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CHAPTER 1

ARTISTIC CONTEXT

DEFINING ELECTRONIC MUSIC

Let me begin with the most – seemingly – obvious question: what is electronic music? And furthermore, why do I prefer to use the term *electronic music* and not another of the myriad phrases used, almost interchangeably, to refer to the same piece of music? This etymological scrutiny will not only provide a historical rundown of the genre, but also establish a context for the specific flavor of electronic music this book will be focusing on.

Before the historical overview, I will first introduce two dictionary entries for the word “electronic”. From the *Oxford Dictionary of English*:

electronic

adjective

1. (of a device) having or operating with components such as microchips and transistors that control and direct electric currents: *an electronic calculator; an electronic organ.*
 - (of music) produced by electronic instruments: *electronic dance music.*
 - relating to electronics: *a degree in electronic engineering.*
2. relating to electrons.
3. carried out or accessed by means of a computer or other electronic device, especially over a network: *the electronic edition of the newspaper; electronic banking.*

This is how *Encyclopedia Britannica*’s *Merriam-Webster Dictionary* defines the same word:

electronic

adjective

1. of or relating to electrons.
2. of, relating to, or utilizing devices constructed or working by the methods or principles of electronics: *electronic fuel injection.*
 - implemented on or by means of a computer; involving a computer: *electronic banking.*
3. generating musical tones by electronic means: *an electronic organ.*
 - of, relating to, or being music that consists of sounds electronically generated or modified.
4. of, relating to, or being a medium (as television) by which information is transmitted electronically: *electronic journalism.*

As seen above, there are several low-level concepts that are tightly coupled with this adjective, such as electrons, electronics, computers and transmission. Interestingly, both entries also

define “electronic music”. The description in the *Oxford Dictionary of English* is quite generic and easy to agree with. I would, however, replace the word “instrument” with “medium” to avoid an implication of *electronic musical instruments* which are electronic media but only as a subset of a larger category. *Merriam-Webster’s* definition of the phrase is also generic but it offers slightly more substance by referring to sound, and moreover to *generation* and *modification* of sound. I will soon touch upon the historical significance of these two processes.

Both of the above entries, on the other hand, are circular definitions in their core: electronic music is music that is produced electronically. The current discourse demands a higher precision than this and the following historical overview will help delineate the links between the nomenclature and the practices of electronic music.

A Brief History of Electronic Music

It is frivolous to try and place a birth-date on the genre. Ideas that propelled the earlier years of electronic music can be attributed to mankind’s perennial obsession with sound making. We do, however, know approximately when the devices which established the electronic medium were developed. Such inventions as the loudspeaker, microphone, phonograph and vacuum tube were all conceived within a span of a few decades from the late 19th century to the early 20th century (Holmes 2008: 6). The transduction of sound waves into electrical charges (and back) was achieved by the advent of these technologies, and it was not long before people recognized the artistic implications of the electronic medium. If we pin down this awareness roughly to the early years of the 20th century, we can talk about a 100-year-old art form, which was in a state of becoming throughout the first half of the century, and was actively practiced from the second half on.

This relatively new form, however, has so far managed to foster a multitude of subdivisions in its course of existence. A perpetual interplay between aesthetic dispositions and technological advancements gave rise to a proliferation of styles both simultaneously and successively. The resulting bifurcations have been heavily driven by schools of thought that demarcated artistic practices through theory. While a retrospective of electronic music history might reveal less clearly articulated boundaries between these schools, visionaries of the period were – at least initially – committed to proclaiming the distinctions between their camps.

In the early 20th century, the western music scene witnessed the emergence of new ideas about sound, during a time when many other art forms were similarly questioning the concept of material. The Futurist painter and composer Luigi Russolo, in his *L’Arte dei Rumori*, put forward several predictions about the future of what he then referred to as *the art of noise*, and proposed drastic changes to the existing notions about musical material. This text is written in a fairly confident, if not commanding manner, in compliance with the Futurist attitude. A hundred years later, some of Russolo’s arguments are no longer staggering, which is possibly a testimony to the accuracy of his predictions. However, not only a significant portion of his propositions have stood the challenge of time in terms of relevance, some are still yet to be realized. In 1977, roughly halfway between now and 1913, the composer Murray Schafer criticized how the decisions in city planning and architecture that impact daily soundscapes were being made arbitrarily (1994: 146). More than a hundred years after *L’Arte dei Rumori*, we are yet to find the engines of our industrial cities “skillfully tuned so that every factory is turned into an intoxicating orchestra of noises” (Russolo 1967: 12).

“We must enlarge and enrich more and more the domain of musical sounds” (11). This is one of the clearer messages in the 1913 text, which calls for an expansion of the vocabulary of those sounds which are deemed to be musical. A very similar sentiment was shared by the composer Edgard Varèse in an interview with the New York Morning Telegraph in 1916 when he stated that “our musical alphabet must be enriched” (Chadabe 1996: 59). This idea, at the time, had of course been resonating in a much broader field, not only as a precursor to electronic music, but also as a new philosophy towards music composition in general. For Russolo and Varèse, the device with which to materialize this vision was the *non-musical sound*.

But what exactly is a non-musical sound? The negation of *musical sound* can be viewed as a criticism of the then prevailing status quo in Western music. The “alphabet of musical sounds” at the time has been described by Varèse as being “poor and illogical” (Varèse and Wen-chung 1966: 11). Throughout the following decades Varèse, arguably ahead of his time², would promote the electronic means of producing sounds. Accordingly, he expresses that “[o]ur new medium has brought to composers almost endless possibilities of expression, and opened up for them the whole mysterious world of sound” (18).

Russolo, in his brief hypothesis on the origins of music, relates mankind’s initial fascination with the sound of an instrument to the prevalent quietness of life in early history (Russolo 1967: 4). He suggests that this amazement encouraged people to attribute a divine origin to musical sound: “Thus was developed the conception of sound as something apart, different from and independent of life. The result of this was music, a fantastic world superimposed upon reality, an inviolable and sacred world” (5). He then extrapolates his theory to the modern world and suggests that the “proliferation of machinery” in the 19th century mandates a “revolution of music” (5). At the time these sentiments were voiced, mankind had recently gone through the Industrial Revolution and was heading rapidly towards the first world war. People hence were acclimatized to a new and louder soundscape, and according to Russolo, music was supposed to follow suit: “We must break at all cost from this restrictive circle of pure sounds and conquer the infinite variety of noise-sounds” (6). His suggested means of achieving this was the “intonarumori”s (noise intoners). These were mechanical devices designed to produce a specific vocabulary of non-musical sounds, which were categorized into groups of what Russolo referred to as “fundamental noises” such as roars, whistles, cracks and bellows. The sacrilege against musical sound was to be perpetrated by a “futurist orchestra” of the noise intoners³.

In 1937, the composer John Cage expressed a view similar to Russolo’s but more of its own time: “If the word “music” is sacred and reserved for eighteenth- and nineteenth-century instruments, we can substitute a more meaningful term: organization of sound” (Cage 2004: 26). Here Cage echoes the terminology of Varèse, who is credited for coining the term *organized sound* in the 1920s. During a lecture at Yale University in 1962, Varèse refers to his interpretation of this concept as follows:

² During the first half of the 20th century, Varèse made several appeals to organizations like the Guggenheim Foundation and the Bell Laboratories, as well as various production studios in Hollywood, to advise them to invest into the electronic medium (Chadabe 1996: 59; Doornbusch 2013). These attempts, however, were to no avail. Said organizations would become significant proponents of electronic music in the second half of the century.

³ The first concert of *intonarumoris* caused a rampage, prompting the police to arrive at the venue only to arrest the performers for inciting a riot. Marinetti, who also performed and got arrested alongside Russolo that evening, described the performance as “showing the first steam engine to a herd of cows” (Holmes 2008: 15).

Although [electronic music] is being gradually accepted, there are still people who, while admitting that it is “interesting,” say, “but is it music?” It is a question I am only too familiar with. Until quite recently I used to hear it so often in regard to my own works, that, as far back as the twenties, I decided to call my music “organized sound” and myself, not a musician, but “a worker in rhythms, frequencies, and intensities.” Indeed, to stubbornly conditioned ears, anything new in music has always been called noise. But after all what is music but organized noises? (Varèse and Wen-chung 1966: 18)

Although such discourse is largely on breaking away from musical dogmas, the problematization of how the artistic outcome of this movement should be categorized dates back to as early as the first decades of the 20th century. Music was evolving – as it had always done – into something new, *but was it still music?* Electronic music was one of the forms that grew from these celebrations, and it has engendered its own share of taxonomical entanglement.

Around halfway through the 20th century, some of the predictions of the future of music from previous decades had already begun to materialize in the context of electronic music as a result of technological innovations. Public broadcasting agencies around the world were taking an interest in the possibilities of this new form of artistic expression (Chadabe 1996). In a postwar Europe, the electronic music studio was born and furnished with phonographs, magnetic tape machines, reverberators, filters and oscillators. Schools of aesthetic thinking emerged along with these studios, and gave rise to an initial wave of stylistic and philosophical divisions.

French and German studios lead the way for a significant period of time. Under the leadership of Pierre Schaeffer, the studio of Radio France, and subsequently the *Groupe de Recherches Musicales*, promoted the concepts of *musique concrète*, *sound objects* and *acousmatic music*. Established in Cologne under the initiative of the physicist Werner Meyer-Eppeler, the engineer Robert Beyer and the composer Herbert Eimert, the Westdeutscher Rundfunk studio embraced the *serialism* extrapolated from the music of the Second Viennese School as its stylistic direction (Chadabe 1996: 37). While modifications of recorded sounds constituted the material of most early pieces of *musique concrète*, oscillators and noise generators were the principle instruments for composers of the Cologne studio, who referred to their output simply as *elektronische Musik*. The sense of *play* inherent to *musique concrète* stood in significant contrast to the absolute determinacy of serialism, and this ideological difference was voiced clearly in the writings of the members of the two groups. For Eimert, *musique concrète* was “fashionable and surrealistic” and consisted of “incidental manipulations or distortions haphazardly put together” (Holmes 2008: 58). Conversely, serialism as a method of music composition has been criticized to varying degrees by prominent members of the French studio such as Schaeffer and Xenakis (Holmes 2008: 58; Xenakis 1992).

These articulated approaches gave an impetus to the genre and encouraged many composers to tread into uncharted territory. The stylistic principles adopted by the studios guided the composers, most of whom came from pen-and-paper composition, through their initial encounters with the electronic medium. *Etudes* of *musique concrète* or *studies* of *elektronische Musik* were, to the most part, timid stabs at an entirely new mode of music making, and mirrored the distinct aesthetic inclinations of the studios. But at the same time these exercises granted the composers a much-needed technical sensibility. Those who imagined a long-

standing relationship with electronic music were quick to integrate the unique implications of the medium into their craft, and it was not long before *composers' instincts* began to unravel the predetermined credos of the studios. The stylistic barriers were to dissolve in a matter of few years.

This evolution marks the emergence of the musical style this book will be focusing on: a view of electronic music which gives precedence to the composer's instincts; a form of composition that thrives on imagining one's way through the endless possibilities of sound; a form of music whose practicalities and boundaries are intrinsically delineated by the electronic medium. This medium defines both the structure and the sound of the music that emerges from it (Barrett 2013, personal communication). The pioneering composer of electronic music Morton Subotnick reflects a similar view when he describes his first contemplations of electronic music in the early 60s:

I didn't know what kind of music it would be. I did believe that it should be a music for that medium, not just any old piece of music that got recorded and put out — a whole new kind of music. I used as a model for myself the metaphor of Chopin and the piano. He used the concert grand in a way that just wouldn't have made sense as anything but solo piano pieces. It was (media theorist Marshall) McLuhan's idea that "the medium is the message," that his piano music and the piano were linked together in a very special way. I was looking for something equivalent with a record. What would a record be if (the piece) never got performed on the stage, just for the record? (quoted in Rosenbloom 2011)

The reciprocation between what is imagined and what is perceived impacts upon compositional strategies in real time and at various formal scales. This situation effectively prioritizes listening in a feedback loop between actions and perceptions (Vaggione 2001: 60). The result is a music that is "fundamentally different in character and in aspiration from any music that preceded it" (Demers 2010: 12); a music which "opens access to all sounds, a bewildering sonic array ranging from the real to the surreal and beyond." (Smalley 1997: 107).

Why Call it *Electronic Music*?

When thinkers and composers from the early periods of electronic music coined phrases to describe their craft, they had clear ideological bases for what they meant to communicate with these terms. But as the stylistic borders between the so-called schools of electronic music began to blur, the etymological precision of these terms started to degrade. I will now overview the electronic music nomenclature, including both modern and historical phrases, and discuss the accuracy with which these phrases are capable of describing the music under discussion here. Obviously, some of the terms discussed below have gained their prominence not purely on the basis of their etymological aptness, but also by their wide-spread usage. My intention with this discussion is not to disregard some of these phrases, but rather to establish a context for what I will call *electronic music* throughout this book.

The part of my artistic practice which relates to this book can be described as *computer music*, since I compose my music on a computer and I play it from a computer. But the computer is not an instrument for this music in the sense that a piano is an instrument for *piano music*. The modern computer is a wide-open platform; a *tabula rasa*. The more it can get out of the way

of composing, the more useful to the composer it becomes. Hardware is less of a limiting factor than it has ever been; for an artist working in the audio domain, today's computers are vastly capable. This was indeed not the case 30 years ago. The burden of the routines performed to operate an early computer was significantly entrenched into the nature of what could be achieved with it. The artist was forced to bear actively in mind what can retrospectively be described as the shortcomings of early computers: losing an entire day waiting for a piece of code to be compiled was a part of the composition process. Fortunately, this is no longer the case. A computer today is an infinite playground, equipped with all the tools of the early electronic music studios and much more. Techniques which spearheaded the various historical styles of electronic music are implemented side-by-side within the frame of a single software environment.

Furthermore, the phrase *computer music* lacks a historical comprehensiveness. Most obviously it abstracts itself from any electronic music which existed before the computer. From a listener's standpoint, a piece of electronic music composed on tape in 1958 might well display the same experiential qualities as a recent piece of computer music, yet fall into a different category purely on a taxonomic basis. On the other end of the spectrum, *tape music* is a nostalgic phrase still used on rare occasions when referring to fixed pieces of electronic music, even though the amount of music produced on tape today is next to none.

Electroacoustic music is another widely-used name for the music that I compose. *Electro-acoustic* is an acoustic engineering term defined by the *Oxford Dictionary of English* as "involving the direct conversion of electrical into acoustic energy or vice versa". Based on the concept of energy transduction, the term is associated with the working principles of loudspeakers and microphones. Treating the phrase as the adjective that it is, electroacoustic music translates to "music involving the direct conversion of electrical into acoustic energy or vice versa" or "music involving loudspeakers and microphones". By this definition, *electroacoustic music* is an apt contender for specifying the genre. However, I maintain that the word *electronic*, in comparison, is a more comprehensive indicator of the medium, based on the word's generic description discussed earlier.

Another popular phrase in this vernacular is *acousmatic music*. In my experience, this phrase is most commonly used when categorizing content for concert programs to differentiate fixed pieces from live performances of electronic music. From this perspective there might be an apparent justification for this expression in relation to Pythagoras' use of the phrase *acousmatic* when referring to his lectures given behind a veil so that the sound of his voice would be abstracted from its *visible* source. In a performed piece, the audience is able to discern an acoustic (or a causal) source for the sounds they are experiencing. In fixed pieces, however, there will only be speakers. Here is the caveat though: the speakers *are* the sources for the sounds, and I will further discuss this in the fifth chapter.

Schaeffer's usage of the word "acousmatic" proposes an entirely different theoretical perspective. The recorded sound is already detached from its visible source but the *sound objects* in acousmatic music are also to be abstracted from any *symbolic sources* which the sounds themselves may instigate. Acousmatic music is defined through the listening experience, regardless of whether it is the composer or the audience who is listening. This interpretation of the term therefore falls further out of place when differentiating fixed pieces from live ones, since a piece of electronic music can be fixed but not acousmatic in the Schaefferian sense. Furthermore, the fact that a listener can choose to experience even a live performance as an acousmatic piece by merely ignoring visual cues implies a greater complication. Acousmatic

sound is in the ear of the beholder and imposing it onto music taxonomically can cause inaccurate representations.

An obvious pitfall in using the phrase *electronic music* could be its implications when translated into German, which gives us the name with which the composers of the Cologne studio referred to their music. But *elektronische Musik* is such a historically and stylistically distinct form that I do not foresee a risk of exclusively summoning up the (beautiful) serialist organizations of oscillator sounds from 1950s when I say *electronic music*.

This book will discuss works of electronic music that have been described – accurately or not – as acousmatic music, computer music, electroacoustic music, tape music or *elektronische Musik*. It is the music that aligns with the visions of those like Russolo and Varèse. It is the outcome of an expanded musical language that is inherently coupled with the implications of the electronic medium. I therefore conclude that *electronic music* is an appropriate phrase to refer to this form of artistic expression. When referring to the listening experience of electronic music, I will not draw a distinction between the encounters with the musics of Stockhausen, Vaggione, Parmegiani or Ferrari. From the perspective of the listener, different works originating from the electronic medium can display similar characteristics regardless of their underlying methods of production. What is common to the experience of all this music will become more evident in the third chapter when I discuss the cognitive idiosyncrasies of electronic music.

COMPOSITION PRACTICE

Composition practice represents one of the three pillars of this study alongside experimentation and theoretical discourse. In this section, I will provide descriptions of the compositions that are attached to the research discussed in this book. These descriptions will range from program notes to composition reports. I will provide more comprehensive analyses of the four pieces, namely *Birdfish*, *Element Yon*, *Christmas 2013* and *Diegese*, which were used in the listening experiments.

As I will further detail shortly, the pieces described below rely on a variety of compositional intents, materials and techniques. This variety originates from my artistic practice on the one hand, and the goals of this research on the other. In that sense, every piece was composed with a hypothesis built into it. This may as well be considered a quality of all artistic processes. The artist, as a perceiving body, inevitably develops assumptions as to how his or her work will be perceived by an audience. Although my assumptions could have turned out to be severely inaccurate, they nevertheless helped me construct this thesis from the inside out: these works were composed around the underlying concepts of this thesis, were utilized in the experiments and later analyzed to delineate practical applications of some of these concepts.

As I mentioned in the previous section, I refer to a broad field of practices when I use the phrase *electronic music*. Works of other composers that I will refer to throughout this book come from considerably different styles. Electronic music can be performed or composed through micromontage, algorithms or chance, with recorded or generated sounds, to count just a few of the methods and materials made available by the electronic medium. The current study focuses on fixed works both for practical reasons pertaining to experiment methodology, and in order to concentrate on the theoretical constructs discussed throughout this book by eliminating the unknowns of live performance situations. Nevertheless, the fixed works at the core of this study utilizes a great variety of production techniques. While some of the pieces were composed entirely with synthesized sounds, others incorporated recorded sounds. Some of the compositions were rooted in pre-determined narratives, while others emerged from different kinds of processes. Sections that were produced algorithmically were juxtaposed in the same piece with those that were composed stochastically. Some movements of these works were created with generative software while others were performed with instruments. This variety was not necessarily intended to investigate the experiential effects of these techniques in isolation, but to achieve a gestalt of techniques afforded by the modern electronic medium.

My ability to reflect upon my own works evolved as I observed other people reflecting upon them in the context of the experiments, and moreover as I established the links between the data from these experiments and the theoretical constructs of the thesis. As a practitioner and teacher of electronic music, I have been dealing with the analysis of other composers' works for a long while. However, it has become clear to me that artistic research differs from a

musicological stance in that it provides an intimate connection between the artistic work and its analysis. Both of these components transform as the research proceeds, and this transformation reveals new insights. My account of the creative processes of each piece as provided below merely disclose the perspectives from which these pieces originated. These works will be subjected to further scrutiny throughout the book. The report in the current section will serve as an initial point of reference for the reader.

Birdfish

2012, 4'40"

Birdfish was composed during the 9 months between October 2010 and June 2011. The piece was revised during an additional 2-month period in early 2012. It is the third piece of a tetralogy on evolutionary phenomena. The sequence of the works in this tetralogy (in the order which they adhere to the tetralogy's narrative arc) is *Let the World End* (2012), *Nautik* (2011), *Birdfish* (2012) and *Insectarium* (2013). The latter is an interactive audiovisual piece, a second version of which is in development at the time of this writing. While these pieces belong to a preconceived sequence, they vary greatly in material, form and language. The tetralogy is therefore not intended for a compound performance: each piece stands on its own and is performed individually. What connects these works is the inheritance of research across the pieces. *Nautik*, for instance, is a 3-movement live-performance of about 12 minutes during which I synthesize various forms of liquid sounds. The methods used in this performance greatly informed the composition of water-like textures in *Birdfish*. Certain phase modulation techniques developed to create organic structures in *Birdfish* were later used in *Let the World End* to form the central gestures of the piece. Furthermore, the research on aerial and avian sounds conducted during the composition of *Birdfish* was utilized to design the interactive sounds of *Insectarium*.

Birdfish unfolds in two movements which in itself are composed of two and three sections respectively. The 38-second opening acquaints the listener with the sound world of the piece with an abstruse exposition of the bird, water, and other creature sounds as well as intermittent melodic material. The first instance of a leitmotif which will recur throughout the piece marks the end of this section with an E-flat resolution. The following development section, which lasts until the 2'04" mark, accommodates more concrete incarnations of the water, fish and amphibian sounds. This section builds up on the representationality of its sound elements, yet at the same time introduces more abstract objects such as brief glides of discernibly synthesized sounds. This section also reveals the spatial design of the piece with articulated reverberant fields, low frequency rumbles and gestures which traverse the implied spaces. These spaces are designed to enhance the contextual coherence of the previously introduced representational sounds. The leitmotif marks the end of the section, this time in D-flat.

The second movement begins with a 30-second section of fast-paced mutations between the actors introduced so far (i.e. birds, water-like elements, amphibians and abstract structures) and ends with an almost evaded cadence-like reincarnation of the leitmotif which *dissolves* into the ensuing reverberant field as the pitch decomposes around D. The collage of bird sounds then sinks into the background. This opens up several compositional prospects: while the gestural pace of this background matches that of the previous sections, these gestures are now pushed away spatially to distance the listener from the texture which has persisted throughout the piece so far. This was one of the revisions I have applied upon the first series

of experiments I conducted with the first version of *Birdfish*. In this first version, the consistency of textures between movements, although implying a sustained richness of the sound elements, for lack of contrast, negatively caused a staleness in the piece.

The shifting of the figure gestures to the ground sets a stage for a new foreground, which I populate with a more sparse distribution of sounds that evolve over time from abstract pitched elements back into creature sounds. Further into the section, the *sunken* gestures of bird and amphibian sounds swing in and out of reverberation to ephemerally reclaim their foreground roles. The reverberations and the low frequency pulses are reminiscent of the first movement but are much more articulated to create a spatial tension for what is to come. The representational sounds progressively manage to break through the screen of reverberation. Following the most articulated submersion into reverberation between 3'35" and 3'45", a brief reprise of the textural density and the representational clarity of the first movement lends itself to a final resolution involving a climactic build-up in various dimensions of the piece such as spatial, spectral and textural densities, and representational variety. The effect I wanted to achieve here was to shift the perspective from the third person to the first person and have the piece *wash over* the listeners, as if they were amongst the creatures who were trying to transcend the surface of the ocean. A final repetition of the leitmotif concludes the piece in D-flat.

Despite its representational intents, *Birdfish* does not contain any recorded sounds. The processes to generate its constituent sounds comprise complex combinations of pulsar, granular and frequency-modulation syntheses, modulated delays and various frequency-domain filters executed with both custom-designed and off-the-shelf software devices. The granulations to create the textural elements of the piece were carried out using stochastic processes. Once I created the actors and the settings via several generations of the processes described above, I have montaged these elements into the temporal structure of the piece in a variety of layers.

Element Yon

2011, 3'45"

*Element Yon*⁴ was composed concurrently with *Birdfish* during the 9-month period between October 2010 and June 2011. I devised this piece to emulate several structural characteristics of *Birdfish* but in an entirely different language. This differentiation in language is achieved with a change in vocabulary rather than in grammar. Just like *Birdfish*, *Element Yon* is composed entirely of generated sounds. The main difference is that I have conceived *Element Yon* as an abstract counterpart of *Birdfish*. In *Element Yon*, one can clearly discern that the sounds originate from oscillators and not from recordings. To establish a non-representational quality for the sounds, I have mainly worked with synthesis and filtering methods that maintained the pure characteristics of simple waveforms.

Except for this choice of material, *Element Yon* shares similar temporal and spatial organizations with *Birdfish*. The micro-montage strategies used to sculpt phrases are also highly analogous between the two. As a result, the gestural grammars of the pieces are homogenous. While this homogeneity benefitted from the concurrency of their compositions, it is at the same time significantly obscured by the differences in sound material. To achieve

⁴ The word "yon" (here written in Romaji) represents the number 4 in Japanese.

the specific sound characteristics of *Element Yon*, I have implemented modulation matrices across various synthesis modules. These are the same modulation matrices which I have used during my studies on the synthesis of avian vocalizations for *Birdfish*. As a result, certain gestures in *Element Yon* verge on the organic sounds in *Birdfish* in terms of their structural complexity. In contrast with the aforementioned harmonic evasion in *Birdfish*, which transpires in a representational sound world, the evasions in *Element Yon* are those of representationality within an abstract context.

While the structuring of the piece does not share the same binary model, its macro structures are comparable to those of *Birdfish* in terms of their length and their use of interim silence. The piece begins with a 20-second exposition of its vocabulary followed by a 33-second section which explores the frequency spectrum of the piece. Here, the listener is acquainted with the gestural characteristics of *Element Yon*. During the development section between 0'57" and 2'57", the texture so far is augmented by stereo separation and audio decorrelation techniques used in *Birdfish*. The segments between 2'57" and 3'05", 3'07 and 3'25", 3'27 and 3'35", and finally 3'36 and 3'45" constitute the four elements which give the piece its title. The second segment accommodates a harmonic resolution in the vaguely implied key of the piece. These elements are structurally consistent with the development section but are intended to obfuscate any motivic closures to the piece, in the manner of moment form⁵.

Christmas 2013

2011, 2'16"

The sound material of *Christmas 2013* is extracted out of the jazz trio *Tin Men and the Telephone's* 2011 album, *The Very Last Christmas*, which consists of avant-garde jazz interpretations of famous Christmas songs. Since the band's instrumentation comprises a piano, a double bass and drums, the sonic vocabulary of the piece is based on frequency and time-domain manipulations of these specific instruments. In late 2011, the band kindly offered me the uncompressed stereo mix-downs of every track in the album. Having decided to animate a post apocalyptic tale with this material, I have *mined* the album for sound chunks of certain spectral and temporal characteristics. Once I had sound material sorted, the composition of *Christmas 2013* was completed and revised in the relatively short period of two months.

Inspired by the ill-conceived prophecies about the world's expected end in 2012, *Christmas 2013* is set in a post-apocalyptic world, about a year after the demise of mankind. A main theme for me during the composition of the piece was *future nostalgia*. The selected chunks were therefore processed to sound electronic, organic and antiquated at the same time. From a structural point of view, the piece exhibits a temporal unfolding marked by distinctive staccato sounds. The recurrence of these sounds in various timbres establishes an obscure rhythm which operates at various time scales. The spatiotemporal organization of the staccato sounds is formed so that they reveal a collective behavior of spatial causality, akin to flocking, to give the listener a sense of observing a landscape populated with animate objects.

Following a first instance of the impulse which will mediate the temporal progression of the piece, *Christmas 2013* begins with a quotation of the well-known Christmas carol *Silent Night*.

⁵ When describing his conceptualization of moment form, Stockhausen writes: "a given moment is not merely regarded as the consequence of the previous one and the prelude to the coming one, but as something individual, independent and centered in itself, capable of existing on its own" (translated in Kramer 1978: 179).

This part is kept true to its form in the recording (apart from added reverberation) to prime the listener with an instrumental reference which they can clearly recognize as a song, if not as the specific carol that it is. The reverberated melody is then layered with a harmonically related layer which furthers the ambient feeling of the introduction. At this point, a spatial play of impulses takes over the foreground and immerses the listener in a vast environment. The sporadic appearances of the piano sounds are placed amongst its highly processed siblings in an ornamental fashion. Narrative function of these appearances are to remind the listeners of the now, in a future from where they are looking back. The now therefore becomes an object of nostalgia through the contrast between an unsettling post-apocalyptic landscape and a happy memory. The ending of the piece returns to the clearly identifiable sound of the piano now playing a progression fabricated from processed recordings to compliment the tonal and temporal threads of the piece.

A Christmas song for a world that no longer exists, as crooned by the anti-Santa strolling a wasteland formerly known as Earth: A repurposing of Tin Men and The Telephone's celebrated Christmas album. (Çamcı 2012, concert program notes)

Diegese

2013, 1'54"

Diegese was composed and revised between June 2012 and February 2013. The initial motivation behind this piece was to illustrate several concepts discussed in my article *Diegesis as a Semantic Paradigm for Electronic Music*, published on Canadian Electroacoustic Community's journal *eContact!* in May 2013. The sound material of the piece is mostly synthesized with the exception of a brief piano recording.

In *Diegese*, I specifically intended to explore the placement of musical quotations within electronic music as *diegetic actors*⁶. To materialize this idea, which I had previously experimented with in *Birdfish* and *Christmas 2013*, I incorporated two musical quotations into the composition of the piece. The quotations are blended into the narrative flow of the piece rather than being juxtaposed with the remainder of the sonic textures. The first of these quotations is from my former teacher Curtis Roads' 2009 piece *Touche pas*, which was also used during the listening experiments upon Curtis' kind permission. During the period I studied with him in Santa Barbara, I witnessed Curtis finish the first version of this piece and later perfect it into one of the most impressive displays of modern electronic music. Here are the program notes for *Touche pas*:

In April 2008, I was experimenting with the granulation of a brief sound file when I noticed that its opening looping sonic texture was reminiscent of the classic electronic music work *Touch* (1969) by my former teacher Morton Subotnick. I know this work well, having produced and remastered it in 1986 for the Wergo label. In homage, I decided to dedicate this work, whose French title means "touch not," to Morton Subotnick. The title proved apt, as after months of work, *Touche pas* sounds nothing like *Touch*. (Roads 2009, concert program notes)

⁶ This is a concept which I will discuss extensively in Chapter 5.

As a quotation, I chose the sonic texture mentioned above in an homage to Roads' homage to Subotnick. For this, I developed a simple granulation algorithm which re-synthesized its input material into arhythmically juxtaposed loops of sound grains. I later layered processed instances of this material to give the texture a spectral variety similar to that of *Touche pas*. This quotation begins at 0'49" mark and lasts for 18 seconds before it lends itself to another quotation.

The second quotation was a phrase from Ludwig van Beethoven's Piano Sonata No. 27 in E minor (Opus 90). The choice of instrument here sets a clear parallel with *Christmas 2013*. The main difference between the two quotations is that while *Christmas 2013* incorporates an external musical form as a whole (i.e. a Christmas carol), *Diegese* uses the piano as a structure which can be associated with the instrument but not a musical form. In other words, the latter offers a decontextualized quotation which functions as a gesture. The pairing of the particular quotations in *Diegese* is motivated by the metaphorical similarities between the motion trajectories of both textures.

Temas

2014

I began developing *Temas* in the fall of 2013 in support of my composition *Autounfall*, which I had started planning in 2009 and have been actively composing since 2012 with an expected completion in 2015. A point in *Autounfall*'s narrative makes it necessary to create an illusion of a car crash, which I could slow down and speed up, zoom in and out of, and alter its representationality by manipulating the sonic elements which would emanate from the mechanical causalities of a car crash. Besides investigating the physical properties of impacts and frictions on metal surfaces for this scene, I also studied the sound characteristics of glass deformations. To create the intended effect, broken pieces of glass in various sizes would have to originate from different locations and impact the ground at different speeds and angles. The size variations would cause the impact sounds to exhibit different motion and damping characteristics. It soon became clear to me that an algorithmic implementation would be necessary to achieve a convincing level of sonic complexity for this texture. I figured the software I had developed for *Diegese* mentioned earlier could serve as a starting point by virtue of its ability to simultaneously granulate a variety of input sources and do so in an arhythmically correlated fashion in accordance with the intended motion of glass particles in *Autounfall*.

During the first month of programming devoted to expanding the functional complexity of my initial software, the stochastic approach to its development began to take a life of its own. Furthermore, I had started integrating signal processing chains designed for the sounds in *Birdfish* and *Element Yón* into this new software. By the end of 2013, *Temas* had taken form of a stand-alone stochastic performance platform, design of which was innately informed by the strategies I have devised for the works composed during the course of the research discussed here.

Stochastic musical systems allow for the incorporation of a seemingly infinite number of parametric possibilities in humanly perceivable musical forms. Accordingly, *Temas* too offers minute control over probabilities which, in combination, amount to an endless variety of gestural and textural structures. Although *Temas* emerged from an attempt to stochastically emulate the sound of an environmental phenomena, in its final form it is capable of

producing highly abstract sounds. The first version of *Temas* was completed in March 2014 and was premiered in a concert in April 2014.

Temas (tr. *contact, touch*) is a stochastic performance. The software underlying the performance integrates the artist into a generative system as a module of analysis. The software interface affords control over probability distributions instead of immediate parameters. Sound acts as a seed; the artist listens, and in return, performs probabilities. All sounds are generated in real time. *Temas* draws inspiration from Karlheinz Stockhausen's *Kontakte*, Morton Subotnick's *Touch* and my former teacher Curtis Roads' *Touche pas*. *Temas*, which generates purely electronic sounds, stochastically traverses the fine line between the organic and the synthesized as it forms contacts with representationality. The initial design principle behind *Temas* was motivated by an algorithmic implementation of the sonic texture from Subotnick's 1969 piece *Touch*, which prompted Roads to name his 2009 piece *Touche pas* as an homage to his former teacher. All instances of *Temas* emerge from the same origin but evolve into unforeseen sonic territories. An optimal performance of *Temas* lasts 8 to 10 minutes. (Çamcı 2014, concert program notes)

Shadowbands

2010, 2'48"

The human mind has an uncanny power of recognizing symbolic forms; and most readily, of course, will it seize upon those which are presented again and again without aberration. The eternal regularities of nature, the heavenly motions, the alteration of night and day on earth, the tides of the ocean, are the most insistent repetitious forms outside our own behavior-patterns (...) They are the most obvious metaphors to convey the dawning concepts of life-functions — birth, growth, decadence, and death. (Langer 1948: 155)

Shadowbands builds on the idea of a sonic Rube Goldberg Machine. I first explored this concept in my 2009 piece *Hajime*, which I will discuss shortly. The sound material of *Shadowbands* is purely synthetic. Inspired by the total solar eclipse of March 29, 2006, the piece narrates a story of machines witnessing a disruption in the most ceaseless pattern in daily life: the rising and setting of the Sun. In doing so, the piece draws a parallel between the systematic behavior of a machine and the “eternal regularities of nature”.

The first 23 seconds consist of a vocoded speech which sets a narrative context for the piece. The following section until 0'44" is an exposition of the synthetic sound world of the piece. In awe of the disruption in this most persistent pattern that moderates their utility, the machines attempt to break away from their daily routines. At 0'44" we hear a repeat of the initial instigator of the causality chain, implying a futility of these attempts. The repeat, however, does manage to progress into an alternative route. A more consistent repetition of the initial sequence reiterates this futility before the machines descend back into order at 1'37". The metaphor of order is conveyed by the harmonic organization of sound elements and the reduction of inharmonic content from the individual sounds. Musical incarnation of this metaphor is further established when a rhythmic grid is introduced in the temporal structure.

A distinct loop of 2 seconds at the end of the piece declares the unmistakable defeat of the machines in their attempts to break the pattern.

The opening speech to the piece is from a broadcasting of the 2006 solar eclipse which was viewed in its totality at various locations in Turkey. As an out-of-place experiencing of this bewildering event not through the eyes of the man but the machine, the piece depicts "a phenomenon impossible to photograph". (Çamcı 2010, concert program notes)

Hajime

2009, 6'09"

Hajime is an octophonic⁷ study on sonic causality. As the sound material for the piece, I recorded my own voice saying "My name is Anıl" and processed it through several generations of filtering, granular synthesis and micro-montaging. In composing the micro forms of the first movement, I intended to create a sonic Rube Goldberg Machine. A Rube Goldberg Machine is a mechanical contraption designed to execute a physical task through chain reactions across its constituent mechanical parts. Since Rube Goldberg Machines often perform redundant tasks, they can be considered as kinetic sculptures rather than functional devices. My idea with the first movement of *Hajime*, was to create an auditory representation of a similar behavior. Throughout the movement, the timbre of the human voice is discernible for the most part. Each sound behaves like a physical object which sets other objects in motion by interacting with them in various ways. Objects spring, stretch, spin, bounce and impact each other in a linear causal chain similar to that of a Rube Goldberg Machine. This behavior, which dominates the first movement of *Hajime*, is a metaphor for the almost predetermined routines of an acquaintance process between two people, as witnessed by a third person. In accordance with this choice of perspective, the movement is composed for the front stereo speakers.

The second movement portrays a zoomed-in moment of contemplation during which I dread announcing my name. This is a humorous comment on the myriads of polite attempts at pronouncing my name, hindered to the most part by the vowel "ı", which is non-existent in many languages and therefore virtually impossible to vocalize for non-Turkish speakers. In compliance with the narrative, the second movement unfolds in first person view and therefore incorporates the rear stereo speakers as well to create an immersive depiction of inner thought with quadraphony.

The third movement is another humorous take on what I imagine could be my addressee's experience as I announce my name. The movement therefore shifts the perspective to second person. It begins in a frontal monophony and soon develops into a confusingly exaggerated spatialization of octophonic sound to create a sense of turmoil. The final utterances of my name no longer instigate a spatial turmoil, yet they are still equally unintelligible.

Traversing a voice recording of the composer introducing himself, this work depicts an acquaintance process in a foreign land in 3 movements, each observed from a different perspective (third, first and second person respectively). (Çamcı 2009, concert program notes)

⁷ *Hajime* has been adapted for quadraphonic systems in late 2009, and for stereo systems in 2010.

Do You Remember Rob Nolasco?

2007, 4'31"

Although I had already been experimenting with cognition by the time *Do You Remember Rob Nolasco?*² was composed, this piece from 2007 is the earliest work I prefer to associate with the current study. Retrospectively, I can describe it as a precursor to *Shadowbands*, *Element Yon* and *Birdfish* in terms of the sound worlds they exploit. Also composed purely of synthesized sounds, *Do You Remember Rob Nolasco?* utilizes a blend of pulsar and frequency-modulation syntheses. On its surface, the piece embodies two instances of a basic tension-and-release structure. These two instances, which are similar in form, are differentiated by their musical languages.

In composing it, I was experimenting with the role of anticipation in listening, and the perception of the inevitable. The first 2 minutes and 49 seconds of the piece present a gradual build-up of crackles, insect-like organic sounds and occasional melodic figures. At the 2 minute mark, the build up arrives at a state of relative climax. From 2'35" on, a further escalation in what had seemingly been at the upper threshold of its density implies an inevitable release. Without any intentions to induce physical pain, I wanted the listener to be under the impression that the build-up could not progress any further and it would have to resolve any time now. The resolution is a low frequency pulse, which incites an unmistakable bodily experience when played through a capable sound system. This gesture is aimed at surprising the audience with what they had been anticipating. The second half of the piece imitates this tension-and-release form but with a melodic line and a harmonically related texture. The same bass pulse, which was designed as a corporeally articulated sonic experience for the first movement, now serves a function of harmonic resolution.

Do You Remember Rob Nolasco? is an unresolved mystery in two movements that mimic each other. (Çamcı 2007, concert program notes)

A Relational Map of the Pieces

Seen below in Figure 1.1 is a map of the pieces described in this section (with the inclusion of Curtis Roads' piece *Touche pas*) situated in relation to the common themes and techniques used in their compositions as described above. While the links between these works can be much more complex and multi-faceted than seen below, this representation is useful in summing up the common aspects across the pieces which are relevant to the discussion in this book.

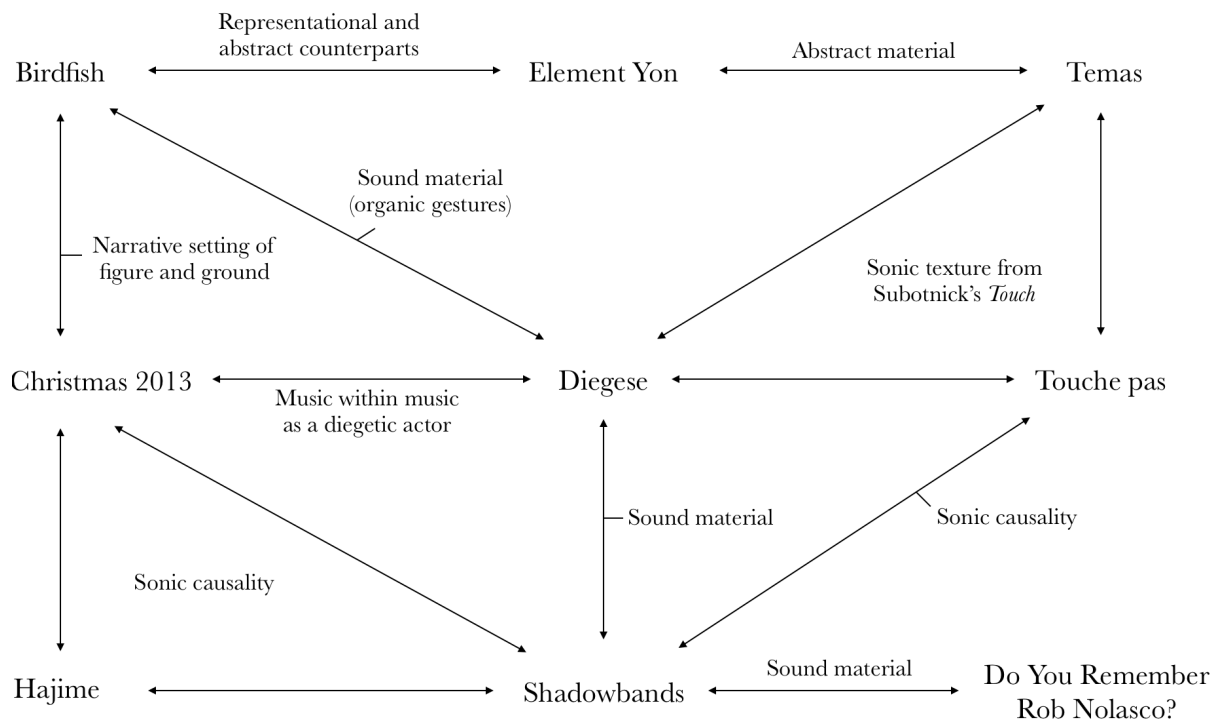


Figure 1.1: A relational map of the pieces