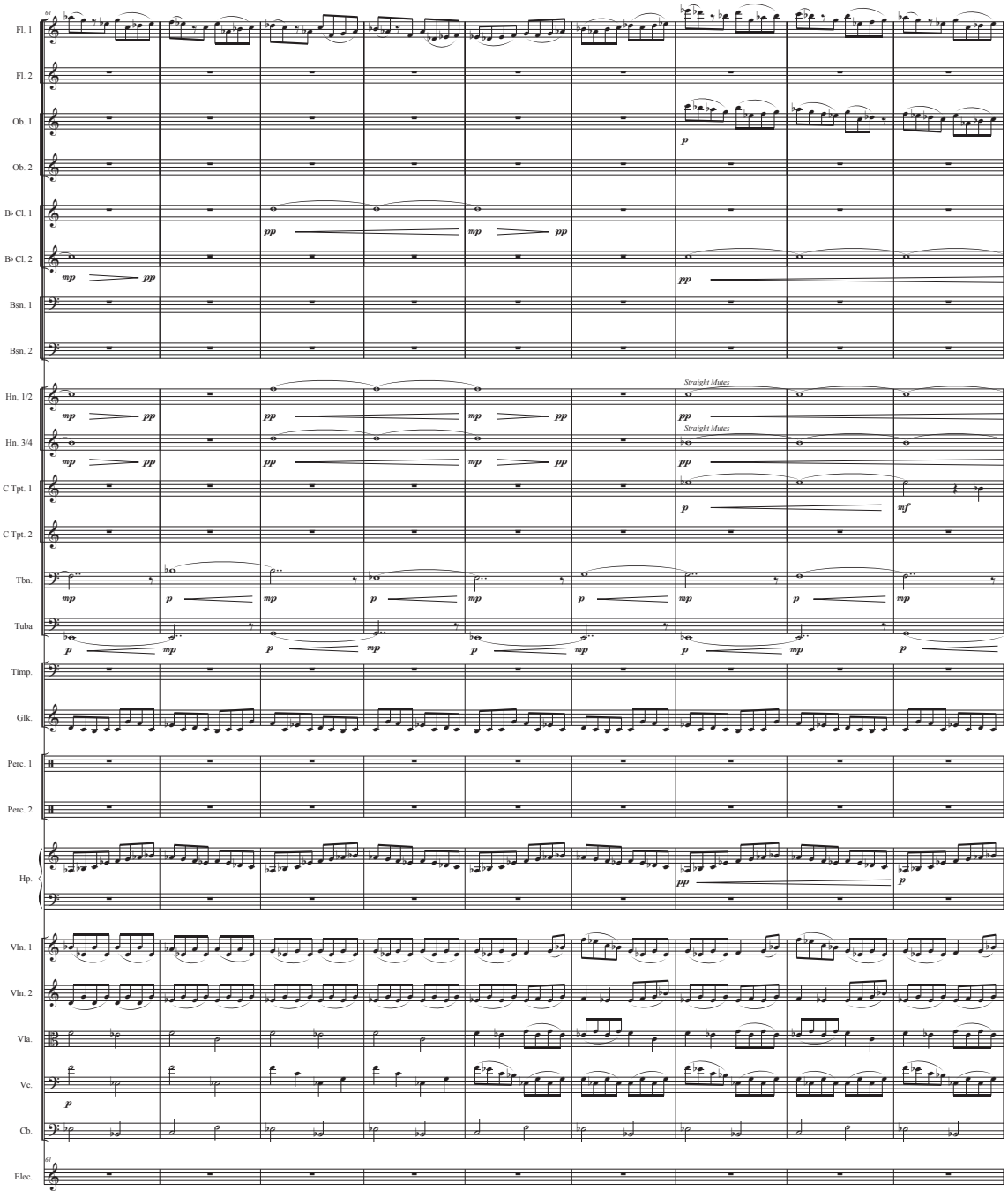


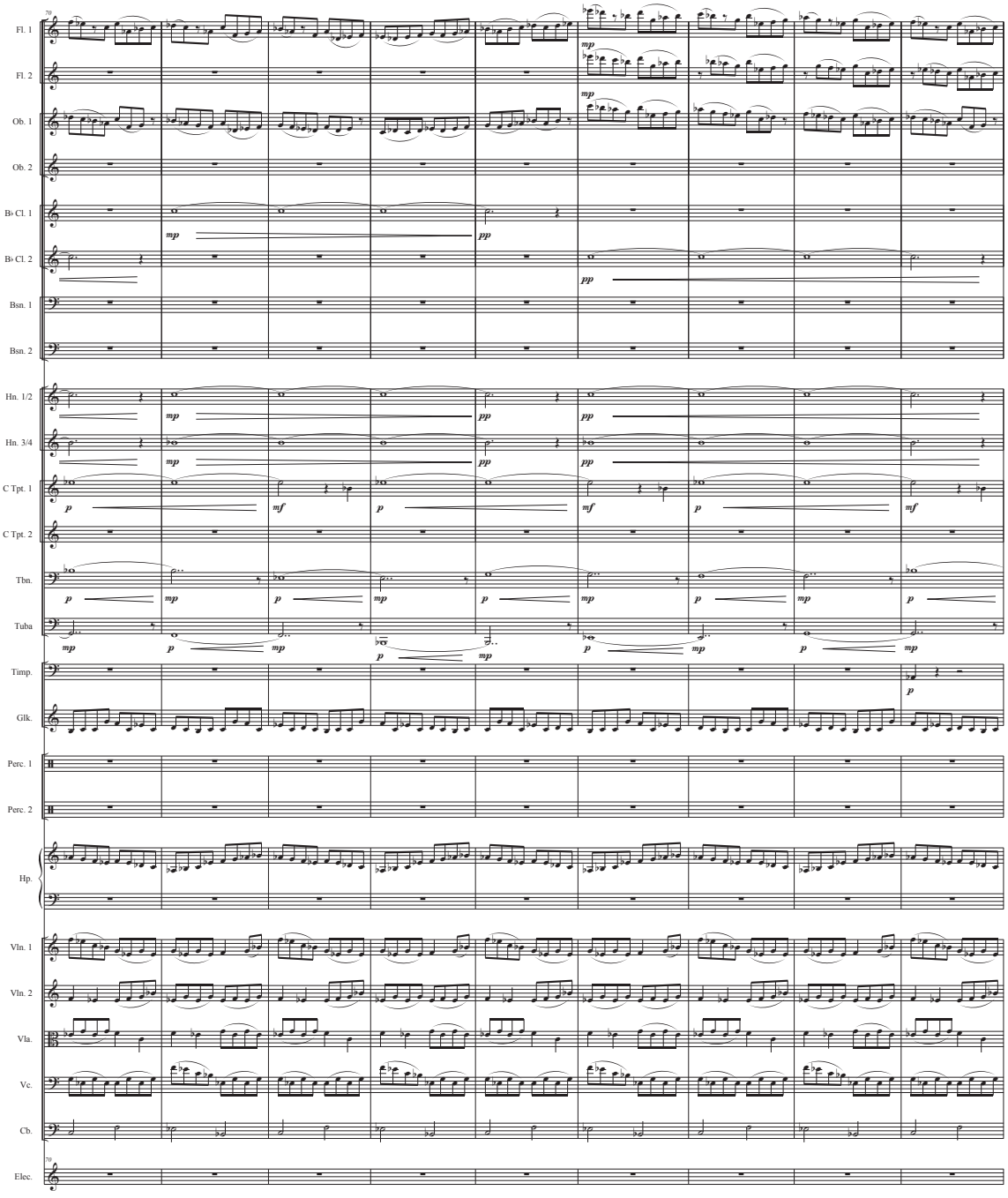

Giants at Night
A
♩=70
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
Elec.
mp
pp
p
simile.
Play Wind
EQ 1

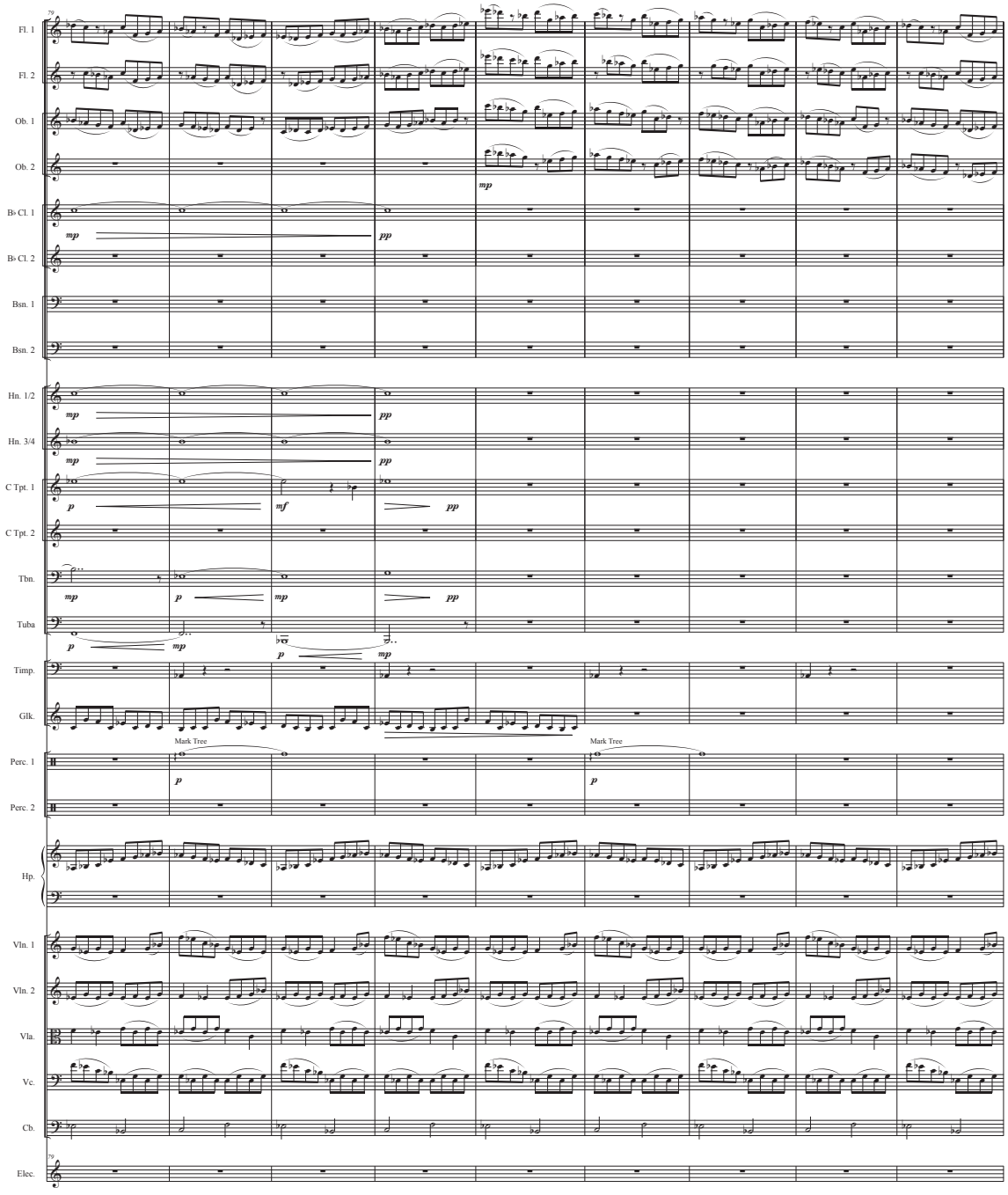

33
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
33
Elec.
pp
mp
p

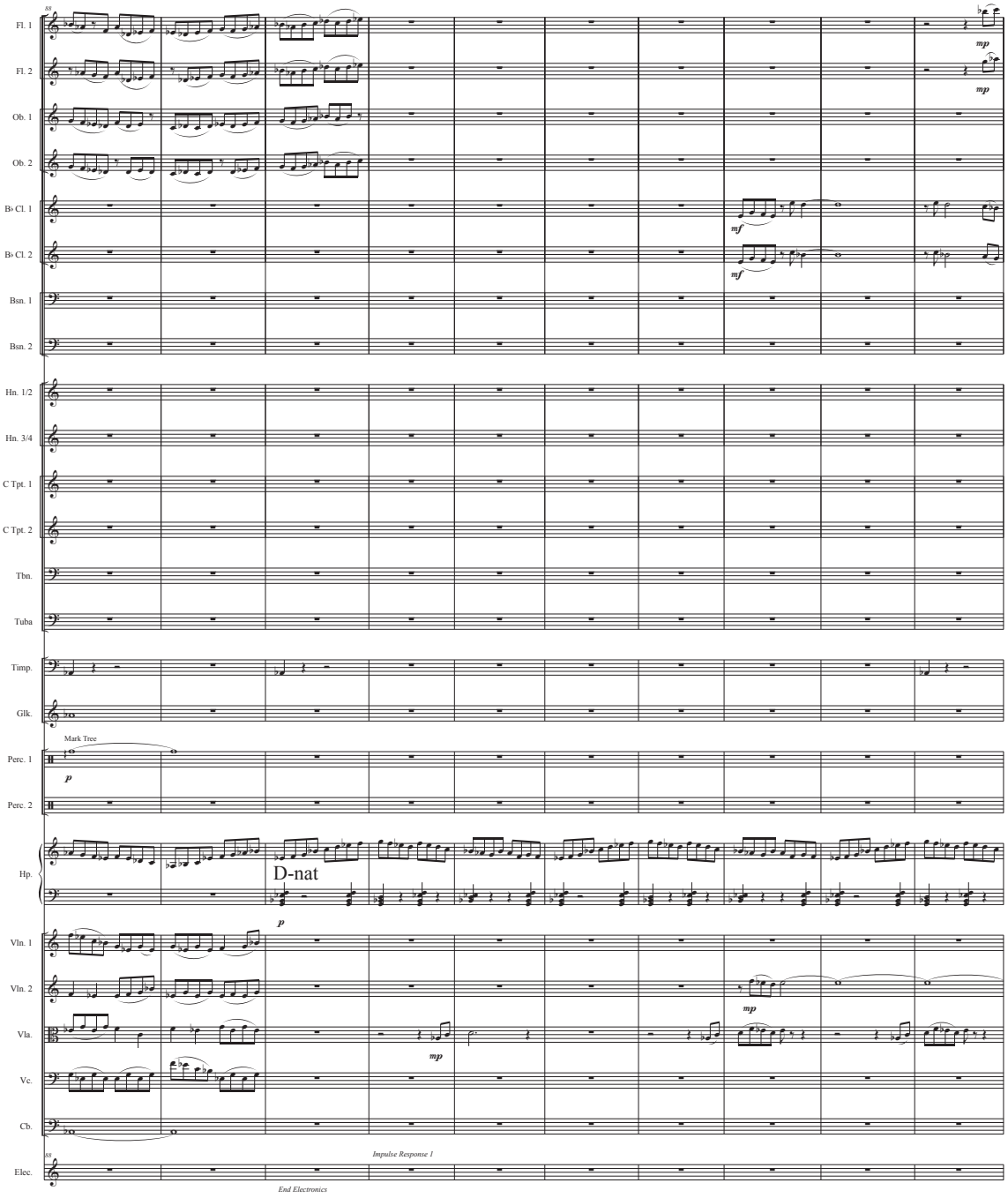

43
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
43
Elec.

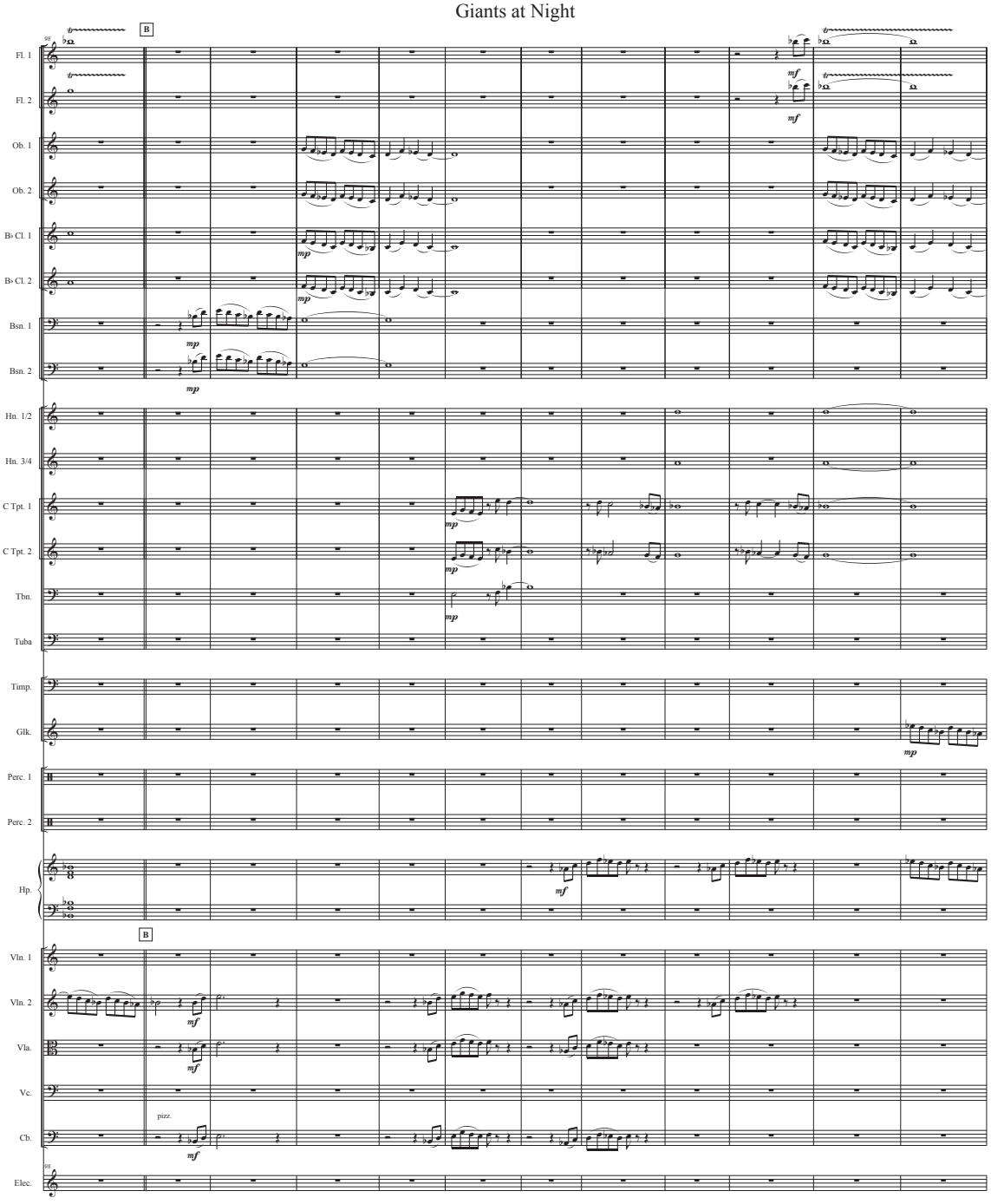

52
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
52
Elec.

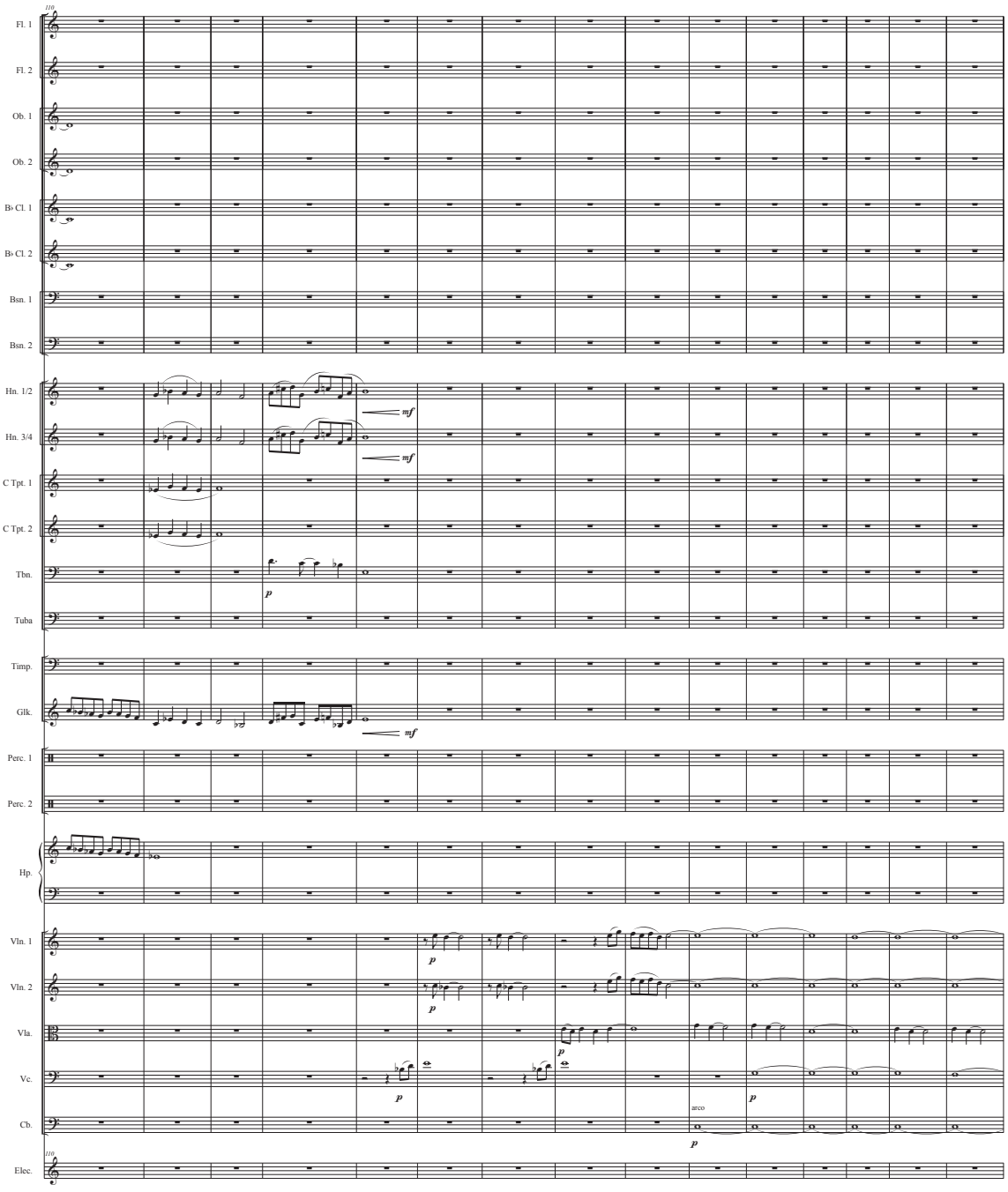

61
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
Straight Mutes
Straight Mutes
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
61
Elec.

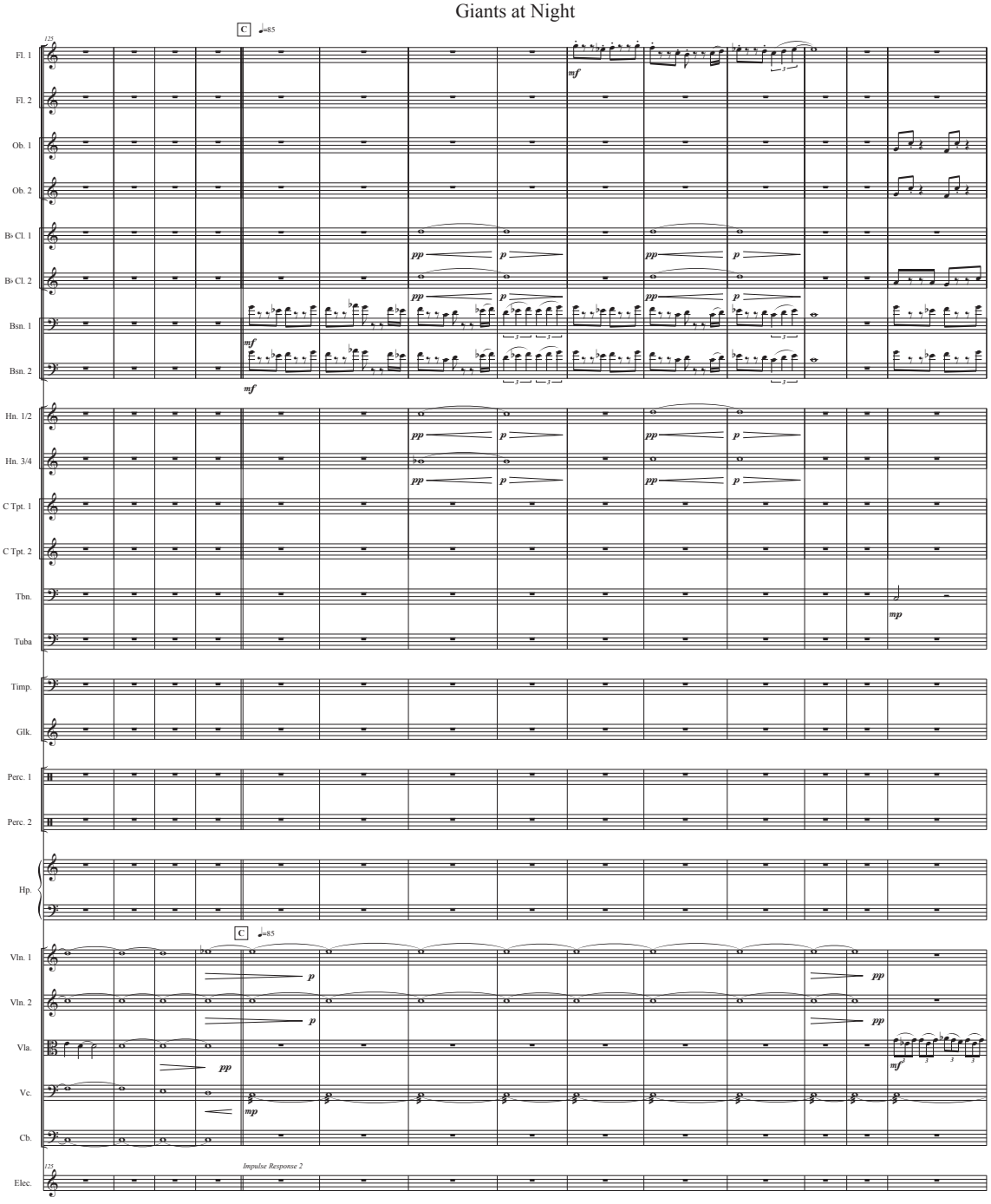

70
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
70
Elec.

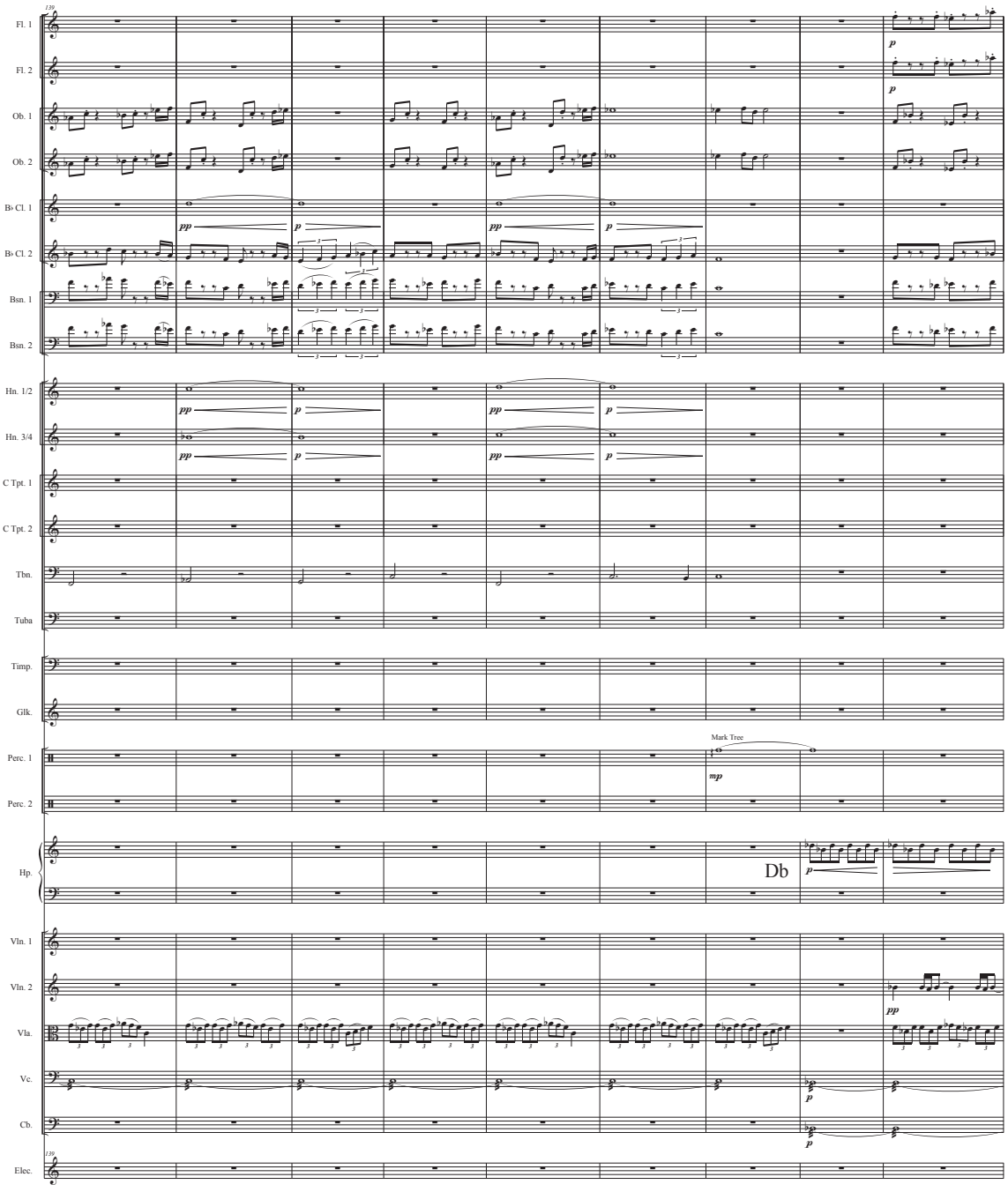

79
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
79
Elec.
Mark Tree
Mark Tree

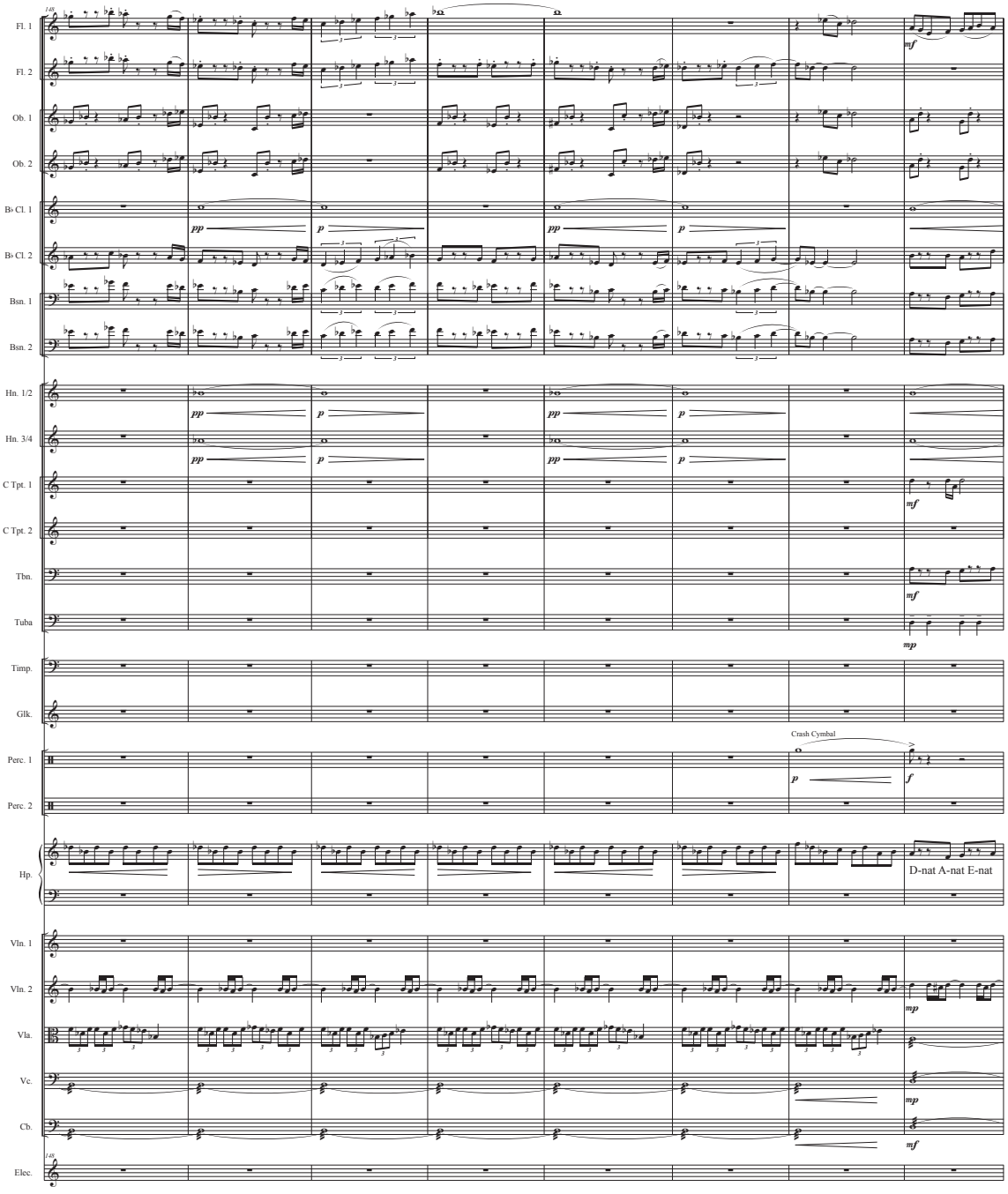

Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
Elec.
mp
mf
p
Mark Tree
D-nat
Impulse Response 1
End Electronics

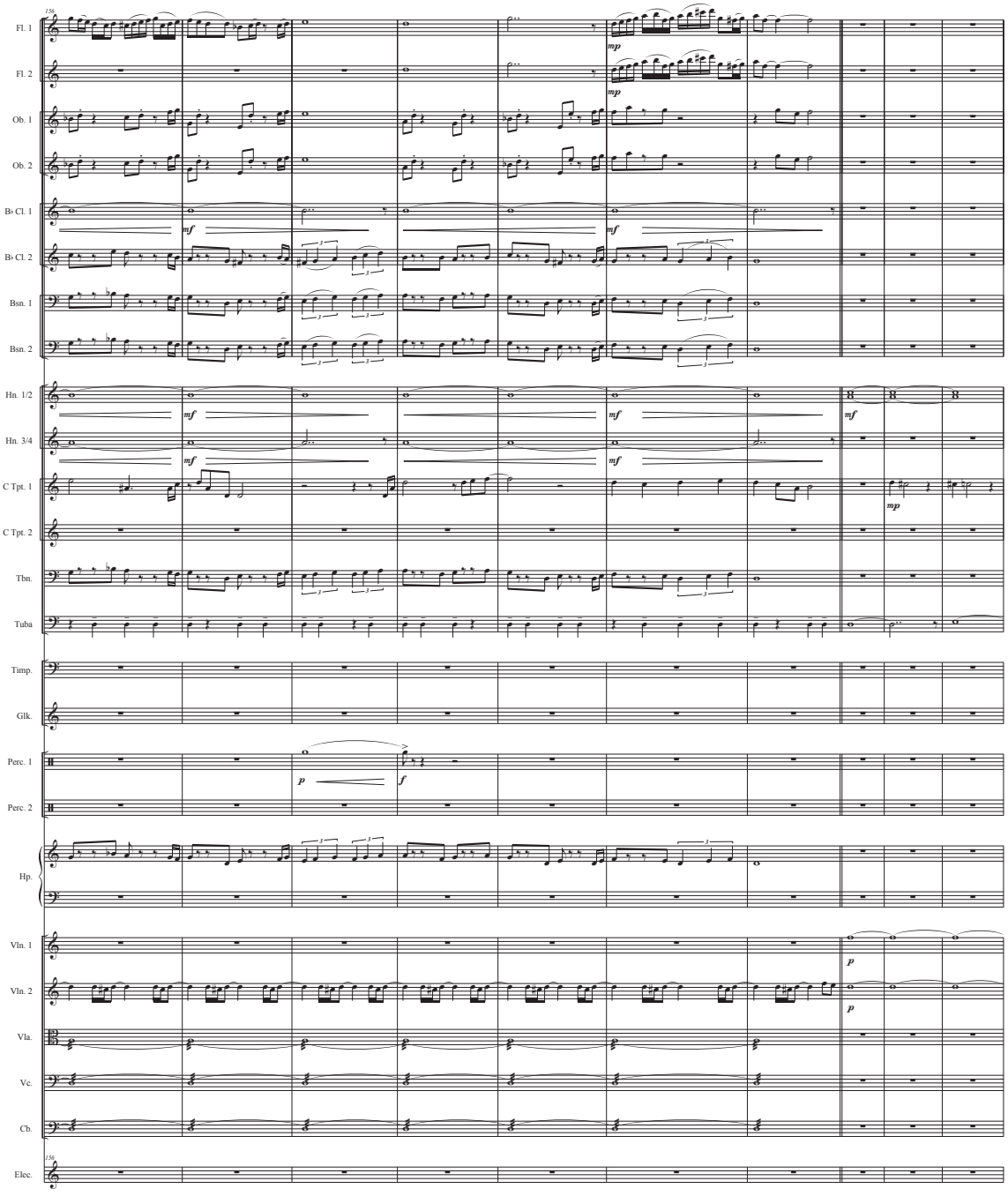

B
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
B
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
pizz.
Elec.


110
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
Elec.
mf
p
arco

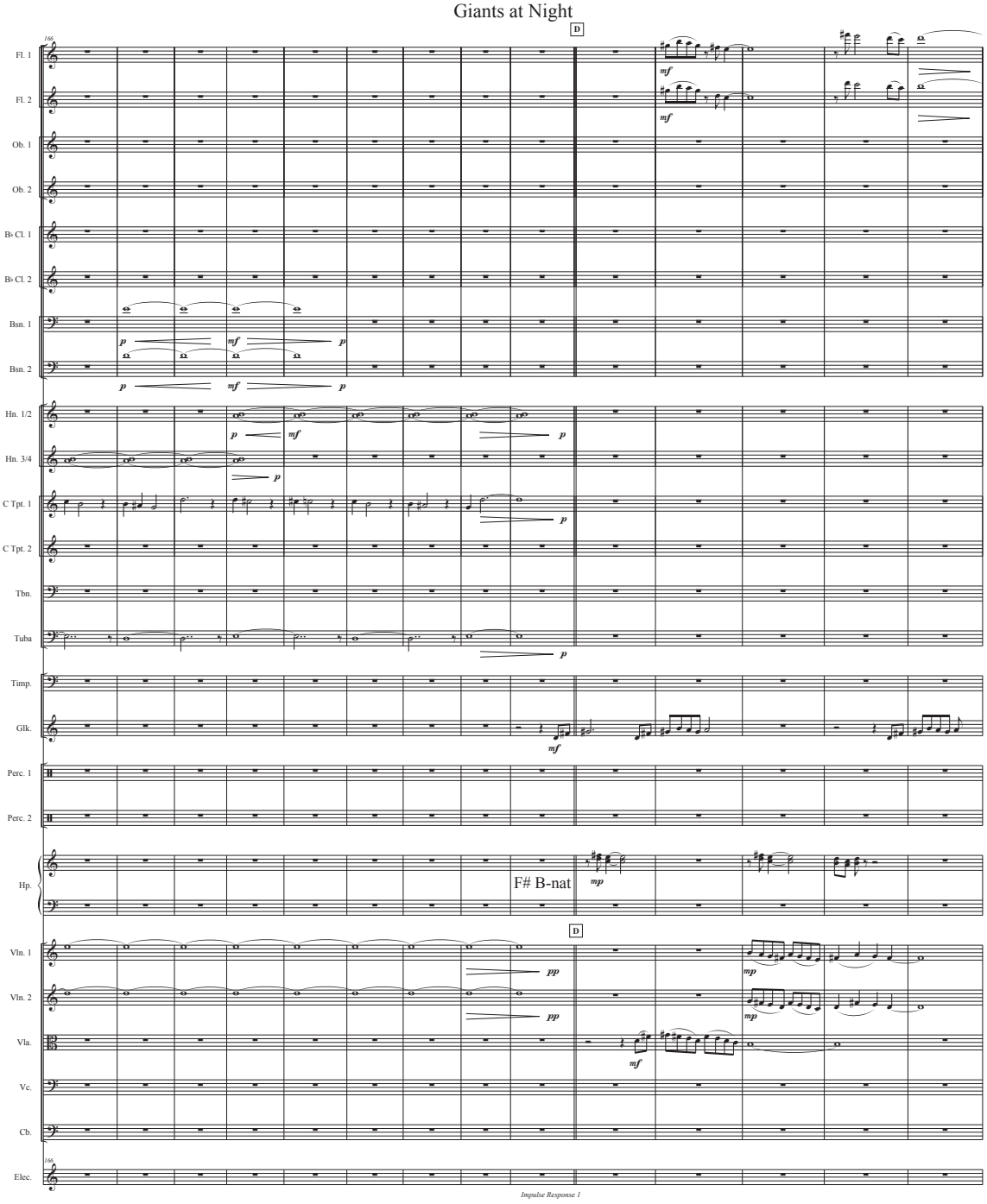

C
♩=85
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
Elec.
Impulse Response 2

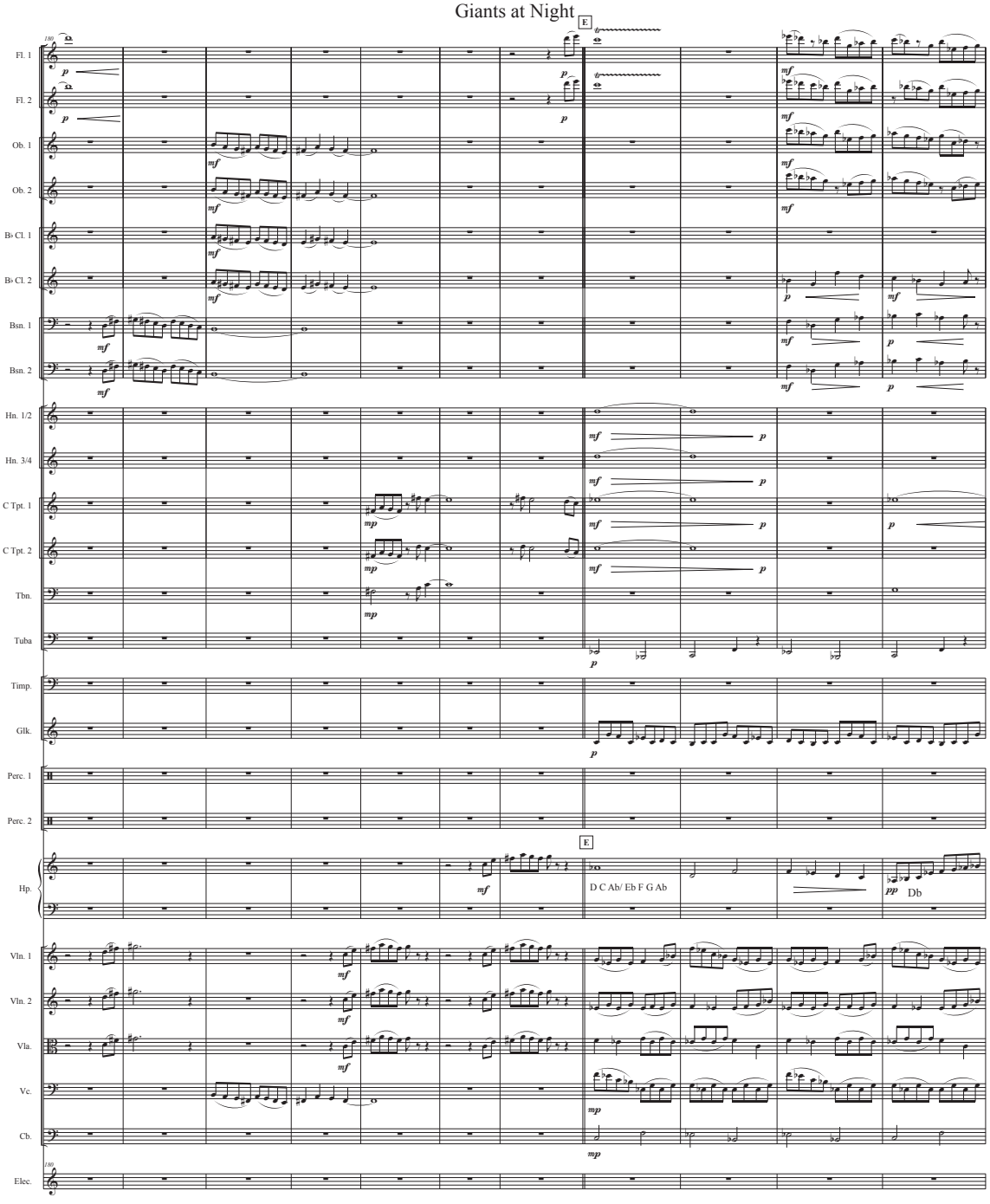

139
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
139
Elec.
Mark Tree
Db

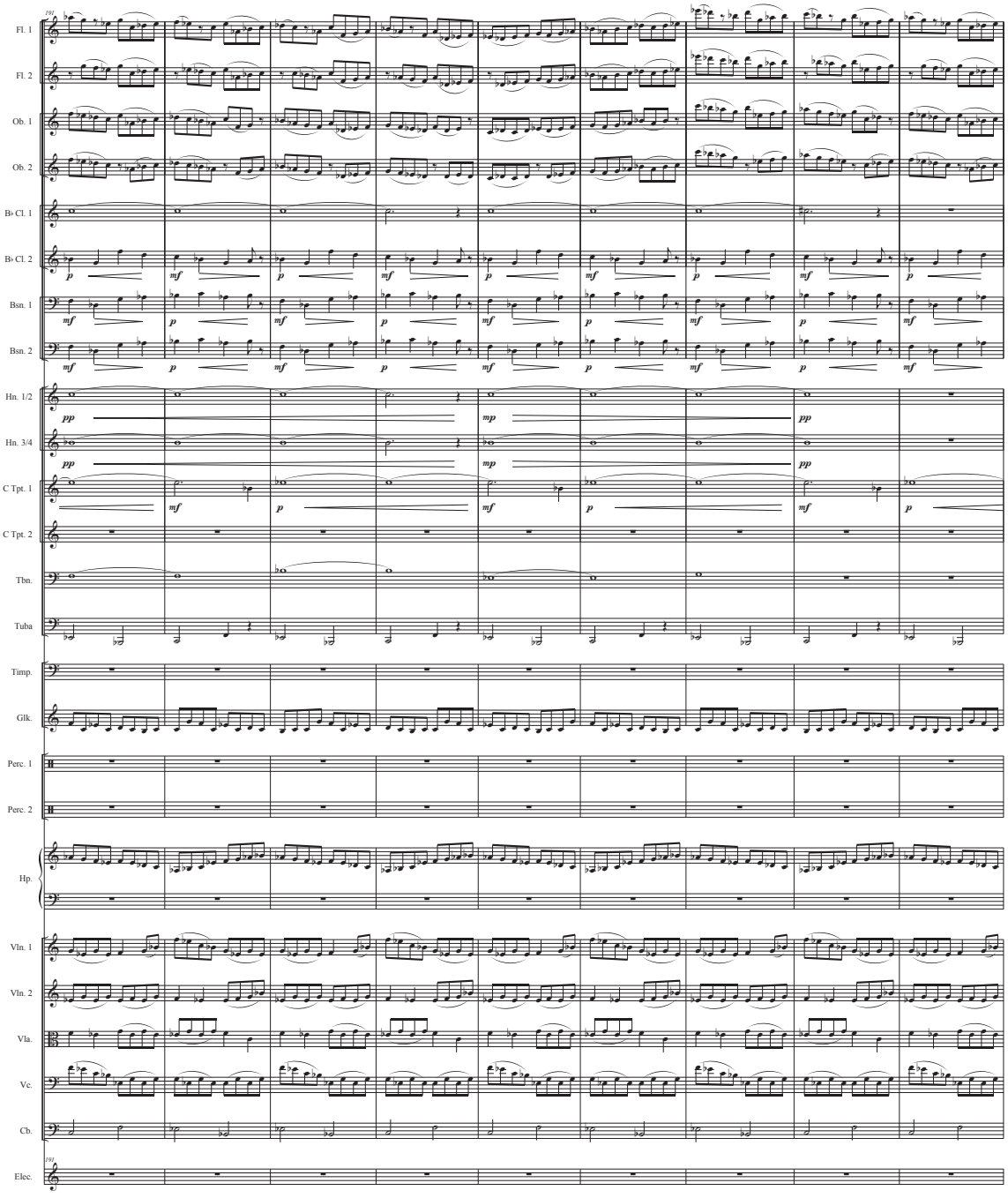

Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
Elec.
Crash Cymbal
D-nat A-nat E-nat

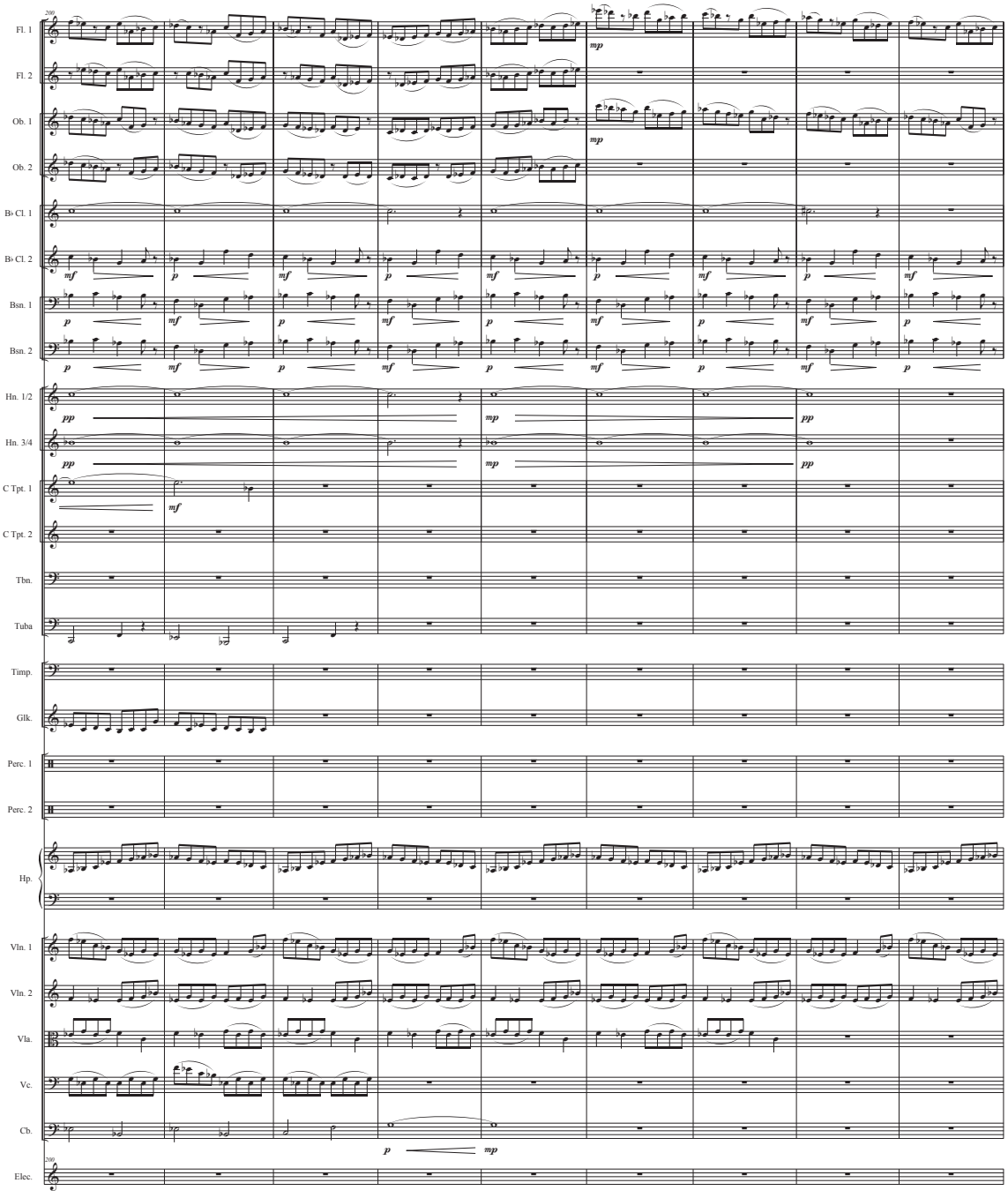

156
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
156
Elec.
mp
mf
p
f

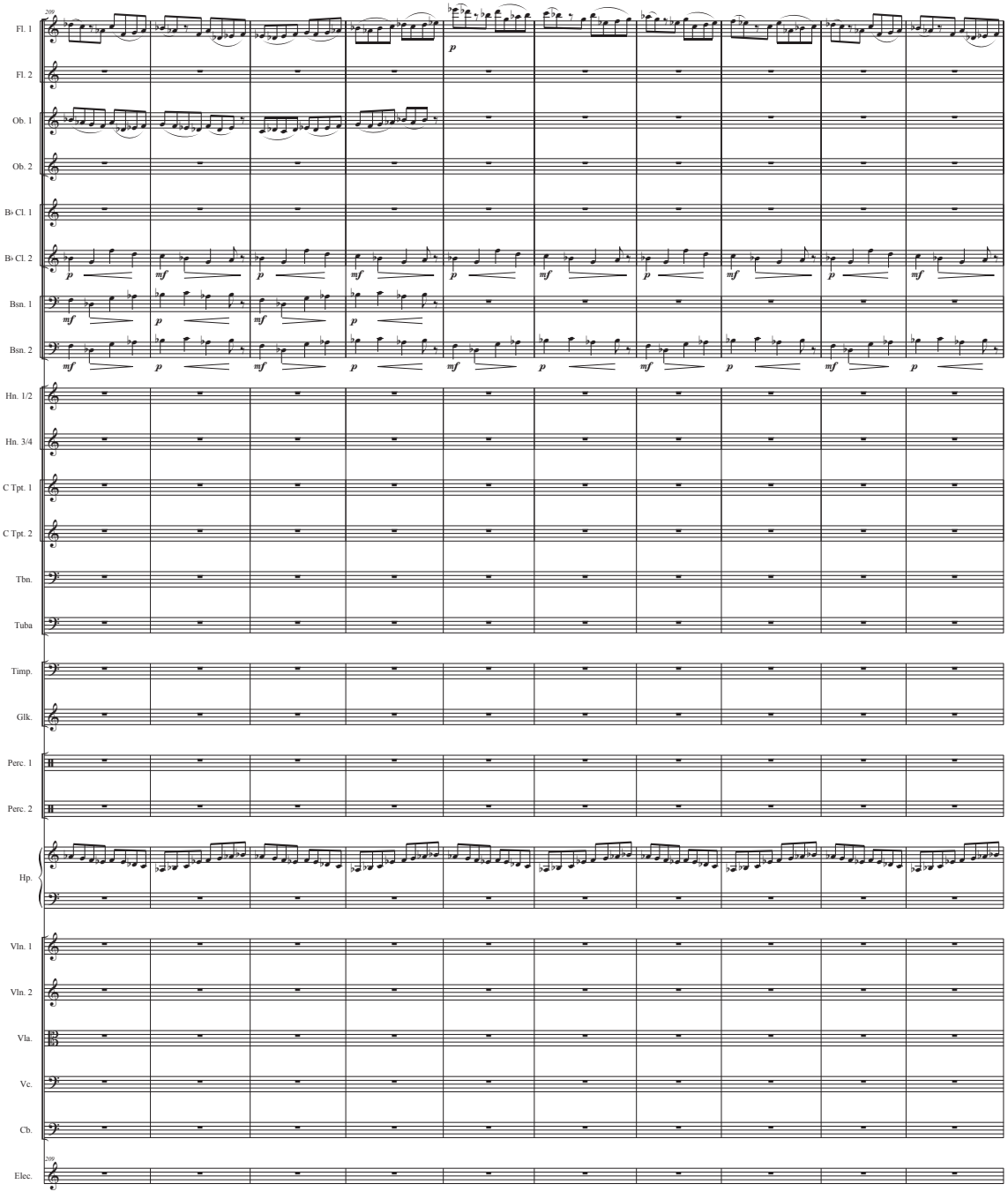
Giants at Night

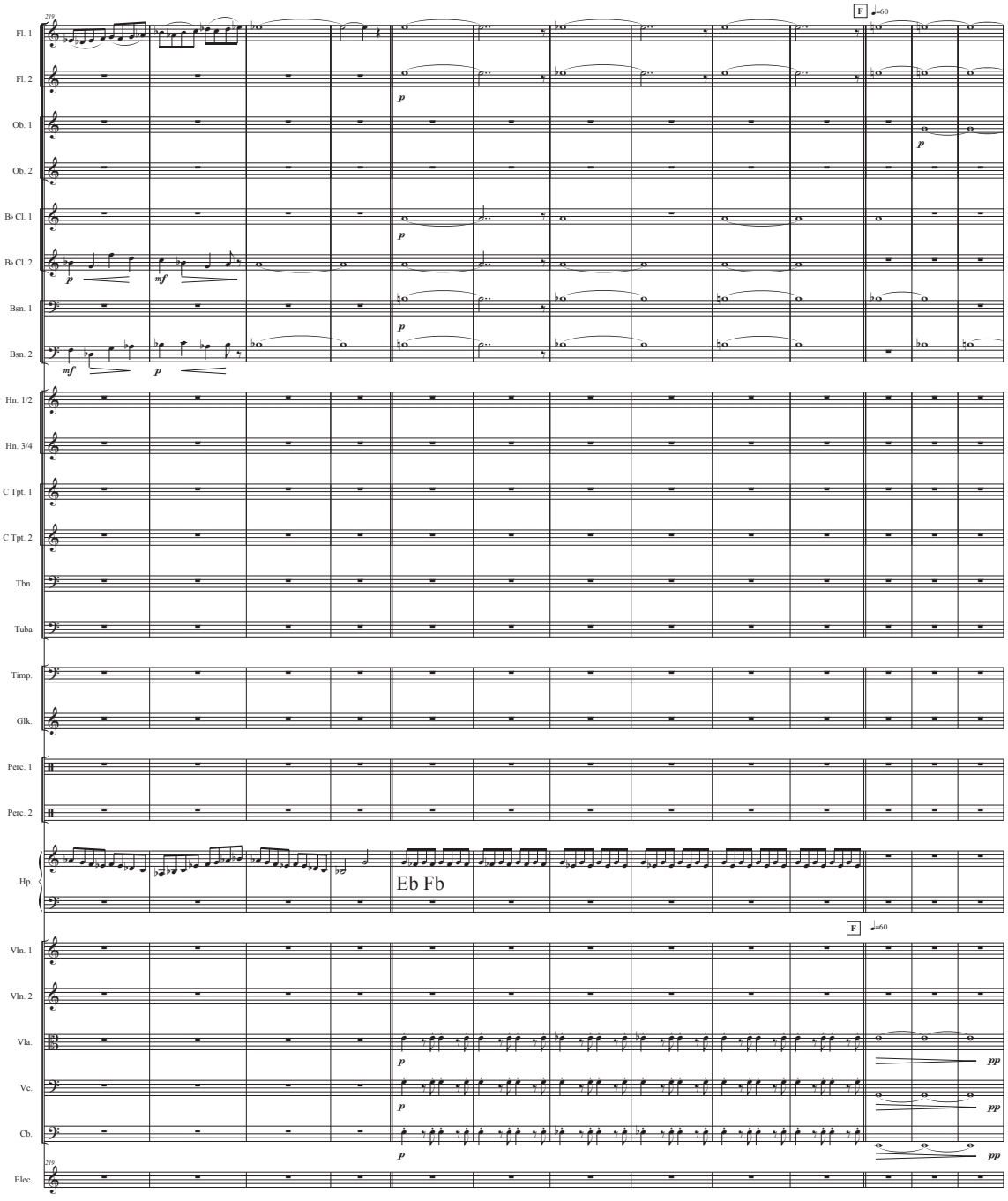


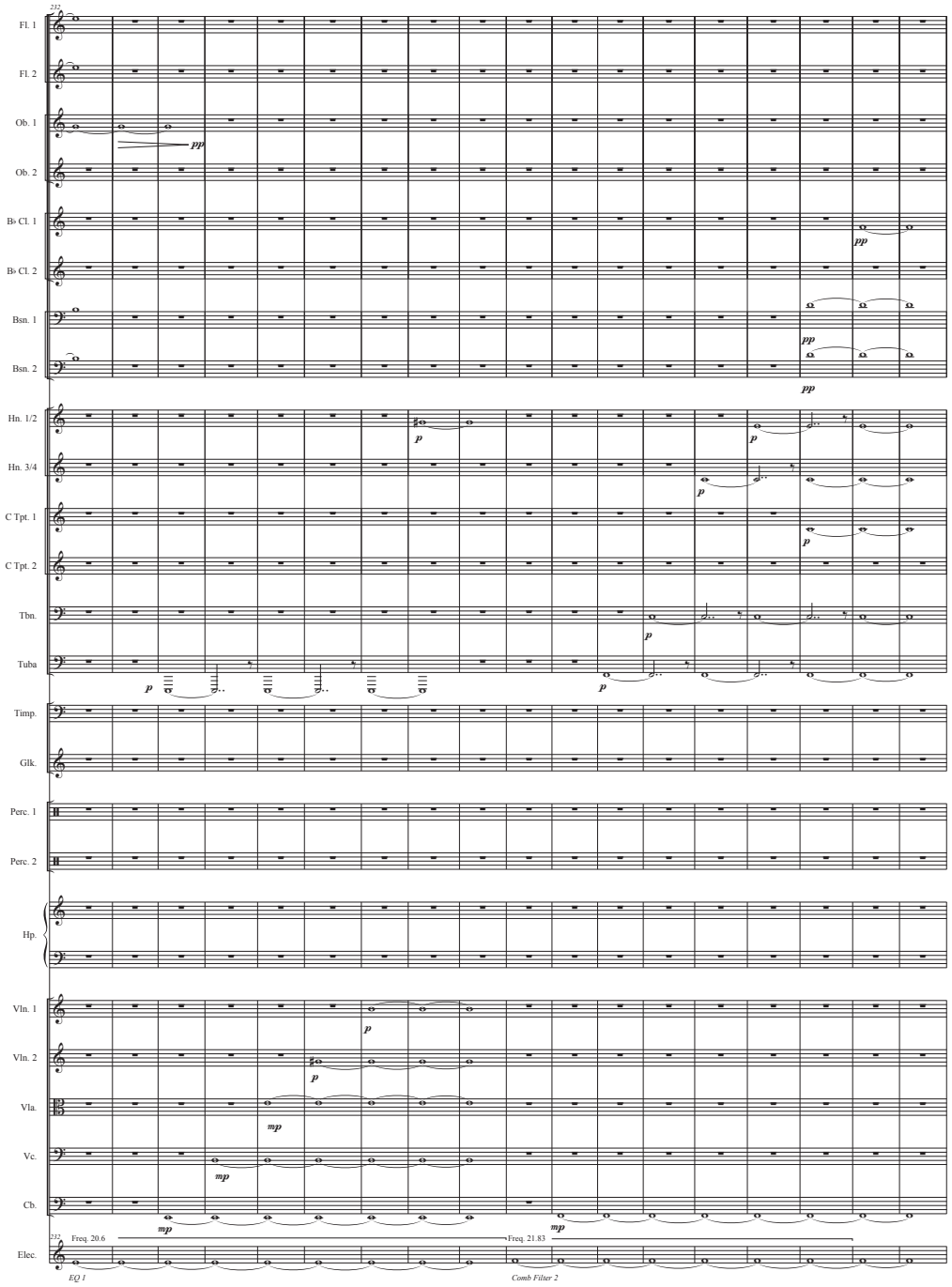

E
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
D C Ab/ Eb F G Ab
Db
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
Elec.

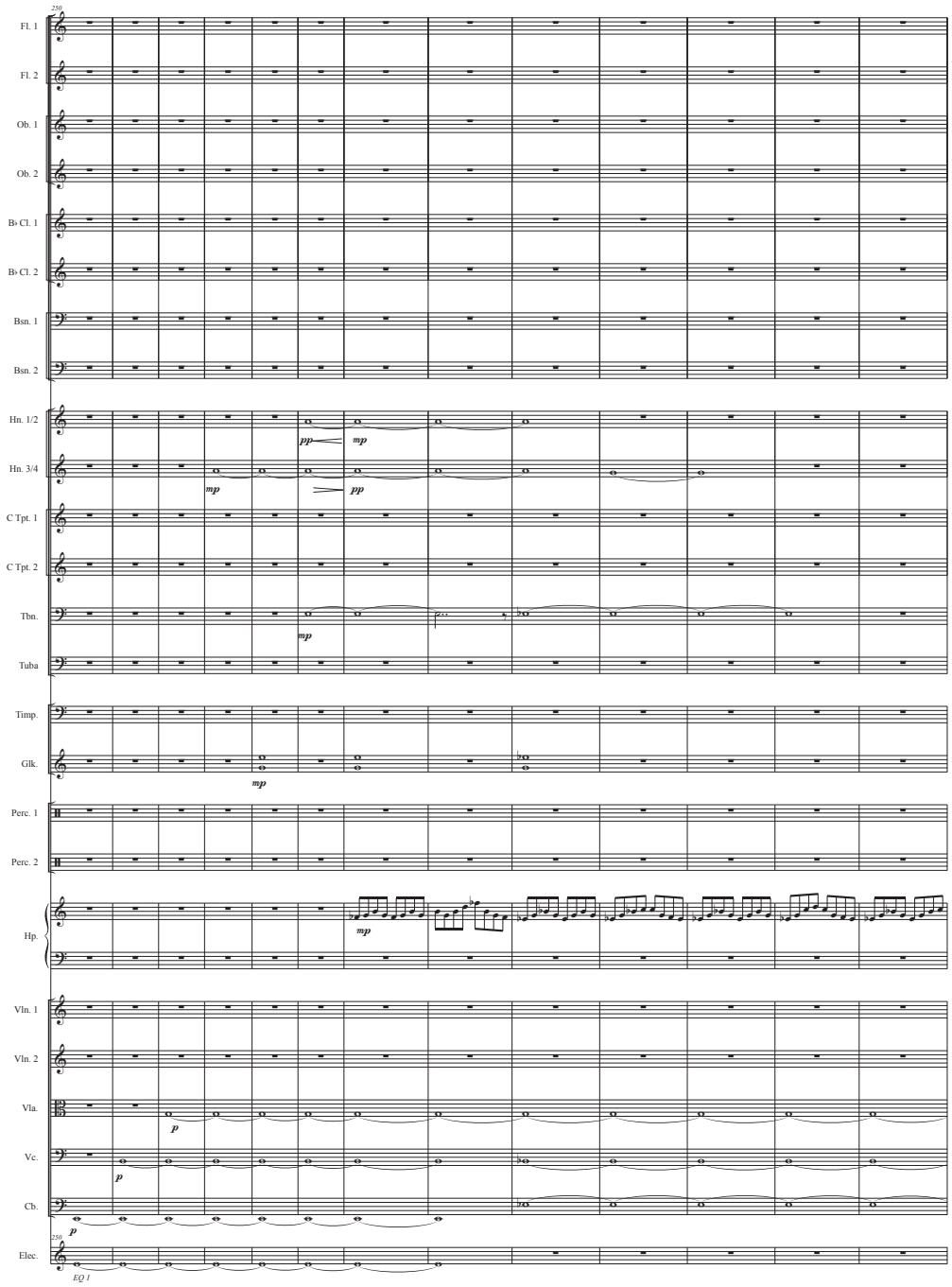

191
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
191
Elec.

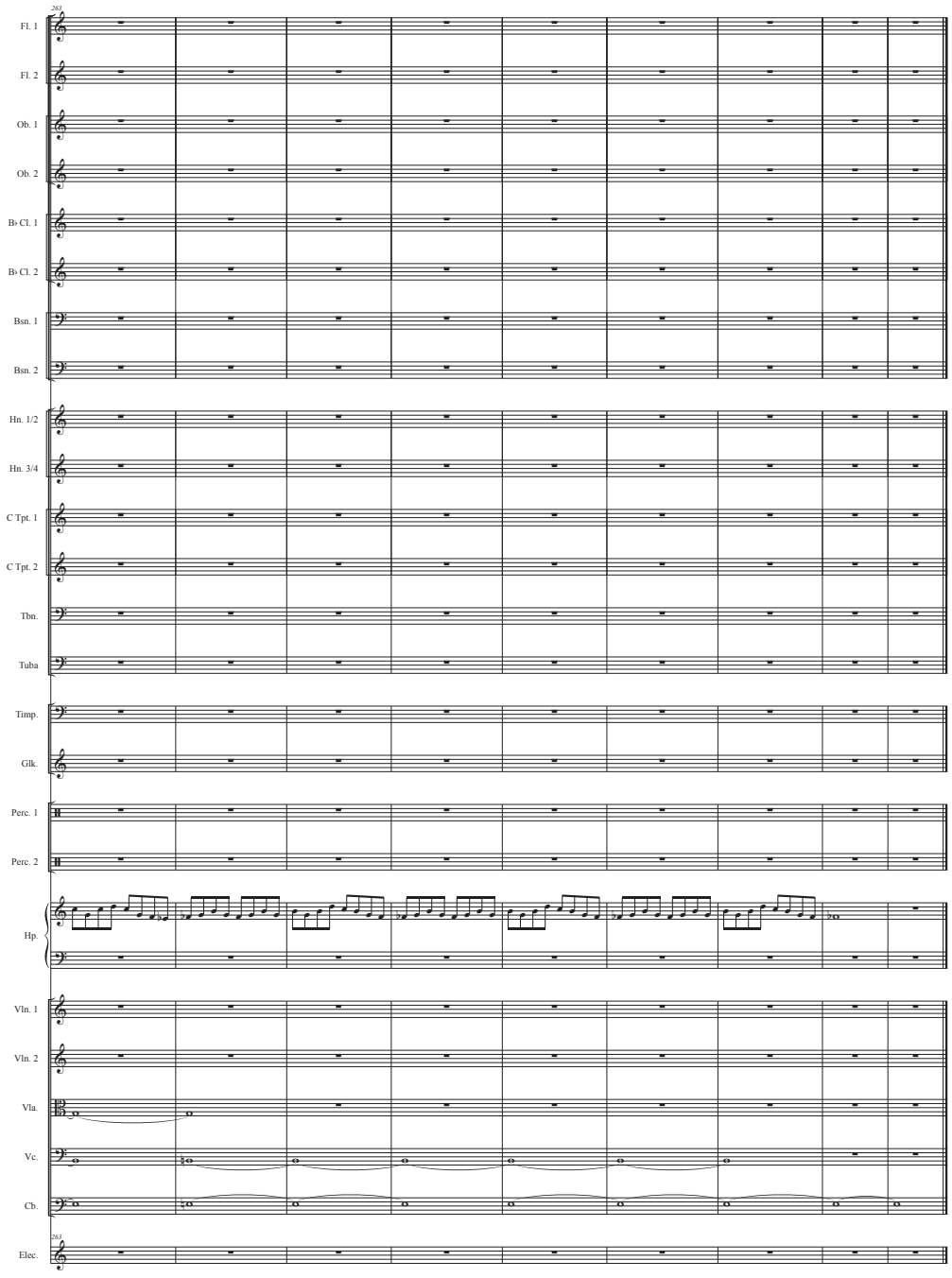

200
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
200
Elec.


209
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
209
Elec.


F ♩=60
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Eb Fb
F ♩=60
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
Elec.


232
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
232
Elec.
Freq. 20.6
Freq. 21.83
EQ 1
Comb Filter 2


259
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
Elec.
pp
mp
mp
pp
mp
mp
mp
p
p
p
259
EQ 1


261
Fl. 1
Fl. 2
Ob. 1
Ob. 2
B♭ Cl. 1
B♭ Cl. 2
Bsn. 1
Bsn. 2
Hn. 1/2
Hn. 3/4
C Tpt. 1
C Tpt. 2
Tbn.
Tuba
Timp.
Glk.
Perc. 1
Perc. 2
Hp.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
261
Elec.

CHAPTER 5 – EXEGISIS

This chapter provides an explanation of the process of composition and the compositional tools used, however, it does not attempt an in-depth musical analysis of these compositions. Pieces are considered one-by-one and sequentially as well as formally.

Natural Opposition

Natural Opposition is the composition that came about as part of "Composing in the Wilderness" in Alaska. It is of note that the requirements for this piece were set out at the beginning. Each participant pulled an instrumentation out of a hat (literally) so the choice was out of my hands. Also, participants were told that due to the short timeframe, no electronic music would be accepted. For this reason, I was unable to include any of the electronic elements mentioned above, and this piece ended up being a purely instrumental work. At first, my thought was that I should re-create this piece when I returned and add in some of the electronic ideas I'd been developing, but in the end, I decided to leave it as an instrumental piece and an exercise in capturing nature in pure music.

During my experience in Alaska I was struck with the wonder and awe of the environment. I was also struck by my own insignificance in such a grandiose setting. As a group, we had many adventures and saw a myriad of different environmental factors; from rivers and ponds to mountains and valleys, from insects to bears and all sorts of

things in between. I tried to think of which experience from the program would work best as an inspiration for my composition. I couldn't think of one specific instance that stood apart from the others. What really struck me was the differences between everything that we saw. Some days were smoky and we spent a lot of time focusing on tiny biospheres, insects, and other very small things that we could see nearby. Other days were clear and I focused on the grandeur of the mountains and the sky. What struck me was the seeming opposition that makes up the whole of Denali. I also thought of how life is the same way, filled with ups and downs, happy times and sad times, sickness and health, great events and mundane days. This is where the title *Natural Opposition* came from.

There was one other thing that I wanted to capture in the piece, and that was the human experience. For centuries there have been people in the Denali area, hunting, trapping, exploring, and living. I thought of the stories of the adventures that others experienced there, as well as my own. I really wanted to pay homage to the people of Denali, so I incorporated an adventure theme into the piece.

Natural Opposition starts with a spectral chord played by the vibraphone with an Eb root. This chord contains a high C which serves as the sixth of the chord. This note is not technically part of the harmonic series. The note that is represented here is the seventh harmonic, which, as mentioned above, is somewhere between the sixth and flat seventh degree of the scale. To be completely honest, I didn't have internet access at this point in Alaska and my working memory of the harmonic series was slightly flawed so I wrote the sixth and the flat seventh. Upon further reflection I realized that the vibraphone

is unable to play this note anyway so it worked out keep the performers playing the sixth and the flat seventh (a Db in the piccolo line) to represent the seventh harmonic of the series. The building-up from "barely audible" in the piccolo, saxophone, and cello lines denotes the quiet of nature in which one often has to listen intently to hear the breeze in the trees or the call of a distant bird. The bell-like chords in the vibraphone are meant to echo the sound of a church bell and represent the sacredness of nature. In the pickup to measure seven, the adventure theme is introduced and doubled in the flute beginning in measure 8. This can be seen in illustration 5, with the saxophone in concert pitch.

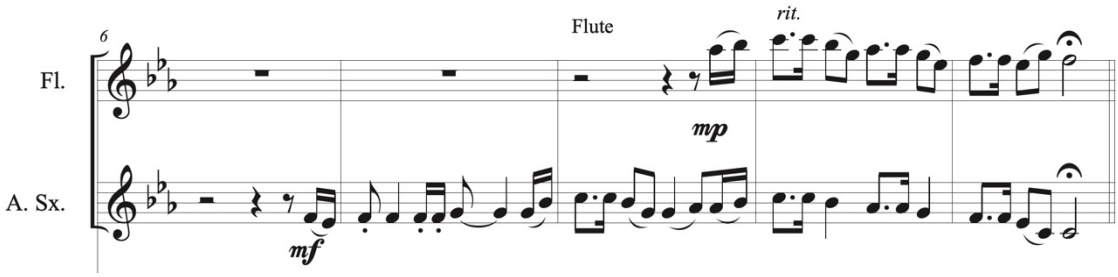


Illustration 5 – *Natural Opposition* Adventure Theme

Section A is meant to portray a stream. This idea came mainly from our first night in the Teklanika campground in which we spent time experiencing the nuances of a stream. We were asked to try to experience the stream with all of our senses. The slow-moving chord structure and minimalist style of this section denote that the stream was also slow moving and calm. It was not a raging river while we were there, but rather a quiet, calm, braided stream. The percussion also plays a big part in the tone painting of this section. The bass drum beats like a life-providing heart in the same way that a river

serves as a vein providing life to the flora and fauna of the area. And the scraping circles on a snare drum mimic the noise of a stream. One of the biggest things that I noticed about the sound of the stream was how the rhythms of the noise never seemed to be quite the same. I had a hard time capturing that in the music but tried to recreate it with rising and falling dynamics in each instrument so that nothing really stayed stagnant. In future performances of this piece, I may add in some river sounds that I recorded along the way to this section.

While on our journey, we ran into a family of bears, a mother and two cubs. They were running and playing and were very energetic. When we first spotted them, all three were running full speed toward the road that we were on. (Thank heavens we were on a bus.) Section B, beginning at measure 27, represents this experience as well as the grandeur of the mountains that we saw at Eielson that same day. This representation happens in both an objective and subjective way. For example, the music objectively follows the action of the bears as each staccato chord signifies a bear pouncing or bounding. This passage can be seen subjectively as well with the tempo and dynamic representing the feelings that I had during the experiences. The speed of the section is in direct opposition to the slow-moving section previous, just as the energy and excitement from seeing a bear is greater than when listening to a calm stream. The running lines represent all of the bright fast-moving parts of the experience: wind in the trees, the brightness of the sun with the clouds lifted, the running of the bears, quick beats of insect

wings etc. Also, during this section is a specific 4 note motive that looks something like illustration 6.

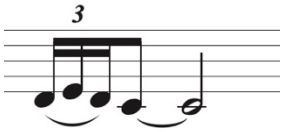


Illustration 6 – Condensed Adventure Theme

This small motive comes from a condensed version of part of the adventure theme and broadly represents the human element in these settings. It is more clearly heard and understood as a reference to the adventure theme in places such as measure 59 and 60 in the flute as shown in Illustration 6.

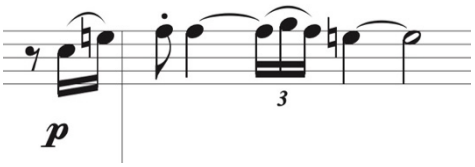


Illustration 7 – Expanded Adventure Theme Snippet

Section C starts off with a reference back to the chimes at the beginning of the piece and takes the listener back to a calm and tranquil setting in opposition to the energy of the previous section. The theme that starts in the vibraphone adds a sense of mystery to the piece and sets the pace for the section. As the section progresses and accelerates, the vibraphone helps to keep the piece together. This section represents exploration and the mystery that often accompanies it, with unsurety of what one will find. It is filled with

examples of the condensed adventure themes found in Illustrations six and seven. It accelerates directly to the adventure theme in section D which serves as a book end to the piece and finishes with a strong and unified theme. Unlike the arch form of *Giants at night*, (discussed below) *Natural Opposition* begins soft and ends fast and strong, yet another example of opposition.

Giants at Night

Giants at Night is a piece about my experiences in Arches National Park. Although the adventure in Arches was much shorter than my trip to Alaska, this piece is much longer and has a larger orchestration. Even though the piece is written for a full orchestra, in essence it is not much more complicated than *Natural Opposition*.

The piece begins small and ends small. It follows the form of a palindrome or chiasmus – that is, that the themes of the second half of the piece are in reverse order of the first half. The formal structure of this piece can be seen in the illustration below.

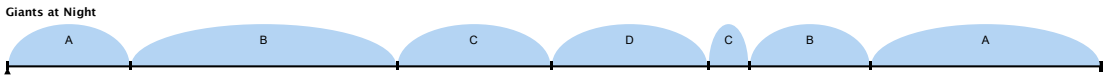


Illustration 8 – Giants at Night Form

I chose this form because it illustrates the form of an arch, rising and falling back to the same level. The composition is not only arch-like in its form, it also gets louder, faster, and more intense in the middle sections, representing the height of an arch in the center

and the two bases which are lower and more stable. This concept is also supported in the instrumentation; the strings are at the bottom of the page and the piece begins and ends with the strings section.

In the beginning of the piece, the strings present a minimalist and spectral form building slowly in dynamics and instrumentation. During this section, a low, barely audible rumble is created in the electronic part with a frequency generator, enhanced by MaxxBass (a bass boost plug-in). This serves as the first example of electronics used in this piece to help achieve a portrayal of nature. In this instance, the low rumble represents the vast openness and grand rising rock figures in the area. At rehearsal marking A, a section of stratification begins. I chose to use stratification, similar to that used by Stravinsky, to mimic the stratification found in the rocks at arches. This section starts with introductions to the striated forms that follow. Each instrument enters slowly until measure 67 at which point every instrument that is involved in the stratification is playing. During this build-up, a wind sound plays and a parametric equalizer enters to enhance the high notes and provides an eerie melody that is barely audible. At measure 90 the stratification ends and a new theme enters. This theme can be seen in illustration 9.

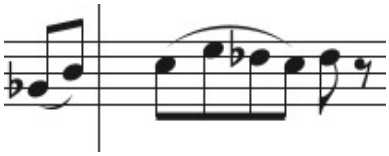


Illustration 9 – First Arches Theme

This theme has the general appearance of an arch. As this theme enters it is accompanied by a reverberation effect created from a impulse response taken in the Firey Furnace. This helps to set the scene for this section of music and will serve to help the listener recognize this theme when it returns later. This theme and its accompaniment continue until measure 119. At this point a minimalist section connects to another theme.

This theme, with its disjunct melody, starts at measure 129 and represents the hardship that has been experienced in the desert of Arches. As mentioned above, there have been ranchers on the land there, and an old ranch house still sits near the entrance to the Delicate Arch trail. The area is so arid that it is hard to imagine trying to raise any kind of animal there. Because of this I designed this theme to be a little bit disjointed to represent the constant difficulty of living in the area. This part also has a lot of space, or air, and serves as the peak of the general form of the piece, the top of the arch if you will. This section is also accompanied by its own reverberation effect that was created from an impulse response taken near Pinetree Arch.

At measure 162, another minimalist section hearkens back to the arch theme presented in illustration eight. This section is once again greeted with the reverberation effect that it had before bringing continuity. This continues until measure 187. At measure 188, the stratification section reappears in full force. It dwindles until measure 222, at which point the minimalist theme from the beginning enters again.

This final section has some interesting electronic parts. For example, at measure 231, a frequency is played at 20.6 hz. This is barely above the threshold for human

hearing, but it is able to be felt. This frequency is the equivolent of E^0. The string section at this point plays the overtone series based on this fundemental frequency. These spectralist parts help to reinforce the fundamental pitch through the same principles that create phantom fundamentals. This continues throughout most of the rest of the piece switching low tones as the tonal center moves. At the same time as these low pitches are happening a parametric equalizer is also applied on the high end to emphasize the partials associated to these chords. The piece ends with a soft string section, taking it back to its foundation.

Conclusion

There were some findings in this process that are worth noting as a final comment. Among these are the use of MaxxBass in the project, the usefulness of the equipment used, and techniques for impulse response capture. MaxxBass is a plug-in that was used as a tool in this project, and was relatively emphasized. After all was said and done, I thought it important to mention that it didn't work quite as I had hoped. Although it is a decent plug-in for emphasizing a low frequency it cannot be used to input a frequency that does not exist, or, as was hoped, to create a true phantom fundamental. It is true that it uses the principles of a phantom fundamental and spectralism to emphasize an existing bass note, but for a sound that lacks a clear bass, it cannot be used to create such.

Secondly, is the use of a slapstick to create an impulse response. Although this technique was chosen for its portability I found it to be lacking in bass tones. I had originally hoped to fix this with MaxxBass, but as mentioned above, it cannot create sounds that are not there. Although a slapstick's clapping sound is technically a broadband sound, it is distinctly lacking lower frequencies. Because of this, the impulse responses gathered and applied into a convulution reverberation effect emphasized the higher notes by providing reverberation there, but distinctly left the low notes alone. A big part of this problem was created by the lack of funding that I had, and the lack of quality equipment. If I had been able to bring a decent speaker, a great quality microphone with a proffesional wind screen, and a pre-amplifier, the impulse responses would have been much more useful. Despite these drawbacks, and using the techniques and equipment available, the research performed did provide some useful steps forward toward the intended goal.

Music is a powerful medium. Adding electronics to instrumental music can create new timbres and increase the range of possibilities for a composition. Through these pieces I have attempted to use electronic elements as well as instrumental music to capture the essence of the national parks. By adding an electronic element to environmental music I have undertaken to expand the repertoire and the concept of how landscape music can be created.

Music is often inspired by nature, and people are often inspired by music. My hope with these pieces is that they will inspire others in the same way that the national

parks have impressed me. My hope is that through these works, people (especially those who don't have opportunity to visit in person) can experience some of what it is like to be in a national park. So many people in our country have never had the opportunity to visit our national parks. *Natural Opposition* and *Giants at Night* sonically immerse people in music that represents outdoor adventures. By doing so I hope to impact the lives of others in some small way.

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VITA

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