MUSIC IN NATURE, NATURE IN MUSIC: SOUNDING THE ENVIRONMENT IN CONTEMPORARY COMPOSITION

by

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Abstract

This thesis examines nature as both a concept and source material in contemporary music. Composers reinforce, revise, and challenge existing conceptualizations of nature through their engagement with natural settings, live or recorded environmental sounds, and/or non-sounding environmental information. How composers understand nature informs the ways in which they employ aspects of the physical world in their music. This study explores the interplay between nature-as-concept and nature-as-source-material in art-based walks, outdoor music, electroacoustic composition, and concert-hall pieces. Through analysis of works representative of these wide-ranging genres, this thesis offers a critical assessment of how nature is imagined in a contemporary musical context.

The concept of a continuum is used as both a structural and theoretical tool in this study. A gradual transition from real-world encounters with nature to an abstracted experience of it is made over the course of the thesis. The works discussed in Chapter Two exist as lightly edited recordings made by artists during an outdoor walk/improvisation. The outdoor theatre piece considered in Chapter Three takes place at a lake and draws on that environment in several ways during a performance. The two electroacoustic compositions investigated in Chapter Four combine unmodified and modified nature sounds. The natural world is still present in the concert-hall works discussed in Chapter Five, but recorded nature sounds are combined with live instrumental music based on environmental properties and processes. In addition, this thesis traces four themes across works. These are technology, human presence, myth, and the transformation of the environment.

The works under consideration demonstrate a range of approaches to composing with and conceptualizing nature. Some of the works comment on environmental issues, such as noise

pollution and climate change. Others aim to drive understanding beyond the limits of human perception; that is, to open up new psychological spaces. In different ways, the works under focus illuminate the relationship between humans and the natural world. By stimulating discourse around how we think about nature, these pieces encourage critical thought regarding our place as humans in the physical environment.

Preface

This thesis is the original work of the author, Tyler Kinnear.

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Chapter 1 Introduction

"Th[e] blurring of the edges between music and environmental sounds may eventually prove to be the most striking feature of all twentieth-century music."

—R. Murray Schafer[1]

The 1960s and 1970s brought about new approaches to the physical environment in the arts. In the visual arts, Walter De Maria, Michael Heizer, Ana Mendieta, Dennis Oppenheim, Robert Smithson, and others moved beyond the limitations of the gallery by transcending the museum through the use of natural settings and materials in their works.[2] Composers and sound artists also began exploring the physical environment in new ways, primarily through their engagement with natural materials and outdoor spaces. Works representative of these approaches include John Cage's *Child of Tree* (1975), a concert-hall piece for cacti; Bill Fontana's *Kirribilli Wharf* (1976), an eight-channel sound installation that presents recordings of waves lapping against eight blowholes on the underside of a pier in Sydney Harbor; and R. Murray Schafer's *Patria the Prologue: The Princess of the Stars* (1981), a live outdoor theatre work realized at a rural lake at dawn.

Although many musicians engage natural materials and spaces, they do so for different reasons. Some, such as Schafer, present natural sounds in order to comment on the environmental and social conditions of a particular place. Others, like Cage, use natural source

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[1] R. Murray Schafer, *The Tuning of the World: Toward a Theory of Soundscape Design* (New York: Alfred A. Knopf, 1977), 111.

[2] This movement came to be known as "land art" (or "earth art"). On the history and development of land art, see Ran Faye, *A History of Installation Art and the Development of New Art Forms* (New York: Peter Lang, 2009); and John Beardsy, *Earthworks and Beyond*, 3rd ed (New York: Cross River Press, 1998); Claire Bishop, *Installation Art: A Critical History* (London: Tate, 2005). For scholarship on aesthetic approaches to land art, see Amanda Boetzkes, *The Ethics of Earth Art* (Minneapolis: University of Minnesota Press, 2010); James Dickenson, "Journey into Space: Interpretations of Landscape in Contemporary Art," in *Technologies of Landscape: From Reaping to Recycling*, ed. David E. Nye, 40–68 (Amherst: University of Massachusetts Press, 1999); and Rosalind Krauss, "Sculpture in the Expanded Field," *October* 8 (Spring, 1979): 30–44.

materials to expand conceptions of musical sound. Of interest here is how contemporary composers and sound artists represent the natural world in their works. Do they consider humans part of nature or separate from it? In what ways do they employ nature as a compositional resource? What are some of the ways in which they comment on environmentalist topics and issues in their pieces? Through close examination of a series of works from across disciplines that share an interest in sound, this study seeks to illuminate how engagement with environmental sounds in contemporary sonic art inform conceptions of nature and how conceptions of nature shape approaches to environmental sounds in sonic art.

Before introducing the works under consideration, a brief discussion of soundscape studies is in order. That discipline has had a significant influence on a number of composers engaging natural sound. Soundscape studies can be traced to the work of the World Soundscape Project (WSP), a research team formed by Schafer at Simon Fraser University in Burnaby, British Columbia, in 1969. The WSP conducted the earliest systematic study of the acoustic environment in an effort to raise awareness of noise pollution and document sonic landmarks.[3] The group turned to Vancouver and the surrounding area for their first study. Their research tools included soundwalking, interviews, field recordings, and sound maps.[4] Their findings were published as a 1973 book and double LP titled *The Vancouver Soundscape*. Subsequently, the WSP conducted similar studies across Canada (*Soundscapes of Canada*, 1974) and in Europe (*Five Village Soundscapes*, 1977). The WSP also explored the environmental and social

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[3] The members of the WSP were Bruce Davis, Howard Broomfield, Peter Huse, R. Murray Schafer, and Barry Truax. Several students assisted the group, most notably Hildegard Westerkamp.

[4] A soundwalk is a silent walk (alone or with a group) where the main purpose is to listen actively to the surrounding environment. A sound map is a document that visualizes sounds in a given physical area during a time period. Sound maps capture acoustic events in temporal or spatial terms, or a combination of the two. Examples can be found in "Appendix I: Sample Sound Notation Systems," in Schafer, *The Tuning of the World*, 26467.

conditions of soundscapes through sonic art. The group worked in electronic-based genres, in particular phonography, radio documentary, and electroacoustic composition. Although genre and compositional techniques vary among early WSP soundscape pieces, each work emphasizes the real-world context of source materials.

Schafer and his team drew on both ecology and communication models to theorize the concept of soundscape. In terms of ecology, the research group considered humans in balance with their surroundings when their sounds were on the same scale as those from non-human sources; that is, where human-associated sounds did not mask non-human sounds.[5] Regarding a communication model, the team critiqued what they saw as the transformation of environments from high-fidelity soundscapes (where sound signals are easily recognizable) to low-fidelity ones (where the sheer amount of acoustic information jeopardizes the audibility of certain sound events).[6] They attributed the decline in the health of the global soundscape to developments in technology since the Industrial Revolution. The WSP viewed the increase in mechanized sounds in the 1960s as particularly problematic.

From this perspective, nature is perceived as being under the threat of Western technology. The bias toward natural sounds is exemplified in R. Murray Schafer's 1977 publication *The Tuning of the World*. In "Chapter Nine: Classification," he sorts real-world sounds according to three aspects: physical characteristics, referential properties, and aesthetic qualities. While Schafer explains the physical characteristics of environmental sounds in

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[5] Schafer's use of an ecology metaphor in his theory of soundscape can be understood as a continuation of the renewed—and popularized—interest in "ecological" thinking in the 1950s. For a discussion of the appropriation of ecology discourse in music, see Brent Keogh and Ian Collinson, "'A Place for Everything, and Everything in Its Place': The (Ab)uses of Music Ecology," *MUSICultures* 43, no. 1 (2016): 1–15.

[6] WSP member Barry Truax went on to develop a communication model for soundscape studies after the research group disbanded in the late 1970s. See, Truax, *Acoustic Communication*, 2nd ed (Westport, CT: Ablex Publishing, 2001).

objective terms, his classification of their referential properties and aesthetic qualities is subjective. Consider, for example, his nine categories for "Classification According to Referential Aspects": "Natural Sounds, Human Sounds, Sounds and Society, Mechanical Sounds, Quiet and Silence, Sounds as Indicators, Mythological Sounds, Sounds of Utopia, and Psychogenic Sounds of Dreams and Hallucinations."[7] Each category has multiple subcategories, with the exception of "Quiet and Silence." The scope and intensity of human sounds increases from physiological to societal to mechanical sounds. However, "Quiet and Silence" serves as a pivot point in Schafer's index. This category is followed by the desired sounds of myth, utopia, and dreams. It is as if stillness and repose provide access to an idealistic world. The progression from natural to industrial to imaginary sounds in Schafer's "Classification According to Referential Aspects" is consistent with the environmentalist leanings of the WSP. The scheme aligns with the research team's commitment to creating greater balance between human and non-human sounds in the global soundscape.

Recent scholarship criticizes Schafer for his preference for "hi-fi" soundscapes, arguing for a non-prescriptive definition. For example, Ari Kelman claims that the idea of soundscape becomes a problem when prejudice is held against urban sounds.[8] Timothy Ingold argues against the term altogether, asserting that sound is not an object of perception; rather, it is "the medium of our perception. It is what we hear in."[9] To deem natural sounds as well as quiet and silence as more valuable culturally, ecologically, and aesthetically than human sounds suggests a prejudice in favor of nature. This is not to dismiss the importance of "balanced" soundscapes to human

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[7] Schafer, *The Tuning of the World*, 139–44.

[8] Ari Kelman, "Rethinking the Soundscape: A Critical Genealogy of a Key Term in Sound Studies," *The Senses and Society* 5, no. 2 (2010): 212–34.

[9] Timothy Ingold, "Against Soundscape," in *Autumn Leaves: Sound and the Environment in Artistic Practice*, ed. Angus Carlyle (Paris: Double Entendre, 2007), 11.

psychological wellbeing and ecosystem health; rather, it is to say that a hierarchical approach to categorization, as found in Schafer's taxonomy, warrants close consideration.

This thesis investigates some of the ways in which nature is engaged as a concept and as a source material in the sonic arts since the fundamental work of Schafer and the WSP in the 1970s. Several of the pieces considered in this study identify with the soundscape tradition, notably those by Schafer (*The Princess of the Stars*) and Hildegard Westerkamp (*Lighthouse Park Soundwalk* [1977] and *Talking Rain* [1998]). Works by composers and sound artists that have contributed to the field of acoustic ecology are also examined, including Carmen Braden's string trio *Candle Ice* (2014), Matthew Burtner's piano piece *Iceprints* (2010), and Dallas Simpson's outdoor improvisation series *The Adoration of Willow* (1998). As will be discussed in Chapter Four, acoustic ecology emerged from soundscape studies. The main premise of both fields is to better understand and raise awareness to sonic environments through academic and artistic work. Braden is a board member of the Canadian Association for Sound Ecology (an affiliate organization of the World Forum for Acoustic Ecology).[10] Burtner has worked in the Sonic Research Studio in Burnaby, BC (the home of the WSP), and he leads educational workshops on sound, technology, and the environment regularly. Simpson is an active member of the acoustic ecology community in the United Kingdom and has contributed to the *World Forum for Acoustic Ecology Newsletter* and to several "green" record labels.

Janet Cardiff and Paul Rudy are the only two artists considered in this study that do not identify with acoustic ecology. Cardiff is a media artist who explores notions of reality and perception in her sound installations; and Rudy is a classically trained composer who works in

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[10] The World Forum for Acoustic Ecology (WFAE) was founded in 1993. Affiliate organizations have since been established throughout the world. For additional information on the WFAE and its affiliate organizations, visit http://www.wfae.net.

the acousmatic tradition and also sound/music therapy. Natural sounds, though, play a prominent role in the two pieces discussed here (and in other works): Cardiff's audio walk *Wanås Walk* (1998) and Rudy's electroacoustic composition *In Lake'ch* (2007).

Some, but not all of the works discussed in this study focus on environmental challenges. The compositions by Burtner, Rudy, Schafer, and Westerkamp engage ecological concerns; however, works by Braden, Cardiff, and Simpson explore other topics, in particular human psychology, memory, and the perceived quasi-biotic properties of non-living entities. Although not all sonic works comment on environmental issues, each in some way connects to the natural world through the engagement with/representation of real-world locations, presentation of live/recorded natural sounds, and/or the generation of compositional materials from non-sounding environmental information.

With and Without Nature

Nature has been a topic of debate in the Western tradition since ancient times. As novelist and critic Raymond Williams once put it: "nature is perhaps the most complex word in the [English] language."[11] He offers three definitions of nature based on uses of the term throughout history: "(1) the essential quality and character of something; (2) the inherent force which directs either the world or human beings or both; and (3) the material world itself, taken as including or not including human beings."[12] Environmental historian Peter Coates adds two categories to the three put forward by Williams: "nature as an inspiration and guide for people and source of

[11] Raymond Williams, *Keywords: A Vocabulary of Culture and Society* (London: Fontana Press, 1976), 219.

[12] Williams, *Keywords*, 219.

authority governing human affairs; and, nature as the conceptual opposite of culture."[13] These five conceptions of nature have often been used to draw lines in Western culture, like that between homosexual/heterosexual, developed/developing world, etc.[14]

The word "nature" has been referred to by other names and concepts, as with (natural) environment, natural world, soundscape, and biosphere. Furthermore, nature can be implied when using terms that refer to different aspects of the physical world. These include animals, natural phenomena, and geologic features. The word "nature" is used in this thesis to locate non-human entities and forces in contemporary composition, but not to attribute meaning to them. The effort is made in this study to avoid prescribing a particular understanding of the natural world. Through examining manifestations of nature in sonic art, this thesis attends to how and why composers and sound artists draw on aspects of the natural world in their works.

Since the 1990s, humanities and social science scholarship on nature has generally sided with one of two areas of discourse that philosopher Kate Soper has referred to as postmodernism and ecology.[15] For her part, she prefers the positions "nature-skeptical" and "nature-endorsing," respectively.[16] The terms "deconstruction" and "reconstruction" have elsewhere been used in reference to the two positions along with other terms.[17]

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[13] Peter Coates, *Nature: Western Attitudes Since Ancient Times* (Cambridge, UK: Polity Press, 1998), 3.

[14] See Carol P. MacCormack and Marilyn Strathern, eds., *Nature, Culture and Gender* (Cambridge, UK: Cambridge University Press, 1980); Donna Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991); Richard H. Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism, 1600–1860* (Cambridge, UK: Cambridge University Press, 1995); and Richard Drayton, *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World* (New Haven: Yale University Press, 2000).

[15] Kate Soper, *What is Nature?: Culture, Politics, and the Non-Human* (Malden, MA: Blackwell, 1998), 3–4.

[16] Soper, *What is Nature?*, 4.

[17] See, for example, David Inglis, John Bone, and Rhoda Wilkie, eds., *From 'Nature' to 'Natures': Contestation and Reconstruction*, vol. 3 of *Nature: Critical Concepts in the Social Sciences*

The nature-skeptical/deconstructivist position claims that nature is a social construct, an idea that emerges from the ways in which we discuss and interact with the physical world. Formulated through discourse, nature is best understood through the act of interpretation. How nature is experienced depends on the culture that inscribes it as a concept. In other words, as a cultural construct, nature is a product of the process that is culture.[18]

Literary theorist Timothy Morton and philosopher Steven Vogel have approached nature as a social construct from different disciplinary angles.[19] Morton begins with a critique of ecocriticism, whereas Vogel turns to critical theory. Morton argues that ecocriticism upholds the romanticized conception of nature that it seeks to overcome. He claims that by subscribing to an image of nature that is defined by external forces, instead of human influence, ecocritical writers do not merely uphold an outdated conception of the physical environment but they are also ill-equipped to address contemporary environmental crises. In that light, Morton calls for critical attention to the role of social mediation in shaping artistic representations of the physical world.[20] He draws on examples of social mediation in music (e.g., John Cage and Brian Eno), literature (e.g., Henry David Thoreau and William Wordsworth), and cinema (e.g., *The Thing* and *The Lord of the Rings*). Morton argues that ecocritical works that present noir and gothic styles are equipped to comment on contemporary environmental conditions. Examples include

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(London: Routledge, 2005); John M. Meyer, *Political Nature: Environmentalism and the Interpretation of Western Thought* (Cambridge, MA: The MIT Press, 2001); and Michael E. Soulé and Gary Lease, eds., *Reinventing Nature? Responses to Postmodern Deconstruction*, 2nd ed (Washington D.C.: Island Press, 1995).

[18] On nature as a social construction, see Peter D. Dwyer, "The Invention of Nature," in *Redefining Nature: Ecology, Culture and Domestication*, ed. Roy Ellen and Katsuyoshi Fukui (Oxford: Berg, 1996); Alexander Wilson, *The Culture of Nature: North American Landscape from Disney to the Exxon Valdez* (Cambridge, MA: Blackwell, 1992); and MacCormack and Strathern, eds., *Nature, Culture, and Gender*.

[19] See Timothy Morton, *Ecology without Nature: Rethinking Environmental Aesthetics* (Cambridge, MA: Harvard University Press, 2007); and Steven Vogel, *Against Nature: The Concept of Nature in Critical Theory* (Albany: State University of New York Press, 1996).

[20] Morton, *Ecology without Nature*, 4**.**

Mary Shelley's novel *Frankenstein* and Ridley Scott's film *Blade Runner.* Such works, as Morton views them, reflect on nature as transformed by humans rather than reifying a pristine nature that no longer exists.[21]

Vogel also approaches nature as a social construct, but he draws upon Marxist criticism to examine the concept. Based on György Lukács' critique of the idea of immediacy, Vogel claims: "all 'nature' is second nature."[22] He goes on to argue that both societal values and cultural norms are purely social constructs and have no connection to the physical world. Vogel observes that we can begin to see the role of social mediation in shaping how we experience the environment when we challenge the view that nature has inherent value (i.e., when we view nature itself as a construct). Ultimately, both Vogel and Morton claim that in order to take greater responsibility for our impact on the environment we must critique how we situate the physical world in social terms. For the two scholars, that entails first interrogating the concept of nature and then finding new ways (and in the case of Morton, new terminology) to engage the physical environment.

Morton's critique of the applications of the concept of nature in ecocriticism is particularly informative to the current study. The burgeoning field of ecomusicology, or the study of music at the intersection of culture and the environment, has its roots in ecocriticism. Those two fields will be discussed shortly. Morton questions the relevance of the concept of nature in light of contemporary ecological circumstances in his 2007 book *Ecology without Nature: Rethinking Environmental Aesthetics*. He claims that the idea of nature has become an obstacle to contemporary environmental thought. In his words: "[Nature is] the one thing that

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[21] Morton uses the concept of "dark ecology" (a term he coins) to explain how noir and gothic texts operate in an ecological context. See Ibid., 186–96.

[22] Vogel, *Against Nature*, 35.

maintains an aesthetic distance between us and them, us and it, us and 'over there.'"[23] He posits that an ecological view more critically attuned to current environmental conditions is one that avoids the trappings of a subject-object worldview.[24]

Morton proposes "a poetics of ambience" in an effort to move beyond the constrained understanding of the physical world that he finds in the concept of nature. His use of the term "ambience" is strategic, for it suggests a spatial orientation that breaks down traditional lines between human subjects and non-human objects. The Latin word *ambo*, as Morton points out, means "on both sides." He claims that ambience enables engagement with the physical world without reducing it to a thing:

> Ambience denotes a sense of a circumambient, or surrounding, *world*. It suggests something material and physical, though somewhat intangible, as if space itself had a material aspect [. . . .] I choose the word *ambience* in part to make strange the idea of environment, which is all too often associated with a particular view of nature.[25]

With ambience, Morton reconfigures the physical world such that the space between humans and their surroundings receives greater attention. Here, the sensed world exists as an "intangible" presence, rather than a quantifiable, and therefore self-limiting other. Although Morton urges ecocritics to adopt a concept that he sees as better fit for confronting environmental crises, his idea of ambience draws attention to the space—perhaps even the distance—between humans and their surroundings. In that way, Morton preserves the subject-object relationship that is observed in many applications of the term "nature."

The nature-endorsing/reconstructivist viewpoint can be seen as a response to the deconstructivist position. According to biologist Michael Soulé and historian Gary Lease, such a

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[23] Morton, *Ecology without Nature*, 5.

[24] On wilderness (nature in its "purest" form), Morton writes: "We possess the wilderness aesthetically—after the aesthetics of Kant, that is. Like an object of value in a shop window as seen by a window shopper, we consume the wilderness in a purposively nonpurposive way." Ibid., 139.

[25] Ibid., 33–34. Italics in original.

view is counterproductive to addressing environmental concerns and that nature does indeed have intrinsic value.[26] Reconstructionists claim that nature exists as an entity that is separate from our experience and interpretation of it as humans. In line with the reconstructivist position, environmental activist Bill McKibben claims that a "humbler world" requires an "independent nature"; that is, an Earth that is not under human control.[27] His position is grounded in the Romantic assumption that nature is pristine and untouched by humans, an argument that dismisses the scientific evidence that all organisms modify their environment, not just humans.

McKibben's desire to restore nature to an "original" state pervades much environmentalist thought. Journalist J. B. MacKinnon asks: "Where in the billions of years of life on earth could we possibly draw that line [i.e., the 'original' baseline that marks nature in balance]?"[28] MacKinnon turns to the end of the last Ice Age, a time when the web of life was deemed most complete. In an effort to create what he considers to be a more natural environment, MacKinnon endorses a method in conservation ecology known as rewilding. That method entails the reintroduction of apex predators and keystone species and the expansion of wilderness areas, in particular corridors connecting protected zones.[29]

Environmental historian William Cronon identifies some of the views of nature that have informed approaches to environmentalism, including nature as *naïve reality*, *moral imperative*, *Eden*, *artifice*, *virtual reality*, *commodity*, *return of the repressed*, *and contested terrain*.[30] Nature

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[26] Soulé and Lease, "Preface," *Reinventing Nature?*, xv–xvii.

[27] Bill McKibben, *The End of Nature* (New York: Random House, 1989), 58.

[28] J. B. MacKinnon, *The Once and Future World: Nature as it was, as it is, as it could be* (Toronto: Vintage Canada, 2014), 51.

[29] See Chapter Two for a discussion of rewilding in the context of Schafer's *The Princess of the Stars*.

[30] William Cronon, "Introduction: In Search of Nature," in *Uncommon Ground: Rethinking the Human Place in Nature*, ed. William Cronon (New York and London: W. W. Norton & Company, 1996), 34–52.

as *moral imperative* is particularly relevant when thinking about sonic works that engage soundscape studies. That conception frames nature as being inherently "good" in a world of human "evil." As such, what remains of the natural world is deemed worthy of preservation and human conduct in need of regulation. Several compositions by Schafer and Hildegard Westerkamp also exemplify this conception of nature, with their critique of noise pollution.

Cronon contends that nature as *moral imperative* is counterproductive to addressing contemporary ecological issues because those that adopt that position often take it as truth. He draws on elements of both deconstruction and reconstruction in order to better understand our troubled relations with the physical world and ultimately to be equipped to improve on those relations. That is to say, he calls for greater attention to the ways in which our interpretations of nature shape how we engage the physical world with the understanding that nature also exists outside of culture. If we are to confront the global environmental crisis, as Cronon views it, we need to give more critical thought to the social, religious, and/or political values that inform any one conception of nature.[31]

For environmental studies scholar John Farnsworth, neither deconstruction nor reconstruction is fully capable of addressing the concept of nature in the contemporary world. He asserts that both approaches position nature in relation to the human, and therefore are prone to creating an opposition between the two (a concern shared by Morton).[32] In an effort to overcome the longstanding conception in Western culture that humans are separate from nature, Farnsworth argues that nature should be "resituated" as a concept, instead of deconstructed or reconstructed. He draws on business scholar David Boje's application of the verb "to resituate"

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[31] Cronon, "Introduction," 52.

[32] John S. Farnsworth, "Resituating Nature: New Horizons for a Pesky Noun," *Minding Nature* 9, no. 1 (January 2016): 43.

to the Western narrative tradition. Farnsworth explains:

> As I understand it, Boje's system is to resituate a story as the final stage in the process of deconstruction. The idea is to 'reauthor' the story outside of its constructed hierarchies in such a way as to eliminate dualities. Boje claims that in a resituated story, there are no more centers, so that the story is free to script new actions.[33]

In line with Boje's approach to narrative, Farnsworth understands re-situation as the final step in the process of deconstruction. However, Farnsworth locates nature in reality, instead of interpreting nature as a social construction. In that way, the idea of re-situation operates along similar discursive lines as reconstruction. Both perspectives aim to recondition humans to the natural world. The two positions invite new ways of perceiving the world "out there" and how we both experience and shape our surroundings as humans. However, Farnsworth's "re-situation" of nature and reconstructive approaches differ in how they go about inspiring change. The former moves beyond an object-based ontology to encourage greater awareness and care for the environment. The latter seeks to overturn the work of deconstructive conceptions of nature by re-grounding nature as a thing that can be known and quantified.

Farnsworth asserts that aesthetics helps to reveal some of the ways in which we can experience and perceive nature without succumbing to dualistic ways of thinking.[34] Farnsworth does not provide a clear definition of aesthetics; however, he argues that when nature is regarded as an aesthetic it is perceived as a process and not as a thing. Aesthetics is, for Farnsworth, one way to retain the term "nature" while at the same time avoiding the antiquated understanding of nature as a material object in relationship to a human subject. The idea of nature-as-process and scholarly responses to that idea will be discussed in detail in the conclusion to the thesis.

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[33] Farnsworth, "Resituating Nature," 45. On Boje's use of the verb "to resituate," see David M. Boje, *Narrative Methods for Organization and Communication Research* (London: Sage, 2001).

[34] Farnsworth asserts that aesthetics garners understanding of the natural world, whereas Morton claims that aesthetics reduces nature to an object. Compare Farnsworth's point above to fn 24.

Since the 2000s, several scholars have moved beyond the deconstructivist and reconstructivist positions through the use of new terminology that calls attention to the ways in which humans have shaped and have also been shaped by their surroundings. For geographers Bruce Braun and Noel Castree, the degree to which societies have transformed their environments both physically and conceptually warrants adding the adjective "social" before "nature." Braun and Castree refer to the natural environment collectively as "social natures."[35] Along those lines, sociologist Damian F. White and geographer Chris Wilbert have adopted the term "technonatures" to describe the relationships between humans and the environment in a contemporary context.[36] For White and Wilbert, "technonatures" problematizes the idealization of past environmental conditions and more importantly helps to navigate a contemporary world increasingly mediated by technology. Both "social" and "techno" natures are the result of changing environmental conditions where human mediation is greater than ever before.

This thesis maintains the concept of nature. However, rather than identifying with either a deconstructivist or reconstructivist stance, it seeks to showcase how contemporary works dealing with nature present elements of both approaches. As artistic products, all of the pieces under consideration have a deconstructive stance. To source sounds and/or non-sounding information from nature and then mediate those materials in a musical space, as part of a representation of nature, is a form of social construction. Works that present recorded sounds are particularly involved in social constructions of nature, as they can change the sounds that we hear and know along with our conceptions of the environments from which those sounds originate. For example, during a performance of Cardiff's *Wanås Walk* at a forested area near Knislinge, Sweden the

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[35] See Bruce Braun and Noel Castree, eds., *Social Nature: Theory, Practice and Politics* (Toronto: Wiley–Blackwell, 2001).

[36] See Damian F. White and Chris Wilbert, eds., *Technonatures: Environments, Technologies, Spaces, and Places in the Twenty-first Century* (Waterloo: Wilfred Laurier University Press, 2007).

participant is cut off from the sounds of their immediate environment through the use of headphones. The audio recording presents a series of fragmented narratives and found sounds—many of the natural sounds on the recording were captured on-site. The participant may imagine certain sounds originating from the actual forest, but there is no way to know without removing the headphones. In that way, the forest in which the walk is conducted is partly constructed. *Wanås Walk* positions the participant in an actual environment where he or she can see, smell, and touch, but the sounds in the immediate environment are supplanted by recorded ones. The nature that is constructed is essentially an enhanced version of the forest in which the participant is positioned. There are realistic sounds on the recording, such as birds and wind in the trees, but there are also voices, singers, and animals that are not visible in the forest.

Reconstruction is the bent of several works examined in the thesis. Pieces that recreate a natural setting in order to get at ideas of a "real" natural world include Dallas Simpson's *The Adoration of Willow*, "Stoke Bardolph," Hildegard Westerkamp's *Lighthouse Park Soundwalk* and *Talking Rain*, and Paul Rudy's *In Lake'ch*. These works reconstruct nature in different ways. For example, Dallas Simpson's "Stoke Bardolph" and Hildegard Westerkamp's *Lighthouse Park Soundwalk* are two works that document actual walks. Simpson and Westerkamp direct attention to aspects of a particular location through both observation (which audiences experience as stationary recordings) and the live performance using materials found on-site. In contrast, Westerkamp's *Talking Rain* and Rudy's *In Lake'ch* present an abstract journey through a series of heightened natural and man-made environments. Like *Lighthouse Park Soundwalk* and "Stoke Bardolph," these two electroacoustic works illuminate soundscapes that each composer deems meaningful.

Common among these different approaches to nature is an interest in engaging aspects of the physical world that are understood as being separate from humans, yet to which we share a connection through our interpretation and manipulation of and ultimately our dependence on the environment. To regard nature as a social construction is particularly useful when studying manifestations of the physical world in contemporary music and sound art. The ways in which natural materials, sounds, and/or spaces are engaged in sonic works adds to our social understandings of nature in that they reiterate, revise, or even question how we engage and interpret the natural world.

Ecocriticism, Ecomusicology, and the Nature of "Nature"

The study of the intersection of nature and culture in the humanities can be traced to ecocriticism (also known as literary ecology or green literary studies). The field is approximately thirty years old. The institutional foundations were laid down with the formation of the Association for the Study of Literature and Environment in 1992 and the establishment of the journal *ISLE: Interdisciplinary Studies in Literature and Environment* a year later. In her introduction to *The Ecocriticism Reader: Landmarks in Literary Ecology*, Cheryl Glotfelty defines ecocriticism as the study of literature in a time of environmental crisis. She explains that researching representations of nature in cultural products not only illuminates conceptions of nature but also sheds light on contemporary environmental issues. In other words, through the examination of a wide range of texts, including novels, poetry, short stories, and films, ecocritics create knowledge of how humans affect and are affected by the environment.[37]

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[37] Cheryll Glotfelty, "Introduction: Literary Studies in an Age of Environmental Crisis," in *The Ecocriticism Reader: Landmarks in Literary Ecology*, ed. Cheryll Glotfelty and Harold Fromm (Athens: University of Georgia Press, 1996), xix.

The first generation of ecocritics received constructive criticism from several scholars. In his book *The Truth of Ecology: Nature Culture, and Literature in America*, Dana Phillips highlights three trends in the field that he finds particularly problematic: 1) dependence on a limited set of ecological themes and a generalized understanding of them, 2) rejection of postmodern views on nature and culture, and 3) a tendency to draw analogies across disciplines that may not be compatible with literary studies.[38] Phillips urges that ecocriticism follow, in his words, "a less devotional attitude toward its subject matter, both literary and otherwise."[39] He sees interdisciplinary work as part of the solution, asserting that ecocritics can deepen their research by engaging critically with the fields of critical theory, philosophy, and science.

Glen Love also calls for a more skeptical approach to researching the intersections of literature, culture, and the environment. He endorses scientific rigor, instead of the interdisciplinary approach recommended by Phillips. In Love's words: "Holistic thinking is necessary, even indispensable, but it must also anticipate all the eventualities of a complex system, for which reductionist techniques may be required."[40] He claims that an ecocriticial perspective more attuned to contemporary times is one that accounts for biology and evolutionary theory. The scope of the field of ecocriticism has broadened since Phillips' and Love's critical assessments. New avenues of work include animal studies, gender studies, film studies, and queer theory.[41] Critical theory has remained a topic of debate in the field, with some scholars arguing against its application to ecocritical scholarship and others endorsing it.[42]

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[38] Dana Phillips, *The Truth of Ecology: Nature, Culture and Literature in America* (Oxford: Oxford University Press, 2003), ix–x.

[39] Phillips, *The Truth of Ecology*, 240.

[40] Glen A. Love, *Practical Ecocriticism: Literature, Biology, and the Environment* (Charlottesville: University of Virginia Press, 2003), 43.

[41] See, for example, Jennifer K. Ladino, "For the Love of Nature: Documenting Life, Death, and Animality in *Grizzly Man* and *March of the Penguins*," *Interdisciplinary Studies in Literature and*

The study of literary representations of nature has served as a model for the emerging field of ecomusicology. Aaron S. Allen, in the *Grove Dictionary of American Music*, defines ecomusicology as "the study of music, culture, and nature in all the complexities of those terms. Ecomusicology considers musical and sonic issues, both textual and performative, related to ecology and the natural environment."[43] Steps towards the formation of the field of ecomusicology began with the establishment of two study groups in academic organizations, the Ecocriticism Study Group of the American Musicological Society (in 2007) and the Ecomusicology Special Interest Group of the Society for Ethnomusicology (in 2011). Members of the two study groups have organized the Ecomusicologies Conference Series and contributed to journal special issues and, most recently, the edited collection *Current Directions in Ecomusicology: Music, Culture, Nature*.[44]

Environment 16, no. 1 (Winter 2009): 53–90; Adrian Ivakhiv, "Green Film Criticism and Its Futures," *Interdisciplinary Studies in Literature and Environment* 15, no. 2 (Summer 2008): 1–28; and Gretta Gaard, "Toward a Queer Ecofeminism," in *New Perspectives on Environmental Justice: Gender, Sexuality, and Activism*, ed. Rachel Stein, 21–44 (New Brunswick: Rutgers University Press, 2004).

[42] See Louisa Mackenzie and Stephanie Posthumus, "Reading Latour Outside: A Response to the Estok–Robisch Controversy," *Interdisciplinary Studies in Literature and Environment* 20, no. 4 (Autumn 2013): 758–77; Simon Estok, Axel Goodbody, and Kate Rigby, eds., *Ecocritical Theory: New European Approaches* (Charlottesville: University of Virginia Press, 2011); Serpil Opperman, "Ecocriticism's Theoretical Discontents," *Mosaic* 44 (2011): 153–69; Opperman, "Ecocriticism's Phobic Relations with Theory," *Interdisciplinary Studies in Literature and the Environment* 17, no. 4 (2010): 768–70; Simon Estok, "Theorizing in a Space of Ambivalent Openness: Ecocriticism and Ecophobia," *Interdisciplinary Studies in Literature and the Environment* 16, no. 2 (2009): 199–201; S. K. Robisch, "The Woodshed: A Response to 'Ecocriticism and Ecophobia,'" *Interdisciplinary Studies in Literature and the Environment* 16, no. 4 (2009): 697–708; and Estok, "Bridging the Great Divide: Ecocritical Theory and the Great Unwashed," *English Studies in Canada* 31, no. 4 (2005): 197–209.

[43] Aaron S. Allen, "Ecomusicology," *The Grove Dictionary of American Music*, 2nd ed, ed. Charles Hiroshi Garrett (New York: Oxford University Press 2014).

[44] Aaron S. Allen and Kevin Dawe, eds., *Current Directions in Ecomusicology: Music, Culture, Nature* (New York: Routledge, 2016). For more on the Ecomusicologies Conference Series visit www.ecomusicologies.org. Journal special issues on ecomusicology include "Colloquy: Ecomusicology," *Journal of the American Musicological Society* 64, no. 2 (2011) and "Sound, Environment, and Action," *Music and Politics* 8, no. 2 (2014). The field shows no signs of slowing down. Forthcoming publications include *The Oxford Handbook of Ecomusicology* (Oxford University Press), journal special issues on ecomusicology in *American Music* and *Journal of Music History Pedagogy*, and several manuscripts under contract with the "Music, Nature, Place" book series (Indiana University Press).

Drawing on ecocriticism, ecomusicology investigates not only representations of nature in music but also the ways in which it might help to create a more environmentally sustainable world. Allen explains:

> In a true pluralistic sense, practicing ecomusicologies can comfortably encompass, on the one hand, our studies of appealing representations of idealized nature and human reflection on nature (à la Beethoven's Symphony *Pastorale*). On the other hand, ecomusicology can, and must, also engage with the profound environmental crises that threaten civilization. Musicologists have the capacities to understand those crises from alternative viewpoints and make some contributions, however small, to ameliorating them.[45]

Along that line of thought, ecomusicology shares a connection to both ecocriticism and acoustic ecology. All three fields are committed to finding ways to improve the world.[46] The core principles of ecomusicology, then, are to better understand musical representations of nature and to gain insights from studying the intersections of music, nature, and culture that can help to address environmental challenges. However, as ethnomusicologist Marc Perlman has observed, the environmentalist leanings of ecomusicology are still being formulated. He explains:

> Ecomusicological findings might possibly recruit music-lovers to the environmentalist cause, or inspire them when they become discouraged. But beyond that, it's not at all clear what the activist implications of ecomusicology might be.[47]

Before considering the types of environments—and human relationships to those environments—that ecomusicology wishes to maintain, recover, or even create, attention should first be given to how nature has been engaged in the field.

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[45] Aaron S. Allen, Jeff Todd Titon, and Denise Von Glahn, "Sustainability and Sound: Ecomusicology Inside and Outside the Academy," *Music & Politics* 8, no. 2 (2014), http://dx.doi.org/10.3998/mp.9460447.0008.205.

[46] Advocacy ethnomusicology is another field of research with activist leanings. See Jennifer Post, "Introduction," in *Ethnomusicology: A Contemporary Reader*, ed. Jennifer Post (New York: Routledge, 2006), 10; and Angela Impey, "Culture, Conservation and Community Reconstruction: Explorations in Advocacy Ethnomusicology and Action Research in Northern KwaZulu," *Yearbook for Traditional Music* 34 (2002): 9–24, reprinted in *Ethnomusicology: A Contemporary Reader*.

[47] Marc Perlman, "Ecology and Ethno/musicology: The Metaphorical, the Representational, and the Literal," *Ecomusicology Newsletter* 1, no. 2 (2012): 19.

Ethnomusicologist Jeff Todd Titon observed two consistent readings of the concept of nature at the Ecomusicologies 2012 conference in New Orleans. Those are representations of nature in music and direct interactions between nature and music, ranging from music performed outdoors to material resources used for making instruments. In his words: "Nature most often was [defined as] wild nature, but pastoral nature and the nature of the built environment also made their appearances."[48] Titon goes on to propose: "an ecomusicological construction of nature worth having, it seems to me, will be based in [a] relational epistemology."[49] By this he is referring to music and sound research driven by ecological models of "diversity, interconnectedness, and co-presence."[50] Though a relational epistemology may prove useful in helping to recondition humans to their surroundings in a time of environmental crisis, it provides yet another broad definition of nature driven by ecological principles. Titon's definition of a nature "worth having" maintains the understanding that humans are detached from the natural world and should reconnect to it.

Ecomusicology, however, is progressing beyond an older ecological model that privileges notions of balance in nature, as found in Schafer's theory of soundscape. For example, Titon has advocated for greater adaptation and resiliency to changing environmental conditions.[51] Other ecomusicologists that are considering ecological implications with more careful attention include Aaron S. Allen, Andrew Mark, Mark Pedelty, and Robyn Ryan. Allen has explored several instrument-making practices worldwide in terms of the relationship between material sourcing

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[48] Jeff Todd Titon, "The Nature of Ecomusicology," *Música e Cultura: revista da ABET* 8, no. 1 (2013): 10.

[49] Titon, "The Nature of Ecomusicology," 16.

[50] Ibid., 8.

[51] See Jeff Todd Titon, "Sustainability, Resilience and Adaptive Management for Applied Ethnomusicology," in *The Oxford Handbook of Applied Ethnomusicology*, ed. Svanibor Pettan and Jeff Todd Titon, 157–95 (Oxford: Oxford University Press: 2015).

and sound standards (e.g., Stradivarius violins) and the environmental sustainability of those practices, or the lack thereof.[52] In his ethnographic study of music culture on Hornby Island, British Columbia, Mark investigates some of the ways in which notions of place and belonging in that island community are being challenged by changing environmental, cultural, economic, and political forces, and how local musicians are responding to those forces.[53] Pedelty has examined approaches to environmental activism in Western popular music, with attention to both musical style and the physical impact of live music making on the environment.[54] Ryan has considered some of the ways in which indigenous musicians in Australia are adapting to climate change.[55]

As the above scholars demonstrate, ecomusicologists are giving critical attention to the complex environmental, social, and political forces at play in a given context, instead of subscribing to a reductive conception of nature driven by an ecological model of balance and order. In addition to these new perspectives, some ecomusicologists are employing new terminology in an effort to comment on nature in an ecological world. Ana María Ochoa Gautier has argued that one way to move beyond a nature-culture divide in music scholarship is through what she calls "acoustic multinaturalism"; that is, where different ontologies of sound are taken

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[52] Aaron S. Allen, "'Fatto Di Fiemme': Stradivari's Violins and the Musical Trees of the Paneveggio," in *Invaluable Trees: Cultures of Nature, 1660–1830*, ed. Laura Auricchio, Elizabeth Heckendorn Cook, and Giulio Pacini, 301–15 (Oxford: Voltaire Foundation, 2012). See also Kevin Dawe, "Materials Matter: Towards a Political Ecology of Musical Instrument Making," in *Current Directions in Ecomusicology*, 109–21.

[53] Andrew Christopher Whitton Mark, "What is Music For?: Utopian Ecomusicologies and Musicking Hornby Island" (Ph.D. diss., York University, 2015).

[54] Mark Pedelty, *Ecomusicology: Rock, Folk, and the Environment* (Philadelphia: Temple University Press, 2012); and Pedelty, *A Song to Save the Salish Sea: Musical Performance as Environmental Activism* (Bloomington, IN: Indiana University Press, 2016).

[55] Robin Ryan, "'No Tree—No Leaf': Applying Resilience Theory to Eucalypt–Derived Musical Traditions," in *Current Directions in Ecomusicology*, 57–68.

into account when interpreting acoustic events in space and time across cultures and history.[56] Ochoa Gautier's "acoustic multinaturalism," like Titon's "relational epistemology," offers a conception of nature that is built on plural perceptions. Both Gautier and Titon examine points of exchange and influence between multiple human and non-human agents, instead of a single human perspective.

Music theorist Eric Drott has offered another way for ecomusicology to move beyond a limited understanding of the concept of nature. He argues that the field should attend to "competing orientations of nature" in musical works.[57] Drott does not explore the larger concept of nature, but instead provides music scholars with a model that takes into account some of the more nuanced, complex aspects of real-world places that are evoked in musical works. He uses the terms "nature," "environment" and "landscape" interchangeably. Drott turns to Luc Ferrari's electroacoustic composition *Petite symphonie intuitive pour un paysage de printemps* (1974) to explore one piece that reflects opposing perceptions of the natural world. Ferrari's work offers two different perspectives of the Causse Méjean, a plateau in southern France known for its favorable farming conditions. Those positions are the shepherds that inhabitant the plateau, and whose lives are threatened by changing economic and political conditions, and the tourists visiting the plateau, a social group associated with the modernization of the landscape. The two views are captured in the field recordings presented over the course of the work. A series of flute recordings and machine sounds are also heard, which can be associated with the peasant and tourist positions, respectively. The former involves a bucolic landscape and notions of the pastoral, and the latter is associated with the modernization of rural settings. Drott examines how

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[56] Ana María Ochoa Gautier, "Acoustic Multinaturalism, the Value of Nature, and the Nature of Music in Ecomusicology," *Boundary 2* 43, no. 1 (2016): 107–41.

[57] Eric Drott, "The Peasant's Voice and the Tourist's Gaze," in *Current Directions in Ecomusicology*, 234.

the rural voice of inhabitants of the Causse Méjean and the urban voice of tourists visiting that region clash over the course of the composition, specifically how traditional ways of living on the plateau are challenged by the pressures of technology and development.[58]

Several works in the thesis present two or more opposing perspectives of nature. Schafer's *The Princess of the Stars*, Westerkamp's *Talking Rain*, and Rudy's *In Lake'ch* are three pieces that pit the natural world against modernized humanity. Schafer uses character roles to represent those two perspectives in his outdoor theatre work, specifically Dawn Birds for nature and the Three-Horned Enemy for modernization. In an electroacoustic context, Westerkamp and Rudy juxtapose quiet natural sounds such as flowing water and birds and brash machine sounds like trains and screeching brakes. However, not all of the composers of works examined in the thesis set the natural world against modern life. Burtner's *Iceprints* and Braden's *Candle Ice* are two works that focus on ice melt patterns without commentary on the impact of humans on the natural formation. The role of humans in shaping those patterns in recent decades is a topic that some audience members may apply when listening to either work, but the exact impact of humans on ice melt trends is not stated explicitly in Burtner's or Braden's composition. An alternative way to consider contrasting views of nature, then, is to examine multiple works from different genres. This study aims to find both discrepancies and repetitions in how nature is engaged in works that are diverse in both format and style. The careful examination of a wide range of pieces builds upon the insights into nature that are brought forth by studies of individual works and artists.

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[58] Drott, "The Peasant's Voice and the Tourist's Gaze," 234–35.

The "Music-Nature" Continuum

This study uses the concept of a continuum as both a structuring device and a theoretical tool. The concept is not new to composers or music scholars. The idea of a continuum is central to the history of electroacoustic music. Several pieces from the seminal period of the 1950s use the continuum as a structural ideal. For example, in Karlheinz Stockhausen's *Gesang der Jünglinge* (1956) electronic sounds and the recording of a boy's voice are used to create a continuous transition from sine waves to white noise, with the human element located midway on the continuum and the sine waves and white noise as outer poles.[59] Works such as *Gesang der Jünglinge* demonstrate how early electroacoustic composers found the concept of a continuum helpful for dealing with the wide range of sounds that they could draw upon.

In music studies, the concept has been applied primarily to electroacoustic music. John Young distinguishes the endpoints of the continuum based on the recognition of sounds and their identification with a real-world context.[60] He uses the terms "Reality" and "abstraction" to describe the two poles. According to Young, "Reality" requires source recognition and a clear or implied physical context and "abstraction" is defined by unidentifiable sounds without a physical context. The midway point of the continuum is absent from Young's discussion. However, based on the endpoints of the continuum, it is plausible that sounds become blurred and difficult to recognize as the listeners move towards "abstraction." Barry Truax sets up a similar continuum within the genre of electroacoustic soundscape composition. His continuum presents "found

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[59] On the continuum concept and the music of Stockhausen, see Elena Ungeheuer, "From the Elements to the Continuum: Timbre Composition in Early Electronic Music," *Contemporary Music Review* 10, no. 2 (1994): 25–33.

[60] John Young, "Imagining the Source: The Interplay of Realism and Abstraction in Electroacoustic Music," *Contemporary Music Review* 15, no. 1 (1996): 73–93. The continuum is discussed on pages 77-79.

sound" and "abstracted" as the two endpoints.[61] A found soundscape entails minimal processing, thus maintaining recognition of sound sources. An abstracted soundscape is created through digital processing. Yet, in the spirit of acoustic ecology, there is an emphasis on environmental context across the continuum in Truax's model.

The continuum concept is a constructive research tool for investigating uses of nature in contemporary works. This thesis applies the concept of a continuum to sonic works from a wide range of genres, including art-based walks, outdoor performance pieces, field recordings, electroacoustic compositions, and concert-hall works.[62] Nature becomes abstracted as the reader moves along the continuum from real-world performance settings (art-based walks and outdoor works) to virtual environments (electroacoustic compositions) to the use of non-sounding information gathered from natural environments to generate compositional material (concert-hall works).

It is through human mediation that artists traverse this "music-nature" continuum. Human mediation is manifested differently depending on the location of a work on the continuum (refer hereafter to Diagram 1.1). At "nature as perceived," listeners/performers experience a direct encounter with actual environments. In the purest sense, "nature as perceived" entails listening actively to live environmental sounds. One example is David Dunn's work for solo listener, *Purposeful Listening in Complex States of Time* (1997–98). In that piece, the listener-performer adopts a series of listening states in twenty quiet, outdoor environments of their choice. The score directs the solo listener to face different directions for a set duration and at times to give attention to live sounds and in other moments to reflect on past or imagined sounds. Although

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[61] Barry Truax, "Soundscape Composition as Global Music: Electroacoustic Music as Soundscape," *Organised Sound* 13, no. 2 (August 2008): 106.

[62] The term "art-based walk" will be introduced in Chapter Two.

sounds are not modified by technological means in Dunn's composition, they are still processed. The act of perception is a form of processing. In other words, the listener-performer interprets sounds as he or she experiences them.

<———Human mediation———>

Nature as perceived **Nature modified** **Nature abstracted**

Diagram 1.1 The "Music-Nature" Continuum.

The three art-based walks considered in Chapter Two do not fall at the end point of the continuum, but they are close to it. Westerkamp's *Lighthouse Park Soundwalk* and Simpson's *The Adoration of Willow*, "Stoke Bardolph" exist as recordings, whereas Cardiff's *Wanås Walk* is conducted live. Additionally, *Wanås Walk* features technology that is not used in the two recorded walks. The participant moves through a specific site wearing headphones. Cardiff gives directions for where to go, when to stop, and what to observe. Many of the sounds do not align with those in the actual space, including environmental sounds, music, and speech. In that way, the listener-performer is disconnected from their immediate surroundings. Yet, all three art-based walks fall closer to "nature as perceived" than "nature modified" for the reasons that each work connects listeners to a specific real-world location, natural sounds are easily recognizable, and, related, studio processing is kept to a minimum.

Midway on the continuum, nature is encountered through an electroacoustic context. Here, works exhibit greater use of technological mediation, especially studio processing. As a result, it can be difficult to trace a recorded sound to an original source. For example, listeners may recognize the sound of flowing water, but this does not provide the contextual information needed to associate it with a specific real-world location. At times, environmental sounds are manipulated to the point that they are no longer recognizable. One such example is the sound of rocks grinding and rolling (possibly a marble) in Rudy's *In Lake'ch*. In other instances, modified

sounds are positioned next to unmodified ones (possibly even from the same source). Such is the case in Westerkamp's *Talking Rain* where quasi-pitched, drop-like sounds are combined with unprocessed water droplets. However, nature is not fully abstracted in works positioned midway on the continuum, as the referential aspects of prerecorded sounds remain important. Such works maintain an environmental context, but generally refer to a region or a type of setting, instead of a specific site like those experienced in art-based walks.

Closer to the endpoint of the continuum, non-sounding information is used to set parameters of a composition. Works at the very end of the continuum use information from the natural world to generate compositional material but are absent of recorded sounds. Some pieces at the endpoint are context based, such as John Luther Adams' permanent sound-and-light installation *The Place Where You Go to Listen* (2004–) and Andrea Polli's online installation *Heat and the Heartbeat of the City* (2004). Adams translates data from multiple geophysical monitoring stations in Alaska into sound and light in real-time. Polli converts documented and projected maximum summer temperatures in Central Park, New York, into synthetic noise. Others compositions engage nature strictly in technical terms, instead of commenting on real-world places and/or environmental issues. For example, Natasha Barrett's *Crack* (2007), for trumpet, electric guitar, percussion, and live electronics, uses information derived from cracks in both natural and synthetic materials to determine form. Another example is Eduardo Miranda's *Biocomputing Rhythms* (2016), for piano and percussion, which uses the electrical impulse of a slime mold in a container on stage to activate mechanical triggers positioned above the instruments. Based on context, *The Place Where You Go to Listen* and *Heat and the Heartbeat of the City* are close to, but not at the furthest point of the continuum, whereas *Crack* and *Biocomputing Rhythms* are placed at the endpoint.

The two works examined in the final chapter of the thesis, Burtner's *Iceprints* and Braden's *Candle Ice*, are located between "nature modified" and "nature abstracted." *Iceprints* and *Candle Ice* are positioned closer to the "nature abstracted" end of the continuum than Westerkamp's *Talking Rain* and Rudy's *In Lake'ch* in light of Burtner and Braden each drawing on non-sounding information to set parameters of the score. Burtner uses ice-extent data to determine register in the piano. Braden applies ice formation patterns to phrase structure and also form, and both composers draw on spectrographic analyses to shape musical elements such as rhythm, pitch, and dynamics. *Iceprints* and *Candle Ice* are chosen for the final chapter—instead of works at far-end of the continuum—for the reason that both pieces maintain an environmental context, which makes them more suitable for purposes here. A real-world scenario is brought into the works through the use of recorded nature sounds and supplemental materials. *Iceprints* features three hydrophone recordings of sea ice and marine animals in an unidentified arctic location. *Candle Ice* excerpts multiple hydrophone recordings of candle ice at Great Slave Lake, Northwest Territories. The two composers also provide introductory notes in the score that explains the background of these source materials.

Themes Across the Continuum

Four main themes emerge across the continuum between "nature as perceived" and "nature abstracted." They are technology, human presence, myth, and transformation. The topics both illuminate aspects of individual pieces and highlight recurring conceptions of the natural world, namely nature as a complex ecosystem with "hidden" acoustic and structural properties.

Technology

Technology is defined here as the tools that composers and sound artists use to engage the physical world.[63] Examples of technology present in works considered in the thesis include the human body (e.g., voice, hands, and feet) and electronics (e.g., audio recording and playback technology). Several composers understand technology as a means by which to enhance awareness of actual environments. For example, both Westerkamp and Rudy modify field recordings in order to illuminate the connotation of a real-world sound. Similarly, Burtner's use of sonification offers new angles for perceiving patterns in environmental systems. In works from the middle to the abstraction end of the continuum, the recognition of the inherent acoustic properties of nature is often secondary to the sounds brought out by technology. This is not to say that technology suppresses nature, rather, that it provides access to the inner properties of sound and natural phenomena. Technology also helps to create commentary around pressing environmental topics, such as noise pollution and climate change. In terms of noise pollution, Westerkamp's *Lighthouse Park Soundwalk* uses speech to remark on the transformation of the Pacific Northwest from a quiet region to one defined by mechanical noise, like seaplanes. Regarding climate change, Burtner's *Iceprints* maps ice-extent measurements onto the score in order to expose the melting trend in Arctic sea ice over the past 40 years.

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[63] For more on the concept of technology, see Wiebe E. Bijker, Thomas P. Hughes, and Trevor Pinch, eds., *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, MA: The MIT Press, 2012); Madeleine Akrich, "The Description of Technical Objects," in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, ed. Weibe E. Bijker and John Law, 205–224 (Cambridge, MA: The MIT Press, 1992); Don Ihde, *Technology and Praxis: A Philosophy of Technology* (Dordrecht: Reidel, 1979); and Jacques Ellul, *The Technological Society* (New York: Alfred A. Knopf, 1964). On technology at the intersection of culture and the environment, see Wim Zweers and Jan J. Boersema, eds., *Ecology, Technology and Culture* (Cambridge, UK: White Horse Press, 1994); Victor C. Ferkiss, *Nature, Technology, and Society: Cultural Roots of the Current Environmental Crisis* (New York: New York University Press, 1993); and Erik Baark and Uno Svedin, eds., *Man, Nature and Technology: Essays on the Role of Ideological Perceptions* (London: Macmillan, 1988).

The large number of works that employ recording devices and computer software raise questions as to why composers depend heavily on technology to interact with the natural world. Have we as a species become so accustomed to technology that the use of it is second nature? Or have we grown removed from nature to the point that we need technology (the supposed opposite of nature) to engage it? Does technology privilege us with a way to capture the complexities of the acoustic environment that traditional forms of composition cannot contain?

Human Presence

Human presence is brought out in a variety of ways in the works under consideration, ranging from the presentation of man-made sounds in electroacoustic compositions (e.g., bodily sounds—footsteps in Westerkamp's *Talking Rain* and drinking in Rudy's *In Lake'ch*) to the placement of audience members and performers in outdoor locations (e.g., Cardiff's *Wanås Walk* and Schafer's *The Princess of the Stars*). In several works, physiological human sounds are positioned in opposition to machine sounds. For example, in Rudy's *In Lake'ch*, machine sounds overpower nature sounds, whereas physiological sounds such as drinking serve as a transition from a damaged environment to a healing space. Along similar lines, the sound of car tires on wet pavement in Westerkamp's *Talking Rain* disrupts the type of rain heard; the car activates a shift to a different nature setting. In contrast, footsteps are presented alongside raindrops striking leaves and soil for an extended passage, and thus evoke a more balanced form of human presence in a natural environment. The presence of mechanical sounds in *In Lake'ch* and *Talking Rain* suggest that technologized society is detrimental to the health of the natural world. Yet, paradoxically, both Rudy and Westerkamp turn to studio technology in order to make such commentary.

Schafer also comments on what he understands as disruptive and complementary forms of human presence in several of his works, including both outdoor theatre pieces and concert-hall works. This juxtaposition of destructive and harmonious ways of being in nature is exemplified by *The Princess of the Stars*. In that piece, Schafer positions instrumentalists and audience members on the edge of a rural lake in an effort to recondition them to the natural environment.[64] Schafer portrays a destructive relationship when he provides a megaphone to the Three-Horned Enemy, the antagonist of the theatre piece. A holistic relationship between humans and the natural world is evoked when the musicians are directed to interact with their surroundings and to imitate the sounds of birds.

Myth

Several composers understand contemporary environmental crises as a consequence of human values. Paul Rudy maintains that the current state of Earth is an erosion of human spirituality, calling for self-reflection.[65] Schafer advocates for a reassessment of how sounds function in society. He remarks that in order to create a more sustainable soundscape:

> We must return to the waters of instinct and the unshatterable unity of the unconscious, letting the long waves of Ursound sweep us beneath the surface, where, listening blindly to our ancestors and the wild creatures, we will feel it surge within us again, in our speaking and in our music.[66]

Schafer maintains that humans can return to a state of equilibrium with the planet, an idea that is upheld by many environmentalists. In line with Cronon's description of nature as *moral imperative*, Schafer's theatre works invite both performers and audiences to reconnect with

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[64] Other works that position performers and audience members at a lake include *Music for Wilderness Lake* (1979), *Patria 9: The Enchanted Forest* (1994), and *Patria the Epilogue: And Wolf Shall Inherent the Moon* (1984–).

[65] Paul Rudy, liner notes to *In Lake'ch*, Twisted Trail Music, TTM 1, 2007.

[66] R. Murray Schafer, "Ursound," *Musicworks* 29 (Fall 1985): 22.

nature so as to cultivate greater care and respect for the physical world.

Rudy, Schafer, and other composers engage myths, collective human stories charged with symbolism, in order to invite listeners to reflect on—and arguably strengthen—their connection to nature. Rudy's *In Lake'ch* (Mayan for "I am another yourself") ruminates on human cosmology. The composer begins with a history that covers changes in the relationship between humans and the environment: from times of shamanism ("Orange Dust: Ancient Chemical Knowledge") to human domination and destruction ("A Quailing Prairie," "Veiled Dead Zones"), to reflection ("Hidden Catalyst"), to a final transcendence ("…a Terminus of Blue"). This narrative—the progression from a primordial landscape, to an industrialized environment, to an otherworldly, heavenly realm—is reflected musically through the initial presentation of rich earthly sounds (geothermal activity) followed by abrasive human sounds (scraping metal) and closing with timeless healing sounds (drops of water, sustained vibrant harmonies).

Schafer, in contrast, posits that in order to recover from the human-made ecological crisis the rediscovery of a past, mythological soundscape is needed. He looks to the past to find hope for the future. In an effort to rediscover this "lost" environment, Schafer leads a troupe of musicians to the Haliburton Wildlife Reserve in Ontario for an annual performance of *The Princess of the Stars* and *And Wolf Shall Inherit the Moon*, both movements from *The Patria Cycle*. Over the course of ten days, performers divide into "clans" (each named after a totem animal native to the region) and engage in daily rituals informed by indigenous traditions, such as the "First Dawn Ritual" wherein a First Nations drum calls participants to the ritual by playing the Earth's "heartbeat" and clan members recite prayers facing the four directions. Through the integration of ancient myths and aspects of natural science (Rudy) and taking music out of the performance hall and into the field (Schafer), environmentalist composers seek to regain lost

knowledge of the human relationship to the physical world and to direct culture to a higher plane of consciousness where humans and nature achieve balance.

Transformation

Several works focus on environments transformed by humans. These include Rudy's commentary on industrialization and environmental degradation in *In Lake'ch*, Westerkamp's attention to noise pollution in *Lighthouse Park Soundwalk*, and Cardiff's remarks on war and memory in *Wanås Walk*. Other pieces focus on changes in natural forces over time, as with Burtner's exploration of ice extent patterns across 40 years in *Iceprints* and Braden's depiction of the final melting stages of lake ice in the spring in *Candle Ice*. The role of human activity in the transformation of arctic and subarctic environments is not engaged directly in those two works. Instead, that topic is alluded to through the now well-established connection between global ice patterns and anthropogenic climate change.

Environmental sounds are transformed in several works through studio processing. Hildegard Westerkamp and Paul Rudy apply bandpass filters and equalization to their source materials. However, many of the modified sounds heard in Westerkamp's *Talking Rain* and Rudy's *In Lake'ch* are still recognizable. These include birdcalls, car traffic, church bells, dogs barking, flowing water, rain, and trains. That sounds remain identifiable in those two works is explained by Westerkamp's and Rudy's interest in maintaining an environmental and social context in their compositions.

It is difficult to identify the recorded materials in *Iceprints* and *Candle Ice* based on their sonic properties alone. The grinding and cracking of polar ice sheets and the distinct clinking of candle ice are not sounds that many humans encounter in daily life. The recording and post-

production techniques used in *Iceprints* and *Candle Ice* abstract ice sounds even more. The hydrophone technology draws listeners into a sub-ice environment where they are exposed to foreign sounds and acoustics. In terms of studio processing, Burtner applies a digital filter to the recorded materials in his composition and Braden uses bandpass filters and equalization in her piece. However, context is important to both Burtner and Braden. They use supplemental materials in order to inform listeners of the source and associations of sounds heard in their compositions.

Several works aim to transform how listeners experience and perceive the natural world. In the tradition of acoustic ecology, both Schafer and Westerkamp use active listening as a way to observe what they understand as balances and imbalances in the environment. *The Princess of the Stars* requires listeners and performers to listen across an open lake, to perceive environmental sounds as part of the performance, and to embrace the transformation of musical sounds by the outdoor atmospheric conditions. In contrast, *Lighthouse Park Soundwalk* raises awareness to the changing soundscape of Vancouver through the use of speech, specifically the impact of mechanical sounds on a quiet natural setting. Where Schafer and Westerkamp draw on the sounds of specific sites in order to inspire the transformation of listeners' perceptions of nature, Rudy leads listeners beyond Earth. He traces the transformation of humanity from a base existence driven by materialism and consumption to a higher plane of consciousness. In different ways, Schafer, Westerkamp, and Rudy invite their audiences to listen both outwardly to the sounds within a physical space and inwardly to their reactions to sounds. Ultimately, these three works aim to raise awareness to real-world environmental concerns and perhaps even inspire action.

The Scope of the Thesis

This thesis is not comprehensive in its consideration of contemporary composers and sound artists that are engaging nature in their work. No study could accomplish this without the extensive work of several authors. Such a manuscript would also be inclined to take the form of a survey. Important artists are missing from this study: John Luther Adams, Leah Barclay, David Dunn, Yolanda Harris, and Annea Lockwood, to name a few. The aim here is to examine works that represent a wide range of approaches to nature and works that illustrate the four themes introduced above.

The physical spaces encountered in the works under consideration are not pristine, untouched locales. Instead, they are places that have been transformed by humans. Locations include an artificial lake, a dike and flood plain, and a sculpture park. Furthermore, several works considered in this study do not position listeners in a specific place. For example, Matthew Burtner engages the vast Arctic in *Iceprints*, and Paul Rudy comments on Earth in *In Lake'ch*. This study argues that works such as *Iceprints* and *In lake'ch* have the capacity to stir emotional bonds to the natural world and to connect listeners to actual locations through abstraction, rather than locating listeners vis-à-vis a landscape. Although nature is engaged differently among the compositions considered in the thesis, each piece connects to a real-world context.

The past four decades have witnessed a growing interest in environmental issues and a greater awareness of the impact that humans have on the planet. Contemporary composers have played an important role in this conversation, addressing such topics as climate change, noise pollution, and the dynamic properties of environmental processes. Additionally, the field of ecomusicology has laid the groundwork for research on contemporary music and sound art that

draws on nature through the exploration of nature depictions in Western classical and popular music and also through showcasing some of the ways in which composers, musicians, and scholars are working towards creating a more sustainable and just world.

By recognizing these lines of inquiry—both artistic and scholarly—the thesis investigates compositional methods little explored in music scholarship. These include art-based walks and sonification. The concept of a continuum will be used to frame the manifold ways in which nature informs contemporary approaches to the sonic arts. Through the examination of nature across a range of compositional approaches, this study seeks to better illuminate the techniques contemporary composers are using to address environmental issues, how they are maintaining, revising, or even challenging cultural conceptions of the natural world, and in what ways they are redefining concepts of musical structure and perception.

Chapter 2 Opening Ears, Activating Space

"To walk is to enjoy the transitory; it is a relic of our nomadic past. Walking requires one to be prepared to make quick decisions, not only about where to go, but also about how to judge the world passing by. It sharpens the senses and helps us to deal with the sudden and the unexpected. Walking enables reflections that might transform the commonplace."

—Mirjam Schaub[67]

On Thursday morning, 17 March 1977, composer and acoustic ecologist Hildegard Westerkamp entered Lighthouse Park, a large park outside Vancouver, British Columbia, noted for its old-growth trees and coastal vistas. With a microphone, Westerkamp set out to capture sonic footage for her weekly radio program, *Soundwalking*.[68] The final work, *Lighthouse Park Soundwalk*, consists of approximately thirty-five minutes of recorded material from this longer walk.[69] The composition begins with a stationary recording in the forest, where a nearby stream, several songbirds, and a distant seaplane are audible. Within an instant, the plane passes overhead, disrupting the sounds of nature as it enters the foreground. As the aircraft sound starts to fade, Westerkamp steps forward, gathers her recording equipment, and welcomes listeners to Lighthouse Park. Without a preface, the listener is introduced to a practice known as soundwalking, an exercise (alone or with a group, preplanned or improvised) where the purpose

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[67] Mirjam Schaub, *Janet Cardiff: The Walk Book* (Cologne: Verlag Der Buchhandlung Walther Konig, 2005), 76.

[68] *Soundwalking* aired from 1978–79 on Vancouver Co-Operative Radio. The program was initially thirty minutes in duration, and was co-hosted by Westerkamp, Anne Holmes, and Joan Henderson. After receiving a grant from the Canada Council for the Arts, the broadcast was extended to one hour starting in the fall of 1978. At this point, Westerkamp became the sole host of the program. Hildegard Westerkamp, personal interview by author, Vancouver, British Columbia, 12 July 2013.

[69] *Lighthouse Park Soundwalk* aired 4 March 1979 on Vancouver Co-Operative Radio. A recording is available at http://cec.sonus.ca/electrobox/sonus02/Westerkamp_Lighthouse.mp3 (accessed 15 June 2013).

is to listen to the immediate environment while moving through space.[70]

Since Westerkamp's radio program, interest in art-based walks has grown exponentially.[71] For purposes here, the term "art-based walk" is used to refer to performance-based art works that combine active listening and physical movement. Approaches within the genre vary greatly. Some artists build on the original concept of soundwalking, giving focus to the sounds of the immediate environment and reflecting on the historical, cultural, and/or political facets therein.[72] Others show interest in exploring new dimensions of sound and space through technological mediation, whether to make the inaudible audible or to re-conceive the everyday experiences of observation and navigation.[73]

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[70] In *The Tuning of the World*, R. Murray Schafer distinguishes a "listening walk" from a "soundwalk" on the basis that the latter calls the participant to make sounds through performance, whereas the former does not. See *The Tuning of the World*, 212–13. The concept of soundwalking has broadened to include both. For purposes here, a soundwalk is defined as a listening walk where sound making is optional—the decision is typically made by the organizer of the walk.

[71] Soundwalking also serves as a research tool, with growing interest in fields such as communication, geography, and urban design. See Ozgun Eylul Iscen, "In-Between Soundscapes of Vancouver: The Newcomer's Acoustic Experience of a City with a Sensory Repertoire of Another Place," *Organised Sound* 19, no. 2 (August 2014): 125–35; Jennifer Schine, "Listening to a Sense of Place: Acoustic Ethnography with Billy Proctor in the Broughton Archipelago, British Columbia," Master's thesis, Simon Fraser University, 2013; Mags Adams, "Hearing the City: Reflections on Soundwalking." *Qualitative Researcher* 10 (July 2009): 6–9; Toby Butler, "A Walk of Art: The Potential of the Sound Walk as Practice in Cultural Geography," *Social & Cultural Geography* 7, no. 6 (2006): 889–908.

[72] Examples include Helmi Järviluoma's sonic memory walks, Andra McCartney's soundwalks, and soundwalks organized by members of the Vancouver Soundwalk Collective. See Helmi Järviluoma, "Lesconil, My Home: Memories of Listening," in *Acoustic Environments in Change*, ed. H. Järviluoma, M. Kytö, B. Truax, H. Uimonen, and N. Vikman, 172–92 (Tampere, Finland: TAMK University of Applied Sciences, 2009); Andra McCartney, "Performing Soundwalks for Journées Sonores, Canal de Lachine," in *Performing Nature: Explorations in Ecology and the Arts*, ed. Gabriella Giannachi and Nigel Stewart, 217–34 (Bern: Peter Lang, 2005); and Tyler Kinnear, "Reflections from the Vancouver Soundwalk Collective," *The World Forum for Acoustic Ecology Newsletter* 9, no. 4 (2012): 11.

[73] Consider, for example, Christina Kubisch's electrical walks, where participants are equipped with headphones that generate sound from nearby electromagnetic currents, and Yolande Harris' *Displaced Sound Walks* (2010–), where participants record a walk with binaural microphones, listen back to the recording, and then conduct the same walk while listening to the recording over headphones. On Kubisch's electrical walks, see Christoph Cox and Christina Kubisch, "Invisible Cities: An Interview with Christina Kubisch," *Cabinet Magazine* 21 (Spring 2006), http://cabinetmagazine.org/issues/21/cox.php. For more on Harris' *Displaced Sound Walks*, see Yolande Harris, "Presentness in Displaced Sound," *Leonardo Music Journal* 23 (2013): 13–14. Technologically mediated forms of soundwalking have

This chapter focuses on art-based walks in outdoor, natural settings. Generally speaking, these locations are significantly less populated than urban environments and are understood culturally as places of repose and renewal. The locations chosen are also typically marked by a low ambient noise level, what R. Murray Schafer calls a "hi-fi environment."[74] In a hi-fi environment, human sounds are heard in relation to a larger ecosystem of sounds (they are on the same scale as the environment). In a lo-fi environment, human sounds often dominate acoustic space (they redefine the scale of the environment).[75] There are lo-fi natural sounds, of course, like a waterfall and a windstorm. However, such sounds are generally absent from the writings of Schafer and the WSP.[76] They instead focus on lo-fi human sounds that are deemed damaging to otherwise hi-fi soundscapes.

The following pages investigate some of the ways in which contemporary artistic approaches to walking treat nature as both concept and source material. What draws artists to nature locales? Do artists treat nature sounds differently than human-made sounds? In what ways do artists interact with their surroundings? How does the design of an art-based walk inform an audience's perception of environmental sound? Each of the walks discussed in this chapter are preserved on a recording that features little or no electronic processing. The intent of recording an art-based walk is often for documentation purposes. It is also how some artists share their work with audiences. These recordings are best described as creating an immersive experience

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become increasingly accessible to the general public. Participants can now download various applications on their mobile device and conduct a soundwalk at their own leisure. These include audio tours (http://www.soundwalk.com), real-time signal-processing software (http://www.rjdj.me/), and the playback of geotagged field recordings (https://foundsounds.me/).

[74] Schafer, *The Tuning of the World*, 43.

[75] R. Murray Schafer, ed., *The Vancouver Soundscape*, World Soundscape Project, Document No. 5 (Burnaby, BC: Sonic Research Studio, Simon Fraser University, 1973), 48.

[76] Schafer mentions powerful natural sounds, such as ice deformation and the eruption of Krakatoa in 1883. He also gives heavy rain and thunder as two examples of what he calls "sacred noise." Schafer, *The Tuning of the World*, 27, 51.

for the listener; that is, a strong allusion to physical presence in a particular real-world setting. How artists position and direct the microphone(s) helps to create immersion. In this way, art-based walks can be positioned at one end of a continuum between artistic practices that feature nature as perceived and those that present nature abstracted. Furthermore, several patterns emerge from investigating walks through nature spaces, including the use of technology and the assertion of human presence in the environment.

In order to explore some of the ways in which artists realize walks in nature settings, three works will be discussed: Hildegard Westerkamp's *Lighthouse Park Soundwalk* (1977), Dallas Simpson's *The Adoration of Willow* series (with particular attention to his "Stoke Bardolph" performance) (1998), and Janet Cardiff's *Wanås Walk* (1998). These artists represent wide-ranging backgrounds. Westerkamp is a classically trained composer and musician. Simpson is self-taught as an artist—his formal training lies in science. Cardiff is a media artist, with a specialty in installations. She often collaborates with her husband, George Bures Miller, whereas Westerkamp and Simpson work alone.

Each of the works above entails a private walk, an exercise conducted alone, either by the artist (Westerkamp, Simpson) or by a single participant (Cardiff). *Lighthouse Park Soundwalk* and *The Adoration of Willow*, "Stoke Bardolph" are experienced as recordings—the actual walks have already taken place; *Wanås Walk*, on the other hand, is enacted live. *Lighthouse Park Soundwalk* consists of stationary recordings of forest ambience interspersed with quotations from published journal entries and short stories by writer, painter, and British Columbia resident Emily Carr (1871–1945) read on location.[77] "Stoke Bardolph" presents a live performance on found objects, including tree trunks, branches, fallen sticks, rocks, and a pool of water. *Wanås*

[77] Emily Carr*, Hundreds and Thousands: The Journals of Emily Carr* (Toronto and Vancouver: Clarke, Irwin and Co., 1966); *The Book of Small* (Toronto, Oxford University Press: 1942).

Walk requires a participant to retrace a route planned by the artist while listening through headphones to a multi-track recording. On the recording are ambient sounds from the site combined with verbal cues indicating where to go, at what pace to walk, and when to pause. Also present is a series of fragmented narratives, including stories, conversations, and internal dialogue, along with excerpts of prerecorded music.

Each work raises questions regarding the roles of composer, performer, and audience as understood in Western art music. For all three pieces, the artist is both audience member and performer. The sounds that Westerkamp, Simpson and Cardiff produce as well as recording techniques are informed by their listening. They create sounds in response to both external stimuli and their own sound making. Whereas listening informs the act of performance, the performance provides the audience with information about the artist's approach to listening. The audience takes on a performative role as well, either through their participation in a live walk (Cardiff) or by envisioning a walk in their mind when listening to a recording (Westerkamp, Simpson). Thus, there are two performances at hand: the realization of a walk and the replaying of a recorded walk. By refashioning the conventional roles of a musical work, artists working with mobile listening explore the environment in unorthodox ways. Before examining each artist's approach, a brief discussion of the origins of soundwalking is presented.

From Documentation to Artistic Expression

The genesis of soundwalking began with the work of the World Soundscape Project (WSP) in the 1970s, a group in which Westerkamp was actively involved.[78] With the WSP, soundwalking was often the initial step in studying a "new" soundscape. These walks were

[78] For more on the WSP, see Introduction. See also website of the Sonic Research Studio at Simon Fraser University (http://www.sfu.ca/sonic-studio/).

primarily improvised and were recorded for research purposes.[79] For the 1973 publication, *The Vancouver Soundscape*, the group presented a soundwalk in the form of a map and set of directions that led participants through an area around the former Canadian National Rail Station (CNR Station) (see Figure 2.1). The directions provided information for where to go, offered cues for making sounds, such as depositing coins for bus fare and humming to the sound of a specific neon light, and drew attention to specific sound sources, including the former Fleck Brothers Clock and a resonant, metal staircase near the CNR Station. The same model was used the following year for a soundwalk featured in Westerkamp's article "Soundwalking," this time in Queen Elizabeth Park (also in Vancouver). However, the route is not specified for Westerkamp's walk, just the order in which sites are visited (see Figure 2.2). Westerkamp's directions are more elaborate than those accompanying "A Vancouver Soundwalk." She invites participants to physically stimulate objects and activate spaces with their hands and through vocalization. At one moment, the composer directs the soundwalker to place his or her ear against the surface of a metal sculpture. She also encourages them to think critically about what they hear: "Do you hear any sounds which do not seem to belong here?" "Is this park as attractive acoustically as it is visually?"[80] Whereas the improvised, recorded WSP walks served as a tool for researchers to collect data, the published, self-guided "A Vancouver Soundwalk" and "Queen Elizabeth Park Soundwalk" held the purpose of educating the public about the soundscape and the importance of active listening.

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[79] Howard Broomfield, Bruce Davis, and Peter Huse were likely those that conducted the walks (they made the majority of early WSP recordings). Many of these walks survive in the recently digitized WSP tape collection at Simon Fraser University. See http://www.sfu.ca/sonic-studio/srs/index2.html (accessed 30 July 2013).

[80] Hildegard Westerkamp, "Soundwalking," *Sound Heritage* 3, no. 4 (1974): 23. This article is reprinted in *Autumn Leaves: Sound and the Environment in Artistic Practice*, ed. Angus Carlyle (Paris: Double-Entendre), 2007.

Figure 2.1 “A Vancouver Soundwalk.” The numbers on the map correspond to sites where listeners are asked to listen to specific sound sources and/or produce sounds themselves. Schafer, ed., *The Vancouver Soundscape*, 70. Image courtesy of the Sonic Research Studio, Simon Fraser University. Used by permission.

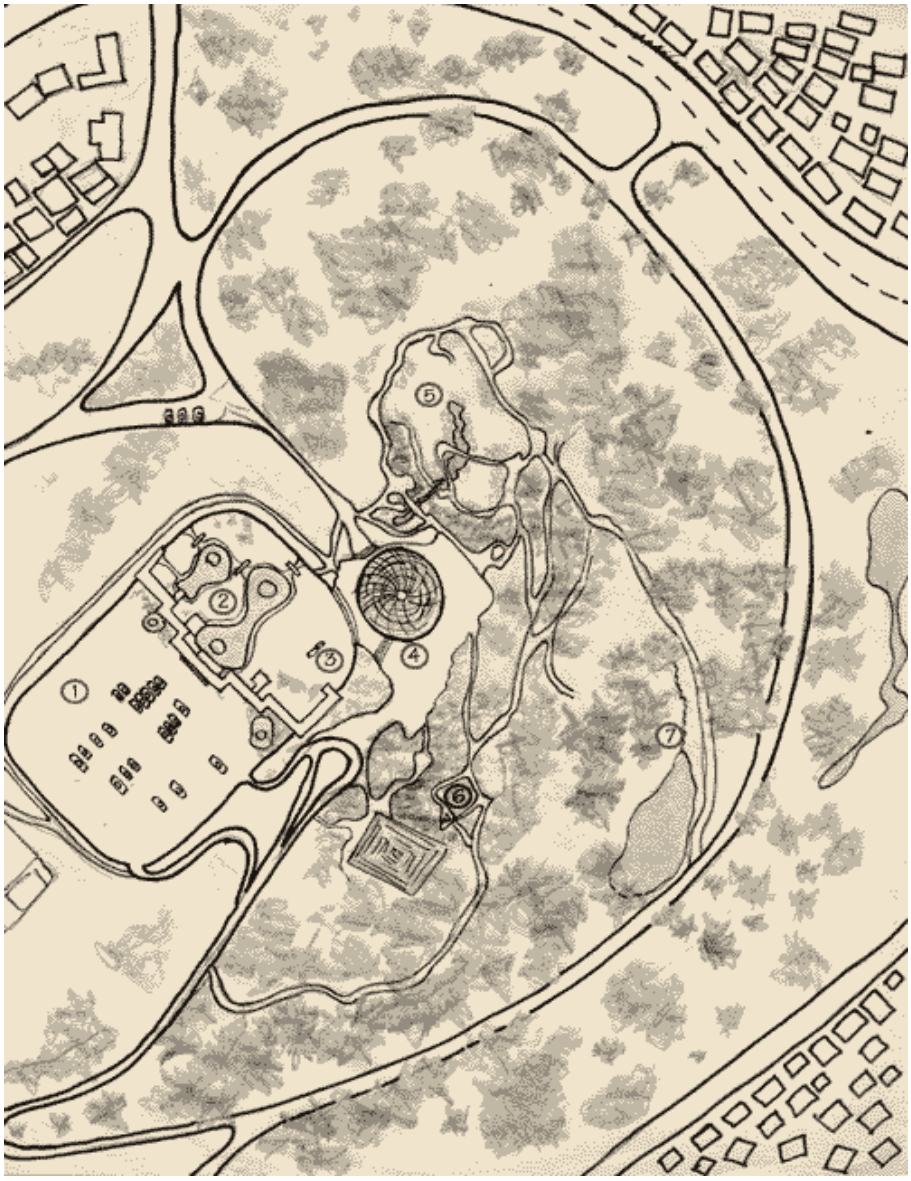

Figure 2.2 Queen Elizabeth Park Soundwalk. Hildegard Westerkamp, "Soundwalking," *Sound Heritage* 3, no. 4 (1974): 22. Image courtesy of the Royal BC Museum, BC Archives, catalogue number NW 902 S725. Used by permission.

With her radio program *Soundwalking*, Hildegard Westerkamp took listeners to various locations in and around Vancouver, British Columbia. Sites visited included a shopping mall, the former Stanley Park Zoo, several nature reserves, including Lighthouse Park and Burnaby Mountain, and a residential neighborhood under the flight path of airplanes headed for and departing from Vancouver International Airport. Although listeners were familiar with the places

featured on *Soundwalking*, listening to unaccompanied environmental sounds on the radio was a new experience for many.[81] The composer explains:

> I was attempting to make radio a place of environmental listening by broadcasting the soundscapes that listeners experienced in their daily lives. With that I had hoped to create a state of resonance within listeners so that when they encountered sounds in the actual environment, recollections of the radio broadcast would alert them to the soundscape in which they lived—creating participating listeners, that is, listeners of the broadcast who could then also be receptive to the soundscape as a whole.[82]

As a mediator between those listening to her broadcast and the environment in which she was recording, Westerkamp encouraged her audience to experience locales from the perspective of sound and to think critically about what they heard. In this context, soundwalking served as a tool for raising public awareness to the conditions of sonic environments.

Reminiscent of her focus on particular sites in Queen Elizabeth Park, Westerkamp's radio show *Soundwalking* showcases specific moments from her recorded walks.[83] The source material chosen for radio play includes sounds representative of a particular location as well as memorable experiences during the walk, such as an encounter with a passerby or a distinct combination of environmental sounds that struck the composer as worth sharing. Westerkamp preserves the original order of much of the recorded material and does not mix recordings from different locations. Crossfading is the only type of audio production used in *Soundwalking*. This technique creates a seamless transition between excerpts.

Westerkamp's method for recording urban environments for her radio show was different from her approach to nature settings. The composer likely felt little need to direct the

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[81] Perhaps the most well-known Canadian broadcast to use field recordings in the context of discussions around place prior to Westerkamp's work is Glenn Gould's *Solitude Trilogy: Three Sound Documentaries* (1967–77).

[82] Westerkamp, "Radio that Listens," 88.

[83] The actual walks were anywhere from two to three hours in duration. Hildegard Westerkamp, personal interview by author, Vancouver, British Columbia, 12 July 2013.

microphone in the city or to stimulate her surroundings by making sounds, since sounds (primarily human-related) came to her without effort. She asserts:

> In the city many sounds present themselves to the microphone; the recordist can remain quite passive and end up with a lot of sound on tape. Not so in quiet environments. There the recordist often needs to take a more active role with the microphone in order to record any sound at all. It is a wonderful opportunity to search for the microscopic sounds in such sonic environments. By recording them at close range, an entirely new world of acoustic complexity can be discovered, all with a relatively silent backdrop.[84]

This opposition of urban and rural settings is heightened by the difference between the lo-fi conditions of an urban area such as Vancouver and the iconic quietude of an unpopulated Pacific Northwest nature setting. The social codes of public spaces also distinguish Westerkamp's approach to urban and nature spaces. Keeping in mind the technology available at the time, it was—and still is—rather unusual to walk through an urban environment at a slow pace in silence with a recorder, microphone, and headphones. For this reason, passersby occasionally approached Westerkamp to ask what she was doing, whereupon she engaged in conversation.[85] By contrast, *Lighthouse Park Soundwalk* features only a few instances where human sounds (other than those produced by the composer) are audible. These are mostly at a distance; however, there is one direct encounter at 34'45" where two passersby with their dog greet the composer.

Following her work for radio in the late 1970s, Westerkamp would go on to apply the concept of soundwalking to several electroacoustic soundscape compositions, notably *A Walk*

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[84] Westerkamp, "Radio that Listens," 91. The type of ecosystem is another important factor to consider when thinking about sound activity. For example, a temperate rainforest sounds sparse compared to a tropical rainforest.

[85] One example is *Under the Flightpath* (1981), where a resident in a Vancouver neighborhood approaches Westerkamp on the sidewalk to ask her what she is recording. Following initial conversation, the resident becomes increasingly open to sharing his frustration towards living under the flight path of Vancouver International Airport.

through the City (1981) and *Kits Beach Soundwalk* (1989). These pieces differ from the early soundwalk compositions in their creative use of post-production techniques. Although the association of environmental sounds with a real-world context is maintained (i.e., where the source of a sound is recognizable), soundwalking is primarily used as a tool for structuring a work. In *Kits Beach Soundwalk*, for example, soundwalking is used to take listeners on an acoustic journey from Kitsilano Beach in Vancouver, British Columbia, through a series of narrated dreams and back. (Westerkamp's work with soundscape composition is discussed in detail in Chapter Four.) What remains central to her practice—from her early works for radio through to her later electroacoustic compositions—is a dedication to highlighting everyday sound as important and worthy of attention.

Like the original idea of soundwalking, the works under consideration employ various forms of sound performance. Sound performance is where the artist introduces sounds into the environment. This includes the use of supplemental materials during the walk, such as reading poems (*Lighthouse Park Soundwalk*), playing a recording (*Wanås Walk*), and physically stimulating found objects (*Lighthouse Park Soundwalk* and "Stoke Bardolph"). Through sound performance, Westerkamp, Cardiff, and Simpson activate the space around them. "Activation" is understood here as both the physical and conceptual stimulation of the environment. In the physical sense, activation entails sounding a stationary object and stimulating the acoustics of a given space. In the conceptual sense, activation is defined by engagement with a sound source or silent object based on its signification. For example, the sound of a gentle stream, regarded by many as a relaxing sound, becomes a point of inquiry when Westerkamp uses the microphone to survey water flowing over rocks. Through sound performance, she enters into conversation with environmental sounds, including those that she deems pleasurable and those that she regards as

disruptive, and, in turn, brings attention to the social significance of quiet, nature sounds. Through live outdoor performance, Simpson enters into communion with a location, to come closer to knowing its collective "voice." Cardiff replays ambient sounds and fragmented narratives where they were originally recorded in order to call into question the perception of what is real.

It is difficult to explain these walks as music in the conventional sense. The artists under consideration do not describe their work from a decidedly compositional perspective. Additionally, Westerkamp is the only artist to discuss her compositions in the context of soundwalking. Simpson describes his walks as a form of "environmental performance," while Cardiff refers to her pieces as "audio walks." The disciplinary background of each artist is also wide ranging. Westerkamp studied flute performance and since has had a career as an acoustic ecologist and composer. Simpson was formerly a chemist and is currently an audio engineer. Cardiff has a background in photography and now creates art installations, many of which include sound.[86] Although approaches to working with art-based walks vary, active listening and sound performance are central components of this practice.

Recent scholarship considers how soundwalking operates as an experimental art form

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[86] Existing scholarship on Westerkamp explains her soundwalking practice and the influence it has had on her career. Simpson is noted for his use of binaural technology. Writings on Cardiff's audio walks emphasize the elements of film noir and *dérive* aesthetics, as well as the artist's use of juxtaposition and fragmentation techniques, and the effects these have on participant experience. See Andra McCartney, "Sounding Places: Situated Conversations through the Soundscape Compositions of Hildegard Westerkamp," Ph.D. diss., York University, 1999; Matthew Barnard, *The Sounds of Displacement: A Portfolio of Binaural Compositions*, Ph.D. diss., University of Hull, 2010; David Pinder, "Ghostly Footsteps: Voices, Memories and Walks in the City," *Ecumene: A Journal of Cultural Geographies* 8, no. 1 (2001): 1–19; Rebecca Duclos, "Reconnaissance/*Méconnaissance*: The Work of Janet Cardiff and George Bures Miller," in *Articulate Objects: Voice, Sculpture and Performance*, ed. Aura Satz and Jon Wood, 221–46 (Bern: Peter Land AG, 2009).

and assesses different methods.[87] Soundwalks are generally seen as part of a larger history of art-based walks, such as Dada excursions, Situationist *dérives*, and Fluxus walks. For some, soundwalking is one of several instances where sound "mobilizes" the listener; that is, where heightened awareness of the acoustic environment mediates the everyday act of observation by highlighting the real-world sounds as important.[88] Here, the act of listening is considered within a broader investigation of the relationship between human perception and urban space.[89] What follows is a discussion of art-based walks as *fixed* works. As such, an exercise in listening and sound performance is documented using recording technology and played back at a later time.

Soundwalking and the Concept of a Musical Work

In *The Tuning of the World*, R. Murray Schafer writes: "When the soundwalker is instructed to listen to the soundscape, he is audience; when he is asked to participate with it, he becomes composer-performer."[90] These roles are similar to those found in Western classical music, the tradition in which Schafer is trained and locates his creative practice. For example, framing time to listen to the soundscape is akin to attending a concert in a music hall, where the audience remains silent and directs their attention to the performance at hand. Additionally, as

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[87] See John Levack Drever, "Soundwalking: Aural Excursions into the Everyday," in *The Ashgate Research Companion to Experimental Music*, ed. James Saunders, 163–92 (Farnham, UK: Ashgate, 2009); and Andra McCartney, "Soundwalking: Creating Moving Environmental Sound Narratives," in *The Oxford Handbook of Mobile Music Studies*, ed. Sumanth Gopinath and Jason Stanyek, vol 2, 212–37 (Oxford: Oxford University Press, 2014).

[88] The "mobilization" of the listener through soundwalking is not unlike iPod culture, whereby a song can serve as a soundtrack to visual stimuli. For more information on iPod use in public-private urban spaces see Michael Bull, *Sound Moves: iPod Culture and Urban Experience* (London and New York: Routledge), 2007.

[89] See Candice Boyd and Michelle Duffy, "Sonic Geographies and Shifting Bodies," *Interference: A Journal of Audio Culture* 2 (2012), http://www.interferencejournal.com/articles/a-sonic-geography/sonic-geographies-of-shifting-bodies (accessed 20 June 2013); and Brandon Labelle, *Acoustic Territories: Sound Culture and Everyday Life* (New York: Continuum, 2010).

[90] Schafer, *The Tuning of the World,* 212–13.

Schafer mentions, the soundwalker takes on the roles of composer and performer when they participate in the environment. One way to participate in the soundscape is by physically stimulating surfaces. Through sound performance, the soundwalker goes from playing a passive role (receiving sounds) to an active one (producing sounds). Although recorded art-based walks have not been understood as musical works (soundwalking, for example, is referred to as a practice), this chapter asserts that there is value in examining them as such. *Lighthouse Park Soundwalk*, "Stoke Bardolph" and *Wanås Walk* modify the concept of a work by employing the roles of composer, performer, and audience member in unconventional ways. The manner in which Westerkamp, Simpson, and Cardiff refashion these roles also shapes how nature is encountered in their walks.

One possible entry point for considering the relationships between composition, performance, listening, and conceptions of nature in art-based walks is to investigate the aforementioned pieces in relation to the "work concept," a term coined by Lydia Goehr. According to Goehr, a musical work is understood as something that is composed, performed, and received.[91] In basic terms, a musical work can be visualized as a conventional communication model (see Diagram 2.1). One critique of this model is that it remits audience interpretation by reducing the work to a unidirectional schema.

Sender (composer) ---> Message (score) ---> Receiver (audience)

Diagram 2.1 Schema for a Work Based on a Basic Linear Communication Model.

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[91] Goehr claims that the work-concept emerged in the late eighteenth century as a result of changing socio-economic conditions. Where music was at once written as a craft or service, around 1800 writing music was legitimized as a form of self-expression. See Lydia Goehr, *The Imaginary Museum of Musical Works: An Essay in the Philosophy of Music* (Oxford: Oxford University Press, 1992), esp. 113. For a different position of when this conceptual shift took place see Harry White, "'If It's Baroque, Don't Fix It': Reflections on Lydia Goehr's 'Work-Concept' and the Historical Integrity of Musical Composition," *Acta Musicologica* 69 (1997): 94–104.

Building on the scholarship of Jean Molino, Jean-Jacques Nattiez offers an alternative model to the concept of a work, which accounts for the intersection of production and reception—Nattiez refers to these as "poietic process" and "esthesic process," respectively (see Diagram 2.2). He labels the intersection of the poietic process and the esthesic process as "trace." Nattiez describes the trace as the physical result of the two processes, meaning that the receiver has not responded to the poietic process.[92] Yet, the reverse arrow between "trace" and "receiver" enhances Nattiez's concept of a work by making the "receiver" an active agent in the creation of a work. From that perspective, the esthesic process has the capacity to shape a work, unlike the unidirectional model in Diagram 2.1.

Poietic Process **Esthesic Process**

"Producer" ------> Trace <------ Receiver

Diagram 2.2 Nattiez's Schema for a Work. Jean-Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music*, trans. Carolyn Abbate (Princeton: Princeton University Press, 1990), 17.

Nattiez builds upon this bi-directional model to represent the concept of a musical work (see Diagram 2.3). His schema for a musical work accounts for aspects specific to Western classical music, in particular music of the common practice period. As Diagram 2.3 shows, Nattiez replaces "trace" with "musical result."[93] Where "trace" is understood broadly as the end of the poietic process and the beginning of the esthesic process, "musical result" refers specifically to the combined outcome of the interpretation of a score through performance and the impressions of the audience in response to that performance. The audience may have an idea of the composition prior to its performance based on past performances or score studies. If the performance differs from what the audience expects (tempo changes, playing notes that are not

[92] Nattiez, *Music and Discourse*, 17.
[93] Ibid., 73.

written, rhythm discrepancies, etc.), then the score can serve as a way to validate whether this departure is deliberate or unintentional.[94] Ultimately, Nattiez demonstrates that a piece of music cannot be reduced to a single component (such as "score" or "musical result"). In other words, Nattiez views a musical work as a composite of the differences of production, performance, and reception.

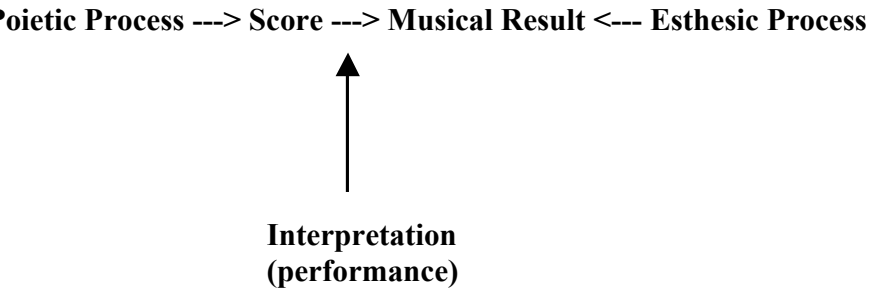

Diagram 2.3 Nattiez's Schema for a Musical Work. Nattiez, *Music and Discourse*, 73.

For many contemporary works, the poietic process and the esthesic process do not meet at the musical result. Nattiez explains:

> If on the other hand we believe that the work is not wholly "produced" *unless* it has been played, the poietic process extends until the performance is complete. Performance shows itself in this case to be the last stage of the poietic, as well as the first stage of the esthesic. In musics without a score, this border is displaced, since the producer and the performer find themselves intermingled.[95]

There are numerous variations in the final stage of the poietic process. Many types of works eliminate the "score" and are self-operating (i.e., the performance does not include human agents). For example, Luc Ferrari's *Presque rien n°1 ou Le lever du jour au bord de la mer* ("Almost nothing no. 1, or daybreak at the seashore") (1967–70) exists as an audio recording of excerpted field recordings made by the composer during the summer of 1968 in the town of Vela

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[94] Roman Ingarden argues that variations in performance do not affect the work itself (i.e., that the concept of a musical work is not dependent on performance). Roman Ingarden, *Ontology of the Work of Art: The Musical Work, the Picture, the Architectural Work, the Film*, trans. Raymond Meyer and John T. Goldthwait (Columbus: Ohio University Press, 1989), 25.

[95] Nattiez, *Music and Discourse*, 72, italics in original.

Luka on the isle of Korčula in Yugoslavia (now Croatia).[96] As well, outdoor sound installations typically do not call for a score or live performers. Such is the case with Gordon Monahan's *Piano on Frozen Lake Nipissing* (2014), Gayle Young's *Les Tuyeaux Sonores* (1994), and Alvin Curran's *Music from the Center of the Earth* (1991), to name but a few. In this way, recorded walks are not unique. However, the distinction between composition and performance is less recognizable.[97] Additionally, recorded walks entail not one, but two performances. (Refer to Diagram 2.4 hereafter.) During the first performance, the artist conducts a physical walk through a specific environment. Both the artist's physical movement through space (his or her walking pace, when and where to pause) and the production of sounds (stimulating found objects, use of voice) shape the initial walk as a performance. Where Westerkamp and Simpson conduct a single walk, Cardiff realizes multiple walks over several days. The second performance occurs when the audience plays back the recording.

[96] A sound engineer could be said to be the performer in the case of electroacoustic music on the basis that he or she is adjusting various parameters of sound on a mixer during playback.

[97] Andrew Kania and Theodore Gracyk explain that there are three types of music recording: a musical work (i.e., a piece in the form of a recording that depends on playback, such as electronic music), documentation of a performance of a musical work (e.g., a recording of Beethoven's Fifth Symphony), and a recording of a composition (i.e., where a musical work is recorded in the studio in ways that cannot be performed live, such as Glenn Gould's 1981 studio sessions of Bach's *Goldberg Variations*). Andrew Kania and Theodore Gracyk, "Performances and Recordings," in *The Routledge Companion to Philosophy of Music*, ed. Theodore Gracyk and Andrew Kania (London and New York: Routledge, 2010), 85.

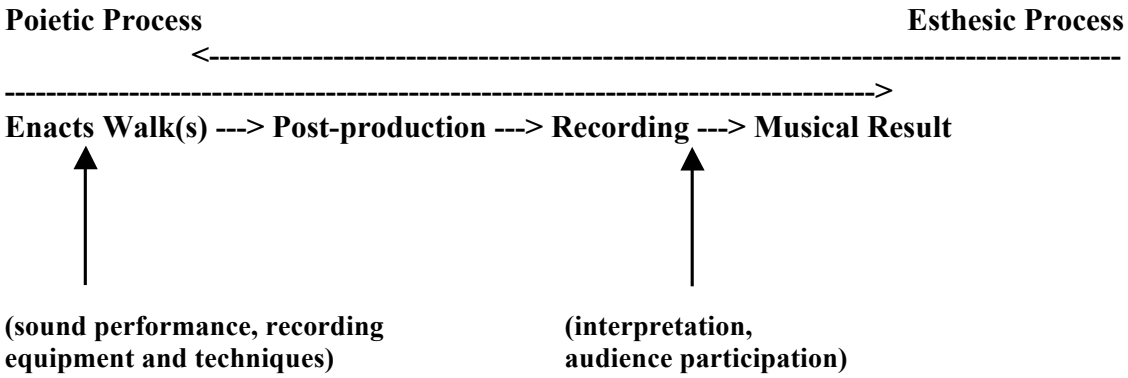

Diagram 2.4 Schema for a Recorded Art-based Walk.

In the case of recorded walks, the listener retraces the artist's movement through and interaction with the environment through audio playback. Thus, the esthesic process extends past the musical result to the initial stage of the poietic process. In the case of *Wanås Walk*, the listener conducts an actual walk at the location where Cardiff made her recordings. *Lighthouse Park Soundwalk* and "Stoke Bardolph" are experienced as recordings. Listeners could hypothetically visit the sites where Westerkamp's and Simpson's walks took place, but this is not a component of either work.

Technology also plays an important role in mediating the listener's experience of a documented walk. The placement of microphones determines the perspective from which the listener will receive a sonic environment. The condenser microphone set-up used by Westerkamp captures a general field of sound.[98] At times, she holds the microphones waist high. In other moments, she directs them towards her mouth. In one instance, Westerkamp positions the microphones directly over a small stream, creating a heightened experience of the water through proximity. Both Simpson and Cardiff use binaural microphones, which capture a three-dimensional perspective. Simpson inserts custom-modified binaural microphones into his ears;

[98] Westerkamp uses two AKG condenser microphones positioned in an X-Y configuration. Hildegard Westerkamp, personal interview by author, Vancouver, British Columbia, 12 July 2013.

the recording is literally experienced from Simpson's hearing perspective. Cardiff places binaural microphones on a dummy head, which she carries in front of her.

After the initial walk, Westerkamp, Simpson, and Cardiff each modify their recordings. Westerkamp and Cardiff make deliberate compositional decisions by reorganizing material from their respective walk(s). Westerkamp crossfades the audio excerpts that make up *Lighthouse Park Soundwalk*, creating a seamless transition between sonic footage from a longer walk. Cardiff selects a recorded walk to use as the master track and then layers individual sounds on top. Simpson applies minimal post-production; he simply "cleans up" the recording by removing certain physiological sounds, such as coughing and swallowing. In essence, Simpson's piece documents a performance, whereas Westerkamp's and Cardiff's work, while containing archival remnants of a walk, emerge as new compositions due to studio editing.

Both *Lighthouse Park Soundwalk* and "Stoke Bardolph" are experienced in settings removed from the performance location. The musical result of both works is arguably informed by whether or not listeners have visited the physical environment associated with their compositions. For example, someone who has been to Lighthouse Park might compare the sounds heard during his or her visit to those in Westerkamp's piece. The listener might also relate his or her own reactions to Westerkamp's encounter. In contrast, *Wanås Walk* is the only work under consideration where the audience is asked to conduct a physical walk (marked "interpretation" in Diagram 2.4). The recording functions as a "score" in the form of verbal cues. The recording also features sounds that are intended as experiential; these include Cardiff's voice, pre-recorded music, and ambient sounds recorded on-site (e.g., animals, vehicles, and conversation).

The aforementioned art-based walks maintain the poietic and esthesic processes central to

the idea of the musical work. However, stages within the model are reordered. As a result, the concepts of "performance" and "composition" are blurred. The function of each step in the poietic process is consistent among all three works: a walk is enacted, various post-production techniques are used, and a final recording is presented to the audience. Audiences encounter all three works through an audio recording, whether played over loudspeakers or headphones.

The three artists discussed in this chapter invite audiences into the creative act by presenting an individual encounter with a nature setting. Hildegard Westerkamp brings the changing soundscape of Lighthouse Park into the homes of Vancouver residents by recording her walk (with excerpts from the writings of Emily Carr read along the way) and playing excerpts back over a local radio station. Dallas Simpson also presents listeners with documentation of a specific soundscape—in the case of *Adoration of Willow*, a floodplain outside Nottingham, England. However, Simpson's aesthetic is not to sensitize listeners to the changing relationship between humans and the sonic environment but to physically stimulate the environment so as to "voice" it. Janet Cardiff instructs participants to retrace her footsteps through a forested area near Knislinge, Sweden. Those enacting this audio walk must physically visit the site. In so doing, participants simultaneously engage the disjointed narratives of the artist while maintaining their own physical presence in—and therefore their own experience of—the environment. Individual works will be discussed now in detail to better understand how each artist creates a particular encounter with nature.

Sounds Heard: Hildegard Westerkamp, *Lighthouse Park Soundwalk*

Hildegard Westerkamp invites listeners to experience Lighthouse Park from the perspective of sound rather than, for example, capturing the Park's visual grandeur or its rich

history as the first non-First Nations settlement on the North Shore (part of what is now Greater Vancouver).[99] What arrives at her ears and ours (through the recording) is not what one might expect in a nature reserve. Over the course of the 1970s the sonic profile of Lighthouse Park was changing as a result of increased seaplane traffic. The Park lies adjacent to a major flight path for seaplanes entering and leaving Vancouver Harbour (see Figures 2.3 and 2.4). Seaplanes were, in part, what informed the WSP's claim that the city was "slipping steadily into the lo-fi condition."[100] The research team came to this conclusion by counting over-passing seaplanes at Ambleside Park in West Vancouver (see Figure 2.3). During an eight-hour period on three separate days in 1970 and again in 1973, the WSP noted an increase from 61 seaplanes to 106—nearly a 43% increase in air traffic. What they found even more striking was the result of asking residents of West Vancouver to conduct the same exercise. Residents observed a mere fraction of the planes counted by the members of the WSP: 8 compared to 65 in 1969 and 16 to 106 in 1973.[101] By the time Westerkamp recorded her soundwalk in Lighthouse Park in 1977, it is likely that traffic had increased further.

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[99] Lighthouse Park is regarded for its stand of old-growth native trees (one of the last remaining on the North Shore). The Point Atkinson Lighthouse was installed in 1875.

[100] Schafer, ed., *The Vancouver Soundscape*, 48.

[101] Ibid., 48–9. This passage also features a diagram comparing seaplane traffic to commercial aircraft traffic in and around Vancouver.

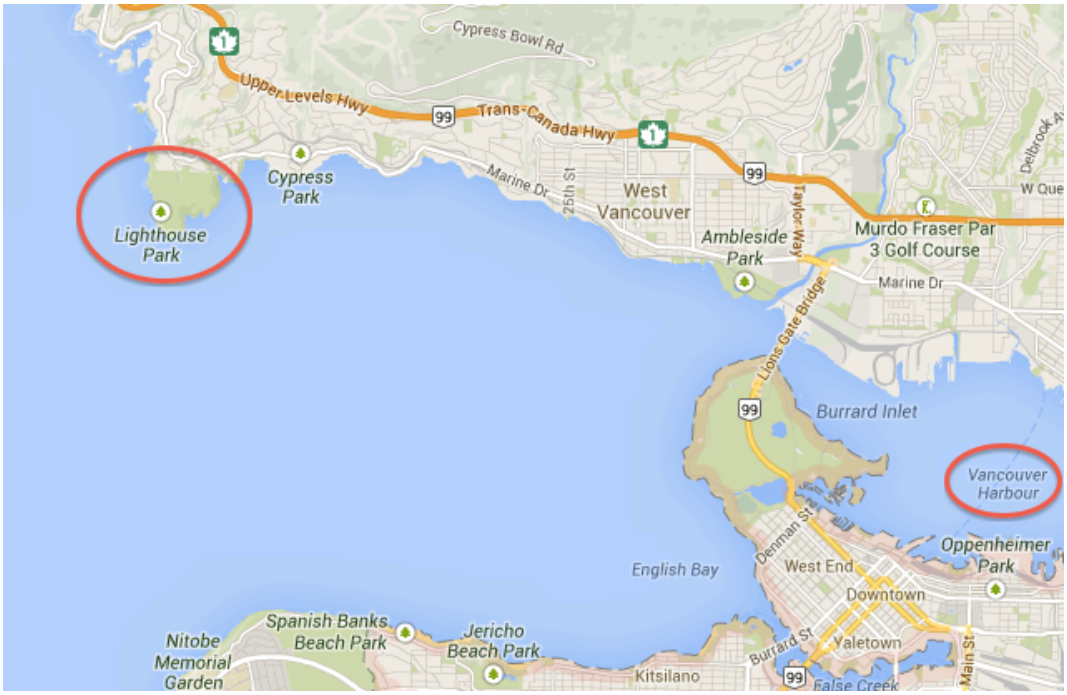

Figure 2.3 Aerial View of Lighthouse Park in Relation to Vancouver Harbour.

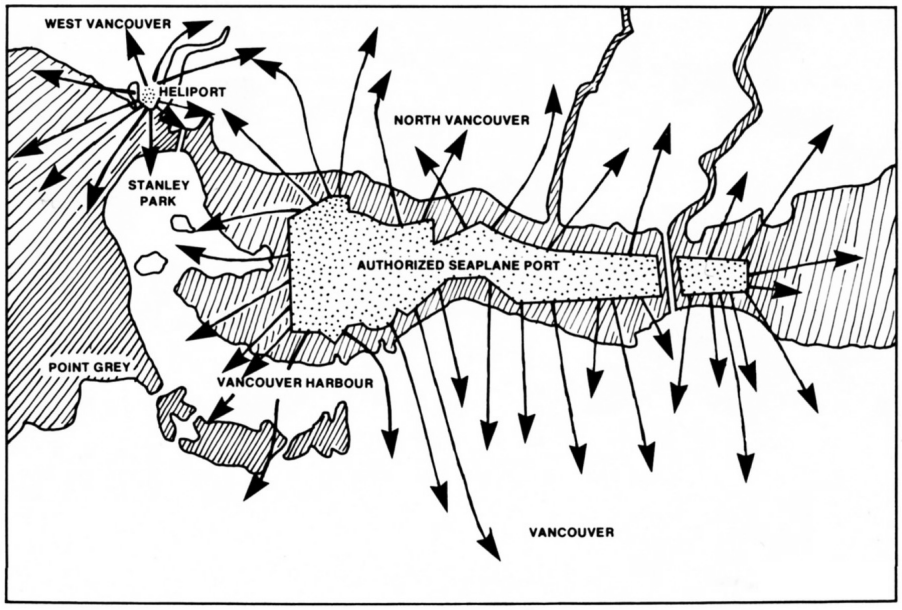

Figure 2.4 Flight Routes from Vancouver's Downtown Seaplane Port. The WSP notes that it is unusual for a city to have a seaplane base within such close proximity to its downtown core. Schafer, ed., *The Vancouver Soundscape*, 48. Image courtesy of the Sonic Research Studio, Simon Fraser University. Used by permission.

As mentioned at the start of this chapter, *Lighthouse Park Soundwalk* begins with a stationary recording of forest sounds (songbirds and a nearby stream) and a seaplane overhead. Aside from her brief introduction to the Park and general description of the exercise at hand, Westerkamp encourages her radio audience to focus their attention on the sounds of the forest reserve. It is not until six minutes into the piece that she engages the environment through sound performance. At this moment, Westerkamp reads aloud a series of excerpts from Emily Carr's published journal entries.[102] Several of these excerpts poetically describe the transformation of both the physical and sonic profile of the West Coast by Westerners. That is to say that the famed quietude of the West Coast was already endangered when Carr wrote the short stories. By reciting Carr's prose, Westerkamp repurposes the historic theme of environmental loss to reflect the changing soundscape of 1970s Vancouver. Through listening Westerkamp draws attention to everyday sounds that may otherwise go unnoticed and, through speaking, she highlights balances and imbalances in the soundscape.

In her 1974 article on soundwalking, Westerkamp encourages the general public to engage their surroundings in the following way:

> Go out and listen. Choose an acoustic environment which in your opinion sets a good base for your environmental composition. In the same way as the architect acquaints himself with the landscape into which he wants to integrate the shape of a house, so we must get to know the main characteristics of the soundscape into which we want to immerse our own sounds. What kinds of rhythms does it contain, what kind of pitches, how many continuous sounds, how many and what kinds of discrete sounds, etc.? What sounds can you produce that add to the quality of the environmental music? Create a dialogue and thereby lift the environmental sounds out of their context into the context of your composition, and in turn make your sounds a natural part of the music around you.[103]

As Westerkamp claims, the soundwalker is encouraged to listen before he or she acts. Moreover,

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[102] These excerpts are found on pages 56, 125–26, 128, 193, and 260 in Carr, *Hundreds and Thousands*.

[103] Westerkamp, "Soundwalking," 25.

sound performance should be "a natural part of the music around you," meaning that the sounds produced should reflect the ambient noise level of a given environment. This idea of balance between human and non-human sounds is one that pervades Schafer's *The Tuning of the World*. He claims that greater interdependence between humans and their surroundings would ultimately lead to "the recovery of positive silence."[104] A "positive" silence is the same type of silence that Emily Carr observed of old-growth forests in Coastal British Columbia. That type of silence, as Schafer, Westerkamp, and Carr view it, is one that is restorative. Human sounds are still welcome, of course, but they are on scale with other sounds in the environment. Westerkamp demonstrates this aesthetic in a hi-fi environment such as Lighthouse Park by speaking quietly and unstrained for the duration of the walk. In contrast, a seaplane masks quieter sound sources when it passes directly overhead, temporarily transforming the Park into a lo-fi environment.

Westerkamp understands listening and sound performance as "orientation" and "dialogue," respectively. Orientation characterizes moments when the composer is focused on the sounds around her (i.e., she is deliberately quiet and often still). This entails both stationary moments and instances where the microphone is used to explore a specific sound source. Dialogue emerges when the composer responds to sounds inherent in the environment through sound performance. *Lighthouse Park Soundwalk* may be divided into five broad sections according to the composer's use of orientation and dialogue (see Diagram 2.5).

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[104] Schafer, *The Tuning of the World*, 258.

Section	Time	Mode	Specific Actions
1	0’00”–6’06”	Orientation	Fade-in, pause, welcomes listeners
2	6’07”–19’45”	Dialogue	Series of quotes read aloud
3	19’46”–26’59”	Orientation	Explores the acoustic properties of a stream using the microphone, walking, occasional pause
4	27’00”–31’29”	Dialogue	Quote, strikes rocks, quote, throws sticks
5	31’30”–36’30”	Orientation	Walking with occasional pause, greets passerby, fade-out

Diagram 2.5 Formal Overview of *Lighthouse Park Soundwalk*.

As shown above, orientation and dialogue become more varied as the work progresses. The first section consists primarily of stationary field recordings. In the third section, there is more physical movement—the composer is heard walking and the microphone is used to scan the surface of a small stream. By the fifth section, passages marked by the sounds of footsteps are more frequent and longer. While Westerkamp pauses several times near the end the work, these moments are significantly shorter than those found at the start of the composition. As well, dialogue in the second section is limited to spoken voice. In the fourth section, however, Westerkamp extends her sound making beyond physiological sounds to include performance with found objects.

Extending the Ear through the Microphone

Westerkamp uses the microphone to both document a soundwalk and to create a heightened experience of environmental sounds. The composer directs the microphone according to her listening—she monitors the recording through headphones (Cardiff does as well; Simpson does not). The microphone brings attention to acoustic information that is not easily—or perhaps instinctually—recognizable by ear alone. In the composer’s words:

> At the point when the ear becomes disconnected from direct contact with the soundscape and suddenly hears the way the microphone "hears" and the headphones transmit, at that point the recordist wakes up to a new reality of the soundscape. The sounds are highlighted and the ears are alerted precisely because the sounds are on a recording.[105]

By amplifying environmental sounds using technology and highlighting them as important through audio documentation, Westerkamp transforms a hi-fi environment such as Lighthouse Park into a trove of "undiscovered" sounds.

There is one moment in *Lighthouse Park Soundwalk* where the composer demonstrates how the microphone can be used to experience the acoustic details of a sound source. At 20'48", she positions the recording device at the edge of a small creek. The proximity of the microphone to the water shifts the listening focus from a broader field of forest sounds to a microcosm of liquidity. Westerkamp proceeds to scan the stream for complex timbral features that may stand out.[106] For a brief moment, we are seemingly transported "inside" the sound source. However, just as the microphone starts to highlight intricate timbral qualities of the stream, an aircraft enters the acoustic space (at 22'10"). Not long after, Westerkamp retreats from the stream (at 22'55"). The sound of flowing water encourages listeners to focus *inward*, whereas planes direct attention *outward*—they literally fill acoustic space and redefine the scale of the Pacific Northwest soundscape. Pausing to record the stream up close, Westerkamp shares her brief

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[105] Hildegard Westerkamp, "Speaking from Inside the Soundscape," in *The Book of Music and Nature*, ed. David Rothenberg and Marta Ulvaeus (Middletown, CT: Wesleyan University Press, 2001), 148.

[106] The composer explains her approach to recording in a recent interview with Cathy Lane: "The moving microphone is very much my preference—guiding me and the listener through an environment. I always monitor with headphones while recording the sounds so that my listening guides the microphone. Even though I might have a certain intent beforehand, often the environment suggests all sorts of other possibilities and I will follow some of those spontaneously. Water is always a good example: imagine yourself at a river recording it from a more distant perspective and then you zero in on a certain part of the water flow by gradually moving the mic towards it, until you are so close that you can only hear this one water gesture. Then you move equally close to other flow formations and explore the fabulous variety of individual water voices that make up the sum total of the river sound at that location where you are recording." Cathy Lane and Angus Carlyle, eds., *In the Field: The Art of Field Recording* (Axminster, UK: CriSAP, 2013), 118.

private encounter with a complex nature sound with her audience. This intimate listening experience may transmit to listeners the reward of taking time to orient themselves with the nuances of the more delicate sounds of nature.

Speaking Back to the Soundscape

Westerkamp's response to noise pollution in 1970s Vancouver is not dissimilar to Emily Carr's encounter with the clear-cutting of forests around Victoria, British Columbia, in the 1930s. Westerkamp's critique of the soundscape—through her recitation of quotes about the former quietude of the Pacific Northwest forest—pits the natural environment against the Western conception of economic progress. Vancouver experienced a growth spurt in the 1960s, which included, among other large-scale projects, the completion of the Vancouver International Airport main terminal in 1968. Comparably, Carr viewed the coastal forest of the Pacific Northwest as intimate and spiritual, whereas most settlers saw it as untamed and challenging, yet bountiful as a resource. The tension between these views is reflected in her forest paintings from the 1930s and 1940s. For example, in *Logged-over Hillside* (Figure 2.5) Carr visualizes both the vitality of the landscape (reflected in the exposed saplings, open sky, and impressive light) and the aftermath of clear-cutting (marked by mangled stumps and lone trees—some alive, others dead).[107] Several of Carr's short stories also present opposed perspectives of the land. For example, in "Silence and Pioneers" two vivid descriptions of a pre-colonized Pacific Northwest forest bookend a series of stories about the rewards and struggles of colonial life on Vancouver Island.

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[107] For a detailed discussion of Emily Carr's paintings of clear-cut forests in the context of logging in British Columbia cir. 1930, see Andrew Hunter, "Emily Carr: Clear Cut," in *Emily Carr: New Perspectives on a Canadian Icon*, ed. Charles C. Hill, Johanne Lamoureux, and Ian M. Thom, 200–47 (Vancouver: Douglas & McIntyre; National Gallery of Canada; Vancouver Art Gallery, 2006).

Figure 2.5 Emily Carr, *Logged-over Hillside*, c. 1940, oil on wove paper, mounted on plywood 59.6 cm x 87 cm, purchased 1947, National Gallery of Canada, Ottawa, Photo © National Gallery of Canada, used by permission.

Westerkamp reads aloud excerpts from Carr's short stories and journal entries in order to "speak back" to the soundscape. At times, Carr's words are used to iterate the natural state of the forest; that is, where loud machine sounds are absent. On several occasions, the composer speaks directly to a passing seaplane that interferes with her listening or jeopardizes the audibility of her voice. It is here that Westerkamp creates a dichotomy between the "natural" profile of the Park and the "unnatural" presence of mechanical noise. Such is the case at 27'00", when Westerkamp reads aloud the opening passage from Carr's "Silence and Pioneers."[108] The loudest plane in the

[108] "The silence of our Western forests was so profound that our ears could scarcely comprehend it. If you spoke your voice came back to you as your face is thrown back to you in a mirror. It seemed as if the forest were so full of silence that there was no room for sounds. The birds who lived there were birds of prey—eagles, hawks, owls. Had a song bird loosed his throat the others would have pounced. Sober-coloured, silent little birds were the first to follow settlers into the West. Gulls there had always

piece passes overhead while Westerkamp recites prose about the former quietude of the Pacific Northwest. Strikingly, the composer remains calm in speech; she does not strain to match the decibel levels of the encroaching plane.

Where Westerkamp reads texts to respond to the soundscape, specifically the human-associated sounds in that space, she performs on found objects as a way to inquire into the acoustic features of the land itself. For example, at 29'26" she strikes two rocks together in order to stimulate the acoustics of the surrounding terrain.[109] At 30'47", Westerkamp throws two sticks immediately following the recitation of an excerpt about the preservation of nature through human storytelling (source unknown). Both gestures assert human presence in the forest on the scale of a hi-fi environment. Unlike a seaplane, which fills a large area of space with sound, the acoustic profile of the stick is limited to a relatively small area. Along similar lines, the details of forest acoustics (as activated by the rocks) are best heard in low ambient noise conditions. The sound of planes in the context of a forest reserve invites listeners to revisit the social meaning of

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been; they began with the sea and had always cried over it. The vast sky spaces above, hungry for noise, steadily lapped up their cries. The forest was different—she brooded over silence and secrecy." Carr, *Hundreds and Thousands*, 119.

[109] This section of the piece is reminiscent of Pauline Oliveros' *Sonic Meditations*, exercise VII "Removing the Demon or Getting Your Rocks Off" (1974) and Hugh Davies' *Sounds Heard at La Sainte-Baume*, exercise VII (1974). Oliveros directs a group of performer-listeners to "sit in a circle with persons facing in and out alternately." Each person strikes a pair of rocks together, building energy to the point where a pre-decided word is shouted. Oliveros, *Sonic Meditations* (Baltimore, MD: Smith Publications, 1974), 3. Davies' work consists of a series of seven listening and sound-making directions in different environments, the last exercise reads: "In a small secluded valley high up in the mountains, surrounded by rock on all sides: strike two stones together in regular rhythms at different speeds, sometimes with accelerando or ritardando, relating these in various ways to the echoes you hear. Face in different directions, to vary the direction and time-delay of the echoes. Invite other people to join in." Hugh Davies, *Sounds Heard: A Potpourri of Environmental Projects and Documentation, Projects with Children, Simple Musical Instruments, Sound Installations, Verbal Scores, and Historical Perspectives* (Chelmsford, UK: Soundworld Publishers, 2002), 44.

nature spaces. Does the sound of planes disrupt the idea of wilderness? Or is the overall ambience level of nature spaces not significant in what defines a natural environment?[110]

Making Room for Nature's Quiet Sounds

Lighthouse Park Soundwalk prioritizes listening to the environment with an awareness of what is present and arguably what is threatened. The composition begins with Westerkamp focused on the act of observation. After an extended exercise in active listening, she enters into sound performance (dialogue) with her surroundings. As a mediator between the environment and her radio audience, Westerkamp sets out to condition listeners to their immediate environment and, more specifically, remind them of their sense of duty to maintain a healthy, balanced soundscape. At the same time, several dualities exist in *Lighthouse Park Soundwalk*. These include pristine wilderness/destructive humanity (i.e., noise pollution), inward/outward listening (manifest by the water-seaplane example), and lo-fi/hi-fi environments (demonstrated by the general ambience of the Park, the volume of sounds made by Westerkamp, and those of the overhead aircraft). These dualities are established through her recitation of Emily Carr's text, her use of the microphone to explore the sound of flowing water, and her approach to stimulating found objects.

Westerkamp presents the Pacific Northwest forest as a place of stillness, a place where

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[110] Westerkamp is among several artists who advocate for the preservation of hi-fi nature soundscapes in their work. Others include Gordon Hempton and Bernie Krause. In part from the efforts of Hempton and Krause, The United States National Park Service has taken steps to reduce disruptive human-associated sounds on federal land (air traffic, ATV use, etc.) as well as promote the importance of sound in the overall experience of nature. See "Soundscape/Noise – Yosemite National Park (U.S. National Park Service)," http://www.nps.gov/yose/naturescience/soundscape.htm (accessed 21 February 2014); and "The Olympic Wilderness: If Wilderness Could Speak," https://www.youtube.com/watch?list=PL25wdAnxwH ZBeTALEmWutIM4dxB_lpJnB&v=r40Tmvdsg-4 (accessed 21 February 2014).

quiet was once respected but is now threatened by the domination of seaplanes and other man-made noises. To reiterate her concern for the overall "health" of the soundscape, Westerkamp privileges the quieter sounds of nature and stresses the radio as a productive medium for raising public awareness to them:

> If we can hear the small, quiet sounds of nature amplified on radio or in any electroacoustic context[,] we may understand that even these less perceptible sounds have an important place in the environment as a whole and warrant respect and protection. The small, quiet sounds in the natural environment are symbolic of nature's fragility, of those parts that are easily overlooked and trampled, whose significance in the ecological cycle is not fully understood.[111]

Technology provides Westerkamp with the tools needed to access these delicate sounds. Listening through headphones to sounds heightened by a microphone invites reflection, which encourages response through sound performance. For the composer, technology is also a way to raise awareness of the environment, encouraging audiences to forge a relationship with their immediate surroundings through sound. Upon turning off the radio, audiences are left where they started, with an invitation to listen more attentively to the soundscape. As the recorded environment ends, a living sonic environment begins.

Sounds Made: Dallas Simpson, *The Adoration of Willow*, "Stoke Bardolph"

Since the mid-1990s, Dallas Simpson has developed a practice of live environmental performance. These improvisations are conducted alone, often in the early morning or late at night, and with little or no preplanning. The majority of Simpson's performances have taken place in England. The sites include a forest reserve (*Aquapump*, 1997), several churches (*Sacred Thresholds*, 2013), and a railway tunnel and viaduct (*Monsal Head*, 2014). Simpson enters into contact with materials found on site using primarily his hands and feet. A number of the objects

[111] Westerkamp, "Radio that Listens," 91.

he uses are natural (e.g., feathers, rocks, and twigs), but Simpson also performs with man-made items. Examples include a metal bucket and nails driven into a tree in *The Adoration of Willow* (1996–98). On occasion, he interacts with historical remnants. Such is the case with World War II machinery in *For Alderney: Invasion, Occupation, Liberation, Reconstruction*, *and Incantation* (2000) and third-century Roman mosaics in *The South Downs* (2013).[112]

The Adoration of Willow is a series of four improvisations at different sites in the floodplain of the River Trent near Nottingham. Each performance is titled after a nearby town or village. Simpson initiated this project in 1995 with his "Kneeton" improvisation, which was followed, in order, by "Colwick," "Shelford," and "Stoke Bardolph" (see Figure 2.6). The series is a tribute to the willow tree, as the title suggests. The willow has a rich history that can be traced to Ancient Egypt and Greece. In England, the species has been used to control erosion, harvested to make baskets, fishing nets, and other items, and consumed for medicinal purposes.[113] The willow tree is associated with a wide range of themes in the arts. These include lost love in Shakespeare's *Othello* (Act IV, Scene 3, "The Willow Song"), wisdom in Hans Christian Anderson's *Under the Willow Tree* (1853), and superstition in the British folk song *The*

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[112] Simpson explains that his mother's audio diaries were an important influence on the development of his practice: "I was greatly inspired by my mother's (Peggy Simpson) audio diaries, in the 1970's and 80's, which consisted of a vocal narrative, emotive and subjective descriptions of locations that my mother made on location, recorded directly to a portable cassette recorder. She has a unique style, which I could not emulate, so I tried to find a way of 'allowing the environment to speak for itself'. In other words, how could I facilitate the environment to speak 'directly', without using any vocal narrative, and hence create a sonic reality, a unique, creative sonic 'voicing' of the environment?" Dallas Simpson, "Live Location Environmental Binaural Performance: An Artist's Outline of an Evolving Theory and Practice," unpublished manuscript, last modified 2 January 2014, Microsoft Word file.

[113] Reverend Edward Stone (1702–68), the claimed discoverer of salicylic acid (the active ingredient in aspirin), was prompted to research the medicinal properties of the willow during a walk near Chipping Norton, Oxfordshire. Stone was suffering from various "agues," and he claims that by chewing on a small piece of bark his discomfort was eased. Stone would go on to distribute powdered bark from pollarded willow trees to individuals suffering from pain and/or fever. John M. S. Pearce, "The Controversial Story of Aspirin," *World Neurology: The Official Newsletter of the World Federation of Neurology* (December 2014), http://www.worldneurologyonline.com/article/controversial-story-aspirin/ (accessed 22 January 2016).

Banks of Green Willow.

Many of the willow trees located in the floodplain of the River Trent are gnarled, split, and twisted as a result of pruning and weather (see Figure 2.7). Some are now partly submerged due to human modification to both the watercourse and the surrounding land.[114] The River has been re-routed for the navigation of ships, while the floodplain has been excavated for gravel and cultivated for agriculture. Many former excavation sites are now restored as nature conservation areas and public parks, including the location where Simpson's Colwick performance took place. Although some listeners may regard the performance sites in the series as natural areas, human intervention is apparent in the terrain (see Figure 2.6).

Figure 2.6 Aerial View of *The Adoration of Willow* Performance Sites.

[114] The River Trent has a rich history as a trade route, boundary (the River has historically divided England and Scotland), and material resource (e.g., dredging for roadways, energy for grain mills, and moist, nutrient rich banks for willow holts). For more information, see Richard Stone, *The River Trent* (Chichester, West Sussex, England: Phillimore & Co., 2005).

Figure 2.7 Willow Trees at "Kneeton" Performance Site, 1995. Image by Dallas Simpson. Used by permission of the artist.

Each work in *The Adoration of Willow* begins with a walk-in to the performance site, is followed by an improvisation using found objects, and concludes with a walk-out to the start location (refer hereafter to Figures 2.8 and 2.9).[115] Both the start/end location and the performance site for *The Adoration of Willow*, "Kneeton," "Colwick," "Shelford," and "Stoke Bardolph" are also similar: a road bordering a field and a copse of willow trees, respectively. Yet, the environmental sounds present during the walk-in and walk-out sections of each performance are different. For example, bird activity dominates those sections in "Shelford," whereas sheep vocalization is prominent in "Stoke Bardolph." The duration of the walk-in and walk-out for each composition also varies, ranging from approximately five ("Shelford") to fifteen minutes ("Stoke Bardolph"). The physical distance between the start/end location and the

[115] Simpson uses this same three-part structure for other art-based walks. With certain performances, the transition between sections marks both a change in the types of sounds heard and in spatial acoustics. See, for example, *Sacred Threshold* and *Monsal Head*.

performance site combined with moments where Simpson pauses to listen explain the varying lengths.

Figure 2.8 Aerial View of "Shelford" Performance Site.

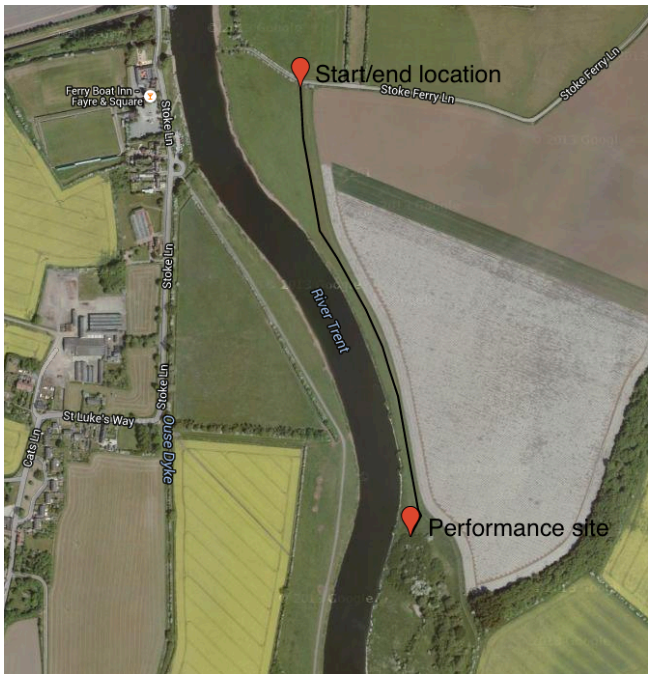

Figure 2.9 Aerial View of "Stoke Bardolph" Performance Site.

"Stoke Bardolph" begins with active listening, a technique that is also used at the outset to Westerkamp's *Lighthouse Park Soundwalk*. However, a key difference between the opening passages of the two works is how the act of listening is presented on the recording. Westerkamp holds two condenser microphones stationary when paused. As mentioned earlier in this chapter, one exception is when she guides the microphone over a water stream in an effort to capture its rich acoustic properties. Simpson, on the other hand, choreographs the position of sounds in acoustic space through subtle body movements, such as head and torso rotation. For example, at 3'50" he pauses to listen as a flock of sheep approaches from the right. Then, at 4'39", Simpson turns 90 degrees to face the flock. The in-ear binaural microphones heighten the location of sheep vocalizations in the left and right channels, a contrast from the strong center channel in *Lighthouse Park Soundwalk*—the result of using two condenser microphones in an X–Y configuration. Two distinct groups of sheep stand out, creating a call-and-response-like effect; that is, until 5'20" when Simpson turns back towards the copse of willow trees and continues walking.

As Simpson makes his way to the performance site, there is a gradual change in the external sounds heard (i.e., sounds not made by Simpson). Birdcalls and songs replace sheep vocalizations as the dominant environmental sound approximately six minutes into the recording; however, sheep are occasionally audible in the distance (e.g., 8'30", 9'20", and 10'24"). There is also a change in terrain and walking pace. At 10'45", Simpson passes through a gate and descends from the dike into the flood plain. This is audible on the recording as a transition from grass to brush. Simpson slows his pace and starts to drag his feet as he prepares to conduct his improvisation in the willow copse.

Classifying Sounds in the Willow Copse

Upon his arrival at the performance location, Simpson starts to activate materials found on site using his hands and feet. Over the course of approximately twenty-five minutes (the duration of the on-site performance), he explores the acoustic properties of individual objects and surfaces, performs with two or more materials simultaneously, and on occasion uses a found object to interact with other sounds in the environment. Based on these different techniques, Simpson's creative approach to sound performance suggests a detailed exploration of the sonic properties of physical surfaces such as rock, water, and wood.

A logical way to categorize sounds heard during the on-site performance is according to their source and the means by which they are created:

> Source
> Air: wind through trees, Simpson whipping a stick
> Animals: sheep, birds, insects
> Earth: metal nail, stone
> Water: contact between Simpson and a pool of water, rain
> Wood: leaf, bark, twig, branch, trunk
>
> Mode of disturbance
> Hands: tap, pat, rub, snap (breaking object), throw, whip, pat
> Feet: step, stomp, drag, snap
> Object (i.e., bringing two objects into contact): rubbing, tapping, striking, throwing

Simpson connects sounds both heard and made to the four classical elements. He writes:

> [T]here are somewhat obscure allusions to elemental realms—earth, water, air, and fire—in varying combinations, proportions and duration. [For example:]
> Earth: footsteps treading the ground
> Air: birdsong, birds in flight, sounds of wind
> Fire: breath of animals, animal calls, my breathing
> Water: squelch of water underfoot, running water[116]

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[116] Dallas Simpson, e-mail correspondence with the author, 27 May 2013. Barry Truax is another composer that has linked environmental sounds to the classical elements. Truax's album *The Elements and Beyond: Soundscape and Electroacoustic Works* (2014) presents a cycle of four soundscape compositions inspired by water (*Chalice Well*), fire (*Fire Spirits*), air (*Aeolian Voices*), and earth (*Earth and Steel*).

Some sounds are more strongly tied to an element than others in "Stoke Bardolph." For example, listeners are likely to attribute liquid water (flowing, dripping, splashing, etc.) to the element of the same name. In contrast, animal vocalization is more difficult to associate with a specific element. Some listeners may designate animal calls a symbol of air on the basis that air passing through the syrinx vibrates the walls of the vocal organ to produce sound, while others may connect it to fire given that animal breath is warm. Simpson categorizes animal calls under both elements. Several passages create a dialogue between two sounds, each alluding to a different element. Such is the case from 22'50"–23'40" where Simpson whips a branch while moving in a water pool (air and water).

Simpson creates a vocabulary of sound types through his engagement with found objects. This vocabulary is revised with each subsequent performance in *The Adoration of Willow* series. Some techniques figure prominently in all four improvisations, such as rubbing hands over bark and tapping stones on tree trunks. Other approaches to sound performance are used primarily in early works in the series, especially playing metered rhythm. For instance, from 22'44"–23'07" in "Colwick," Simpson whips a branch and taps a stone against a log in such a way that he creates an interlocking pattern of eighth and sixteenth notes organized in 2/4 meter. Metered rhythm is absent from "Stoke Bardolph," as it is difficult to discern a recurring pattern with stressed beats. Simpson occasionally taps a steady rhythm (often repeated eighth notes) in order to activate an object with distinct timbral properties, such as a hollow log. In this way, rhythm is used in "Stoke Bardolph" to direct attention to timbre, whereas strict rhythm is emphasized in "Colwick."

Although "Stoke Bardolph" was recorded in close proximity to the River Trent, the river is not audible on the recording. Instead, water sounds are created by Simpson's movement

through a pool of water in the floodplain. Several times during the performance he alternates between standing in the water pool and at the base of a willow tree. Simpson's movement between the pool and dry ground captures the proximity of the water to the tree while also organizing the twenty-five minute on-site performance into discrete sections (see Diagram 2.6). From 20'16"–29'15", Simpson alternates four times between the two locations at increments of approximately two minutes. However, from 29'15–39'00" he remains on dry ground for approximately ten minutes, the longest time spent at a single location in the willow copse. His decision to remain on dry ground for an extended period is explained perhaps by the reason that he is drawn to materials that he has not yet explored. Simpson steps into the water a final time, and only briefly (39'00"–40'20"), before returning to dry ground in preparation for the walk-out.

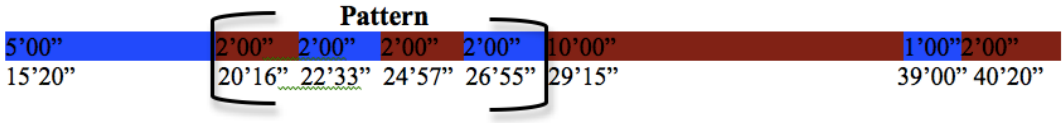

Diagram 2.6 Formal Overview of the On-site Performance in "Stoke Bardolph." Sections in blue represent the water pool; those in dark red correspond to dry ground. The times set against the colored strips represent the approximate duration spent at a location; those below the colored strips mark the arrival at a location.

Not only are environmental sounds intentionally organized through this periodic movement between physical spaces, but also a pattern seems to emerge from this repetition. This pattern is one that is imposed on the environment by Simpson, rather than one modeled after nature. Yet, his alternation between the dry ground and the water pool directs attention to the ecology of the willow copse, in particular the symbiotic relationship between a willow tree and a flood plain. A willow provides biofiltration, soil erosion control, and wildlife habitat, while a flood plain has the moist soil needed for a willow tree to thrive. Simpson's movement between the two locations also enhances listeners' perception of the elements earth and water. Reference is made to these two elements through his engagement with dry and wet surfaces. Listeners can

trace Simpson's movement between the physical spaces as well as focus on his combination of water sounds with materials sourced from dry ground, such as a rock, twig, or branch. In this way, the elements water and earth are understood in relation, rather than in isolation.

The Relational Properties of the Willow Copse

Simpson's use of sound performance highlights not only the sonic characteristics of materials found on site but also the relational properties between the willow tree, his body, and the surrounding landscape. He often performs with individual parts of a tree—a leaf, twig, branch, or trunk. Attention is directed to the tree as a larger formation through his activation of leaf and wood materials. This component-whole relationship is revealed gradually over the course of "Stoke Bardolph," rather than through the immediate succession of sounds.

The relationship between Simpson's body and the willow copse is more subjective than that between a tree and its parts. Simpson deliberately reduces his physical presence in one way, while consciously emphasizing himself in another. He removes coughing, breathing, and swallowing from the recording using post-production techniques. This erasure of internal bodily sounds enables Simpson to place greater focus on his contact with the surrounding environment through touch. There are several passages in "Stoke Bardolph" where he performs for an extended period of time with a specific body part. His choice is such that human anatomy corresponds to tree structure. For example, he uses primarily his fingers to play with leaves and twigs, and his palms and forearms to perform on branches and trunks.

The interconnection of the tree and a nearby water pool are also captured in "Stoke Bardolph." This is perhaps most apparent when Simpson takes different parts of the tree with him into the water. For example, at 15'20", he flicks one end of a fallen twig with his fingers while wading in the pool. At 22'33", he picks up a branch from the ground and carries it into the

pool, which he then whips in the air. During one passage, Simpson uses a found object to interact with an external sound, a technique present in other works in the series. From 29'30"–29'40", he taps a stone against another rock surface in response to a distant train. The pattern created by the rock taps loosely corresponds to the distant sound of train wheels striking the space between segments of track. Simpson's interaction with the train gradually shifts from striking the rock to rubbing it, first against stone and later on wood. Westerkamp uses a similar technique in *Lighthouse Park Soundwalk* when she recites excerpts from Emily Carr's collection of short stories *The Book of Small.* However, Simpson's approach is one of mimicry, whereas Westerkamp comments on sounds in her immediate environment through speech.

Interaction with external sounds extends to animals in *The Adoration of Willow*, "Shelford," a technique not used in "Stoke Bardolph." Starting at 30'19" in "Shelford," Simpson responds to a flock of Canada geese by patting his hands on the surface of a pool of water. The spatialization of sounds and the correlation between geese calls and Simpson's water pats stand out on the recording. The geese are first heard in the right channel, gradually pan to left, and then return to the right. However, listeners do not hear the geese as if they were in flight, given that there is no Doppler effect as the birdcalls move across the stereo field. A more plausible explanation for the panning is that Simpson is turning his head with microphones in ear. Similar to the walk-in in "Stoke Bardolph" (where sheep vocalizations were prominent), the on-site performance in "Shelford" captures both animal activity and Simpson's active listening.

There is a strong pulse or even a pattern to the geese calls in "Shelford" (see Figure 2.10). This musical quality is heightened when Simpson starts patting on the water. Several of his pats align with the geese, while others fall slightly before or after. Although the water pats may heighten listeners' awareness of the geese, the volume level is such that the birds are unlikely to

hear Simpson's sound making. Even less probable is that the geese, presuming that they do hear Simpson's sounds, are consciously responding to him. This perceived moment of dialogue entails a one-way association where Simpson is making a connection that is not necessarily heard or reciprocated by the animals to which his own sound making is directed. Nonetheless, listeners may interpret this rhythmic interplay as communication between species.

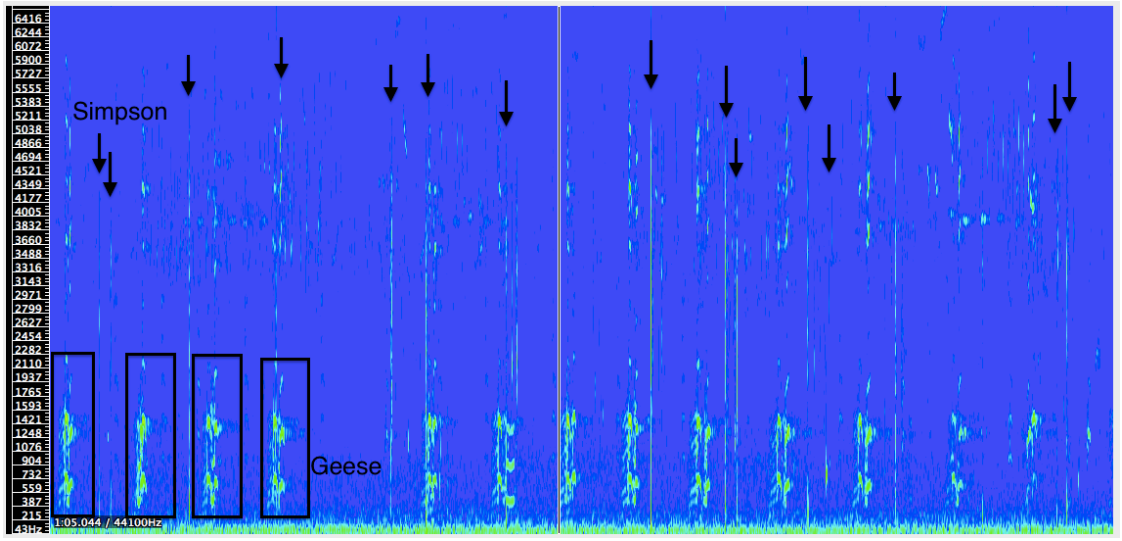

Figure 2.10 Simpson's Interaction with Canada Geese in "Shelford" from 30'19"–30'45".

Simpson's use of sound performance in this passage sheds light on his understanding of animals in the environment. His attempt at synchronization with the geese is an effort to connect with them through sound, perhaps even to speak their "language." Yet, he is not using his voice to imitate the geese, but is instead activating an external surface. Simpson's contact with the water enables him to create a link between not only himself and the geese but also between the pool and the birds. Simpson's approach is different from artists who use musical instruments as well as techniques, such as melody and phrasing, to interact with animals. For example, David

Rothenberg uses wind instruments and electronics to perform with birds, insects, and whales.[117] In contrast, Simpson uses basic rhythms that mimic the geese without adding human musicality or expressivity.

"Stoke Bardolph" and other works in *The Adoration of Willow* series invite listeners to consider relational properties in the environment through sound performance. In this line of thought, Simpson's engagement with objects and surfaces in the willow copse as well as his interaction with other sounds in the area represents a relational epistemology.[118] According to philosopher Barbara Thayer-Bacon:

> A relational (e)pistemology emphasizes the transactional nature of knowing in a variety of ways. Most important, it emphasizes the connections knowers have to the known and helps us understand that we are not spectators to Reality reporting on "it;" we are part of this world, this universe, affecting "it" as we experience "it."[119]

Self-awareness of one's role in shaping the environment is one idea that is central to Simpson's

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[117] Rothenberg often releases his albums in tandem with a book. See, for example, *Why Birds Sing*, *Whale Music*, and *Bug Music.* Other examples of interspecies music include R. Murray Schafer's large-scale outdoor theatre work *The Princess of the Stars* (see Chapter Three), Jim Nollan's waterphone improvisations with orcas off the coast of British Columbia, and Paul Winter's saxophone duets with animals in National Parks in the United States. It is tempting to regard interspecies music as an aesthetic exchange; that is, that certain non-human animals produce and experience sounds for pleasure, and that humans can participate in this experience. Yet, animal communication does not always complement musical collaboration. Take for example, Paul Winter's "Elk Horns" (from his Grammy-winning 1994 album *Prayer for the Wild Things*). The track opens with an alternation between soprano saxophone and a nearby elk. In the context of human music, the elk is a performer. However, in terms of animal communication the animal is responding to Winter in defense—the bugle of an elk is a signal of territorialization.

[118] The majority of existing scholarship on relational epistemology focuses on human interaction. See, for example, Nurit Bird-David, "'Animism' Revisited: Personhood, Environment, and Relational Epistemology," *Current Anthropology* 40 (1999): 67–91; and Joanne Brownlee and Donna Berthelsen, "Developing Relational Epistemology through Relational Pedagogy: New Ways of Thinking about Personal Epistemology in Teacher Education," in *Knowing, Knowledge and Beliefs: Epistemological Studies across Diverse Cultures*, ed. Myint Swe Khine, 405–422 (New York: Springer, 2010).
Jeff Todd Titon encourages ecomusicologists to consider using a definition of nature that is grounded in relational epistemology; that is, music and sound research driven by ecological models of "diversity, interconnectedness, and co-presence." Titon, "The Nature of Ecomusicology," 8. See Chapter Three for a discussion of co-presence in R. Murray Schafer's *Princess of the Stars*.

[119] Barbara Thayer-Bacon, "A Pragmatist and Feminist Relational (e)pistemology," *European Journal of Pragmatism and American Philosophy* 2, no. 1 (2010): 17. Thayer-Bacon puts the "e" in parenthesis in order to ground the term in daily life. Ibid., 2.

approach to outdoor improvisation. He explains:

> [T]he artist must be in a continual state of awareness in assessing the fragility or robustness of the location and to judge what is appropriate or inappropriate behaviour, while equally assessing when to remain respectfully silent and when the location invites participation, the latter perhaps being more appropriately described as spiritual judgments."[120]

Simpson's attention to both sonic and visual stimuli informs his decisions regarding where to go, when and how to interact with objects and surfaces, and when to pause and listen. With this approach, he is aware of not only his surroundings but also his physical presence in the environment. In a rural setting such as Stoke Bardolph, Simpson treats the materials used in his performance with care and respect. He is mindful of when and how to generate sounds in addition to the impact of his physical movement on the flora and fauna in the willow copse.[121]

In addition to an awareness of self and the environment, "Stoke Bardolph" exhibits an exchange between Simpson and his surroundings. This "transaction" (to borrow from Thayer-Bacon) is exemplified by his interaction with other sounds, such as a distant train and nearby geese. These passages do not entail an actual exchange (i.e., where Simpson's sounds elicit a response from another source), but are instead an allusion to one. In each example, Simpson coordinates his own sounds to others through rhythm and timbre. This use of basic musical elements is less interpretive than speech. Through his focus on the sonic properties of materials, rather than on their semantic meaning, Simpson avoids reducing nature to human systems of

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[120] Dallas Simpson, "Aspects of Environmental Binaural Performance," *The World Forum for Acoustic Ecology Newsletter* 9, no. 6 (2012): 4.

[121] It is rare for Simpson to throw or break objects when performing in nature. The only such moment in "Stoke Bardolph" is at 33'15" when he breaks a stick with his hands. This action follows his interaction with the distant train using the rock. One interpretation is that by breaking the stick Simpson shifts focus away from the distant environment and back to the immediate space of the willow copse.

thought.[122]

In line with relational epistemology, "Stoke Bardolph" breaks down the familiar discourse of the environment as a collection of material objects by directing attention to the cohabitation of the perceiver and the perceived. Neither is Simpson a passive subject or the willow tree a mundane object. He transforms the willow copse from a material environment conceptualized in representational terms into a sensate space. Fallen branches, twigs, and stones are transformed from mute objects into creative tools, and the performance location is suspended as an area that functions to raise livestock and control flooding and is showcased as a vibrant space rich in musical properties and symbolism.

The Intersection of Physical and Spiritual Realities

"The primary attribute of live location performance is that it is centred around the experience of now as a continual state of communion with the physical realm."
— Dallas Simpson[123]

Some listeners may experience environmental sounds in "Stoke Bardolph" as pure sonic phenomena, while others may relate them to the rich history and symbolism of the willow tree. Simpson, for his part, connects the work to his Bahá'í Faith. He explains: "[the walk-in] alludes to the Valley of Search, a mystical journey representing the first stage in the progress of the soul and inspired from *The Seven Valleys* of Bahá'u'lláh, founder of the Bahá'í Faith." He continues:

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[122] This idea resonates with what Maurice Merleau-Ponty calls "the primacy of perception"; that is, an attempt to capture something before it is distorted by thought. For more on Merleau-Ponty's concept, see Merleau-Ponty, *Phenomenology of Perception*, trans. Donald A. Landes (New York: Routledge, 2012). See also Timothy Ingold, *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill* (London: Routledge, 2000). Simpson's approach also raises larger questions regarding the phenomenology of hearing. Arguably, the act of hearing involves pre-rational judgments regarding the identity—and even the meaning—of sounds. That is to say that it is perhaps more difficult to escape interpretation than Simpson's approach to found sounds suggests.

[123] Dallas Simpson, "Aspects of Environmental Performance," http://www.dallassimpson.com/statement.php (accessed 18 February 2016).

"The journey evolves to phases of exploration and discovery where transcendence and musicality is concentrated in time to brief single 'notes' that form the central pivot around which the work revolves."[124] Based on this outline, the three-part form of the work can be interpreted such that the walk-in is a procession to a sacred space, the improvisation is a discovery and exploration of that space using symbolic markers (found objects), and the walk-out is a recession from the site.

The "notes" referred to above are objects with pitched qualities, such as metal nails and twigs. It is possible to make pitched sounds using these materials due to their density and surface tension. Where the materials of a given object determine its density, either an environmental or human force can create surface tension. In other words, surface tension exists when one object is attached to another, such as a twig to a tree, or when pressure is applied to an object, for instance Simpson gripping a twig in his hand. In the context of *The Seven Valleys*, these "notes" are perhaps akin to water drops in The Valley of Knowledge (the third stage), where "[i]n the ocean he findeth a drop, in a drop he beholdeth the secrets of the sea."[125] In other words, these pitched objects can be heard as sacred "drops" in the "sea" that is the willow copse. Certain groupings of finger taps and foot stomps also take on spiritual significance when heard as an expression of Bahá'í Faith, in particular the number nine, a symbol of perfection. Applications include the nine-pointed star and nine-sided temples.[126] With this additional information in mind, Simpson's work invites interpretation as a ritual activity.

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[124] Dallas Simpson, e-mail correspondence with the author, 27 May 2013. Written in 1860, *The Seven Valleys* follows the journey of the soul through a series of realms leading closer to God. See Bahá'u'lláh, *The Seven Valleys and the Four Valleys*, trans. Ali-Kuli Khan, assis. Marzieh Gail (Wilmette, IL: Bahá'í Publishing Trust, 1952). For more on the life and writing of Bahá'u'lláh, see Adib Taherzadeh, *The Revelation of Bahá'u'lláh*, 4 vol (Oxford, UK: George Ronald, 1976).

[125] Bahá'u'lláh, *The Seven Valleys and the Four Valleys*, 12.

[126] Shoghi Effendi, *Directives from the Guardian* (Wilmette, IL: Bahá'í Publishing Trust, 1973), 414.

A ritual can be broadly defined as the repetition of a series of physical actions. However, there is debate concerning the function of rituals in society. The field of anthropology offers insight in this regard through the wide range of approaches. Victor Turner regards rituals as social processes that create a sense of cohesion among societal groups.[127] Clifford Geertz challenges the idea that rituals create unity. He argues instead that rituals present narratives that encourage humans to interpret their experiences and through that interpretation identify with a particular social group.[128] Yet a different position is taken by Don Handelman when he argues that rituals have no greater capacity to reveal social norms and trends than do other activities.[129] For Handelman, a more productive way to think about the concept is by distinguishing between two classes of rituals: models and mirrors. Models serve as a standard for how rituals are conducted. In contrast, mirrors reflect how the world is actually viewed by people. Historian Edward Muir summarizes Handelman's argument:

> In effect, rituals that mirror re-present someone or something in a public way. Such rituals can inform and incite emotions, clarify a situation, and even enact a passage from one status to another, but unlike a model they do not offer an alternative for the future constitution of society.[130]

Although Turner, Geertz, and Handelman approach the concept of ritual differently, they share the view that rituals are more than a series of abstract actions. Through the repetition, refinement,

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[127] Victor Turner, *The Ritual Process: Structure and Anti-Structure* (Ithaca, NY: Cornell University Press, 1969).

[128] Clifford Geertz, *The Interpretation of Culture* (New York: Basic Books, 1973). Geertz's perspective on ritual is informed by his view that culture is a semiotic concept. He writes: "Believing, with Max Weber [the historic sociologist], that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretative one in search of meaning. It is explanation I am after, construing social expression on their surface enigmatical." *The Interpretation of Culture*, 5.

[129] Don Handelman, *Models and Mirrors: Towards an Anthropology of Public Events* (Cambridge, UK: Cambridge University Press, 1990).

[130] Edward Muir, *Ritual in Early Modern Europe* (New York: Cambridge University Press, 1997), 5.

and rejection of steps within a series of acts over time, a ritual takes on meaning that both defines groups of people and also raises larger questions of authority and power within a society.[131]

Of interest here are the ways in which actions inform the concept of ritual. According to David Parkin, rituals stand apart from other formalized acts for the reason that they are driven by physical movement, rather than by speech. He writes: "Ritual is a formulaic spatiality carried out by groups of people who are conscious of its imperative or compulsory nature and who may or may not further inform this spatiality with spoken words."[132] The repeated enactment of a ritual helps to affirm that the function and meaning of actions therein are acknowledged and agreed upon by its participant(s). However, no two enactments are the same. This is for the reason that both steps carried out and social and environmental conditions vary from performance to performance.[133]

"Stoke Bardolph" showcases the repetition and variation of formalized actions central to the concept of ritual. That work maintains the three-part structure of "Kneeton," "Colwick," and "Shelford" and also presents some of the same performance and recording techniques used in earlier works. These include rubbing hands and tapping fingers on parts of trees and

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[131] For a rich discussion of ritual as a force in shaping Western culture, see Muir, *Ritual in Early Modern Europe*. Muir examines how the concept of ritual transformed the concepts of time, body, and spirituality in Christian Europe from 1400–1700. He argues that it was over the course of those three centuries that the concept of ritual emerged as a distinct activity.

[132] David Parkin, "Ritual as Spatial Direction and Bodily Division," in *Understanding Rituals*, ed. Daniel de Coppet (London: Routledge, 1992), 18. Parkin makes this assertion in response to Claude Lévi-Strauss' claim that ritual action is empty of words and is therefore irreverent when compared to myth. According to Lévi-Strauss: "The value of the ritual as meaning seems to reside in instruments and gestures: it is a *paralanguage*. The myth, on the other hand, manifests itself as a *metalanguage*; it makes full use of discourse, but does so by situating its own significant oppositions at a higher level of complexity than that required by language operating for profane ends." Quoted in Parkin, "Ritual as Spatial Direction and Bodily Division," 11.

[133] Stanley Jeyaraja Tambiah, "A Performative Approach to Ritual," *Proceedings of the British Academy* 65 (1979): 115. For more on ritual and performance, see Michael Bull and Jon P. Mitchell, eds., *Ritual, Performance, and the Senses* (London: Bloomsbury, 2015); and Ronald L. Grimes, "Ritual Theory and the Environment," in *Nature Performed: Environment, Culture and Performance*, ed. Bronislaw Szerszynski, Wallace Heim and Claire Waterton, 31–45 (Malden, MA: Blackwell Publishing, 2003).

choreographing sounds in the environment through head and torso rotation (i.e., movement of the binaural microphones). At the same time, there are differences. For example, the durations of the walk-in and walk-out sections differ among the four works in the series. Simpson also refines his approach to sound performance with each improvisation. Such is the case with his use of rhythm. Rhythm in "Stoke Bardolph" is used primarily to direct attention to timbre; in "Shelford" it is a way to interact with animals; and in "Colwick" it is organized into interlocking, metered patterns.

In line with the idea that speech is a supplement to ritual, spoken narration is absent from the walk-in and on-site performance in "Stoke Bardolph." However, speech plays an important role in the conclusion to the work. Upon his arrival at the end location, Simpson whispers three times: "Yá Bahá'u'l-Abhá" ("O Glory of Glories"). The phrase is used in the Bahá'í Faith as an expression of gratitude to God.[134] While many listeners (excluding those that identify with the Bahá'í religion) are unlikely to recognize Simpson's references to *The Seven Valleys*, the spoken prayer at the end of the work invites them to consider the previous sections in a spiritual light.

In addition to the spoken phrase at the end of "Stoke Bardolph," Simpson's use of physical objects with pitched qualities also serves a ritualistic purpose. Like ceremonial objects used in traditions around the world, those featured in Simpson's work serve as a link between physical and spiritual realities.[135] The power of these objects is generated from their pitched qualities. They are distinguished from other environmental sounds in that they present regular

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[134] *Bahá'í Reference Library*, http://reference.bahai.org/en/t/b/KA/ka-50.html (accessed 27 January 2016).

[135] For more on object function and meaning, see Sally M. Promey, ed., *Sensational Religion: Sensory Cultures in Material Practice* (New Haven and London: Yale University Press: 2014); Pierre Lemonnier, *Mundane Objects: Materiality and Non-verbal Communication* (Walnut Creek, CA: Left Coast Press, 2012); and Daniel Miller, "Artefacts and the Meaning of Things," in *Companion Encyclopedia of Anthropology*, ed. Tim Ingold, 396–419 (London, Routledge: 1994).

wave fluctuations (i.e., they are not categorized as "noise"). Based on this distinction, otherwise mundane items such as a metal nail or a twig are transformed into tools for expression.

At times, Simpson choreographs the location of a pitched object in acoustic space. Such is the case at 16'58"–17'32", when he alternates between flicking the tip of a twig near his left and right ear. A hollow D4 is produced by his activation of the twig with his finger. Since the sound of the twig does not pan across the stereo field it is difficult to know whether Simpson is turning his heard or moving the object. In other passages, Simpson directs attention to the intervallic space between them. From 17'43"–18'10", for example, he performs with a different twig (positioned to his right) while using his other hand to flick a piece of bark (to his left). An Eb4 is heard from the twig and a Bb3 from the bark, creating a perfect fourth.

The symbolism of pitched objects in these and other passages does not suggest transcendence to a spiritual realm, but rather a sacred presence in the immediate environment. Through his discovery and engagement with these "notes," Simpson cultivates a personal relationship between himself, the willow copse, and his Bahá'í Faith. He cultivates a spiritual bond with willow trees over the course of the four improvisations that make up *The Adoration of Willow*, an approach absent from the other two works discussed in this chapter. In *Lighthouse Park Soundwalk*, Westerkamp explores an old-growth forest threatened by noise pollution. She reads quotes as a way to create a dialogue between past observations of the Pacific Northwest soundscape and her own. In *Wanås Walk*, Cardiff projects a fragmented narrative onto the forest reserve and sculpture park where the audio walk is set. These composed sounds bring the forest to life with voices and sounds of the past while also blurring the boundary between what is real and what is imagined. Simpson does not conduct his walk in order to comment solely on the "reality" of the environment or to create a heightened experience of it. He instead creates a

private ritual wherein certain objects, surfaces, and locations emerge from the periphery of human attention and offer artistic, environmental, historical, and spiritual insight.

For Simpson, "Stoke Bardolph" is a spiritual experience, informed by his discovery of and engagement with "notes" and the association of these encounters with his Bahá'í Faith. Whether listeners will experience "Stoke Bardolph" as a sacred work depends primarily on their recognition of its ritual aspects, namely the procession and recession from a sacred performance site, the use of symbolic objects (what he calls "notes"), and the meaning of the phrase "Yá Bahá'u'l-Abhá." The work also opens up to the practice of soundwalking by raising listener awareness to the soundscape. Similar to the initial walks of the WSP, Simpson combines active listening with sound performance in order to introduce audiences to sounds not generally encountered—or thought about—in daily life. Moreover, an off trail, partially submerged, and overgrown willow copse, becomes a venue for environmental improvisation and for Simpson spiritual nourishment.

Sounds Imagined: Janet Cardiff, *Wanås Walk*

Janet Cardiff's audio walks explore the perception of space and time through the combination of recorded speech and environmental sounds. Each walk maps a fragmented narrative onto a specific route, which an individual listener then traces with the guidance of an audio recording. The headphones and portable audio playback device used to conduct a Cardiff walk are available on loan from a nearby establishment, often a cultural institution. This format has been used since her first walk, *Forest Walk* (1991). Over the course of twelve minutes, the participant meanders through a boreal forest neighboring the Banff Center for the Arts in Alberta, Canada, while listening to a series of disjointed audio excerpts. The recording presents

directions given by Cardiff (at what pace to walk and where to go), the artist describing her surroundings in real-time, excerpts from a conversation between Cardiff and her husband and collaborator George Bures Miller, a weather report, piano music, and birdcalls, among other sounds.

Since *Forest Walk*, Cardiff has created audio walks in North and South America and Europe.[136] These range from five minutes (*Waterside Walk* [1999]) to fifty minutes in duration (*The Missing Voice: Case Study B* [1999]). Her audio walks can be divided into two categories based on their location: cityscapes and nature settings. Spaces in the former category include public buildings and side streets, while those in the latter feature public parks and the grounds of cultural institutions. These natural areas are manicured—they feature walking paths, lawns, picnic tables, etc.—and are either in close proximity to a rural town (*Wanås Walk* [1998], Knislinge, Sweden) or in the heart of a major city (*Her Long Black Hair* [2004], Central Park, New York). Many of the audio walks set in rural locations are conducted in a forest, including the work under consideration in this chapter, *Wanås Walk*.[137]

At thirteen minutes in duration, *Wanås Walk* guides the listener through a forested area of the Wanås Estate outside Knislinge, Sweden (see Figure 2.11). The Estate consists of a castle, farm, sculpture park, and art education center. This combination of history and contemporary art is a unique feature of Wanås.[138] Cardiff may have chosen the forested area for the reason that no art works are installed there, allowing her to explore a more "natural" setting. As she describes it:

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[136] She has also combined audio with video in her walk-based practice. See, for example, *In Real Time* (1998) and *Alter Bahnhof Video Walk* (2012).

[137] Cardiff's interest in forests is maintained in her and Miller's recent sound installation *Forest (for a thousand years)* (2013). In that work, the audience sits on tree stumps and listens to a wide-range of sounds played through twenty-two speakers positioned discretely around the seating area.

[138] The castle dates to the late fifteenth century, the barn and stables to the mid eighteenth century, and the sculpture park to 1987. "Wanås (GER® Certified)," http://www.thelongrun.com/members/view/destination/wan-s (accessed 18 February 2016).

"This was a very bucolic site, a farm, with animals, forests, and it was very quiet."[139] The recording played during the walk presents environmental sounds, several spoken voices, and an a capella duet between a soprano and baritone. Many of the source materials used in *Wanås Walk* were recorded on-site over the course of several days. In contrast, both *Lighthouse Park Soundwalk* and *The Adoration of Willow*, "Stoke Bardolph," were recorded during a single walk. In addition to researching possible routes for *Wanås Walk* and gathering sounds to use in the work, Cardiff spoke with local residents about the history of the Wanås Estate. Of particular interest to her was a past war in the area.[140] The castle at Wanås (labeled "Wanås Gods AB" in Figure 2.11) saw frequent bloodshed during the Northern Wars in the seventeenth century. *Wanås Walk* can be experienced with the Northern Wars in mind.

Figure 2.11 Aerial View of *Wanås Walk* Performance Area. Images from the ground are available at http://www.cardiffmiller.com/artworks/walks/wanas.html#.

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[139] Schaub, *Janet Cardiff: The Walk Book*, 276. For additional information on the genesis of *Wanås Walk*, see Marika Wachtmeister, *Konsten på Wanås/Art at Wanås* (Stockholm, Sweden: Byggförlaget Kultur, 2001).

[140] War is a common theme in Cardiff's audio walks. Audio walks that engage that theme include *Münster Walk* (1997), *A Large Slow River* (2000), and *The Missing Voice*.

The work centers on two unnamed lovers during wartime. The story is told from the perspective of an older woman and an adult man (possibly one of the lovers). The exact relationship of the older woman to the lovers is not explained in the work; perhaps she knew them or heard or read their story. Although the majority of references to war are general observations on life and survival, Cardiff alludes twice to a brutal practice at the Wanås Estate; that is, hanging enemies from trees.[141] At 3'58", the older woman states: "They [i.e., the lovers] had been tied up on to the trees so that the crows would pick out their eyes and the rains would drown them in their sorrows." Then, at 6'27", she remarks: "We tried to untie their bonds but the ropes had grown into the trees and the branches had enveloped their bodies and become part of their skin." These references help to illuminate history in an area that lacks physical markers of war. One exception is the graveyard encountered at the end of the walk, discussed in detail shortly. Akin to a museum audio guide, Cardiff uses storytelling and commentary to enhance the participant's own experience of the historic forest at the Wanås Estate.

Mediated Listening in the Forest

Consistent among Cardiff's audio walks is the problematization of what is real and what is imagined. Hearing is cut off from the outside world with the use of over-ear headphones during the walk, while vision, smell, and touch function as normal. At the same time, Cardiff enhances the participant's experience of their surroundings through audio playback. Certain

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[141] According to the Zeitz Foundation: "During the Snapphane wars Wanås was the centre for the Danish resistance and their enemies were hung from the 500 year old oak that still stands in the park." "Wanås (GER® Certified)," http://www.thelongrun.com/members/view/destination/wan-s (accessed 18 February 2016). The term "snapphane" refers to a member of the seventeenth-century pro-Danish rebel group that fought against the Swedes in the Second Northern and Scanian Wars. The Northern Wars refers to the series of wars fought in northern and northeastern Europe during the sixteenth and seventeenth centuries. For more on the Northern Wars, see Robert I. Frost, *The Northern Wars: War, State and Society in Northeastern Europe 1558-1721* (London and New York: Routledge: 2000).

environmental sounds on the recording may align with visual stimuli. These include footsteps on different surfaces, a passing car, and animal activity. Other sounds draw the listener into an imaginary realm. For example, at 3'46" the sound of bird wings flapping is presented immediately after the older woman describes birds in flight. She states: "As the birds flew, their wings would spark and they would cry out in surprise, making them go mad in their excitement." This combination of environmental sounds with fairytale-like speech creates a displaced reality where the perceived and imagined mingle. The participant navigates the forest while surrendering to Cardiff's composed soundscape.

Art critics and scholars have focused on the disorientation of the participant from their immediate environment in Cardiff's audio walks. For example, David Toop describes his experience of *The Missing Voice (Case Study B)* in London as follows:

> I am leaving myself behind. My radar, the detection system that alerts me to safety and location, seems to be switched to low intensity readings because I am in three places at once: inside Cardiff's urgent narrative [. . .] in step with her voice of guidance [. . .] [and] in my own sense of the here and now.[142]

Also in reference to *The Missing Voice*, Brandon Labelle explains that the separation of the participant from their surroundings depends on the use of mobile listening technology. He writes: "Cardiff's play relies upon the headphonic, as a psychological opportunity to literally split the listening body: to create an envelope in which to unhinge time and place, dislocate one's bearings."[143] Not only does technology create a gap between the participant and their immediate surroundings, but also between Cardiff and her own listening/recording perspective. As with the majority of her audio walks, she used a Kunstkopf system (or artificial head) to capture sounds

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[142] David Toop, *Haunted Weather: Music, Silence, and Memory* (London: Serpent's Tail, 2004), 123.

[143] Brandon Labelle, *Background Noise: Perspectives on Sound Art* (New York: Continuum, 2006), 226.

for *Wanås Walk* (see Figure 2.12). This binaural technology locates the participant in the spatial environment as experienced by Cardiff, similar to Simpson's "Stoke Bardolph."

Figure 2.12 Janet Cardiff, *Wanås Walk*, 1998. Image by Anders Norrsell. Used by permission.

Yet, the recording strategies of the two works are different, which yields contrasting listening experiences. Cardiff's insertion of the microphones into a Kunstkopf creates a discrepancy between her own listening perspective and that of the artificial head. Although the microphones are positioned ear-distance apart, the artificial head is not the same shape and size as hers. The contours of the outer ear are also different. Furthermore, in order for Cardiff to capture her own head rotation on the recording she must rotate her hand holding the Kunstkopf. In contrast, Simpson positions each microphone directly in his outer ear. The shape and size of his head and also the contours of his ears inform the spatialization and quality of sounds on the recording. As a result, listeners experience Cardiff's movement through and engagement with the environment from the disembodied perspective of the Kunstkopf, whereas they encounter Simpson's presence through his ears.

Although the over-ear headphones separate the participant in Cardiff's work from their surroundings, the audio recording played during the walk introduces them to hidden layers of history at Wanås. At times, environmental sounds on the recording are difficult to discern from actual sound sources in the area. Examples include a car passing, nearby conversation at a picnic table, flies buzzing, and birdcalls and songs. Certain sounds may even correspond to events unfolding around the participant in real-time. For example, from 0'52"–1'11" a horse whinnies three times in the left channel; first in the midfield, then near, and then far. It is possible that the listener may see a horse at the nearby stables at the same time as the animal enters on the recording. With this correlation of image and sound, some participants may ask: "Is this horse the same one as heard through the headphones?" Environmental sounds on the recording that do not correlate to a source in the immediate space are used to heighten the spoken narratives. Examples include birds taking flight as the older woman describes them and the sound of an animal rustling in leaves while Cardiff shares a nightmare about rats and ravens trying to eat her. Without a visible source, these sounds have an otherworldly quality.

This combination of composed sounds with the visual stimulus of the forest could be said to create a new space, what geographer David Pinder refers to as a "space-between" and computer scientist Lev Manovich as an "augmented space."[144] Although Pinder and Manovich use different terms, the space that they describe is essentially a heightened reality where recorded sounds are projected onto the location in which the audio walk takes place. Both the separation of the listener from their surroundings via mobile listening technology and the creation of an "augmented/between" space through the use of audio playback help to explain the blurring of boundaries between reality and imagination in Cardiff's audio walks. However, *Wanås Walk*

[144] David Pinder, "Ghostly Footsteps," 1–19; and Lev Manovich, "The Poetics of Augmented Space," *Visual Communication* 5 (June 2006): 219-40.

exhibits a fluid transition between temporal and psychological domains not discussed in existing scholarship on Cardiff.[145] The participant is directed to several different realities over the course of the work. These are the historic past, the recent past (i.e., the walk conducted by Cardiff), the present moment as experienced by the participant, and an imagined reality of the forest evoked by the two singers and several anonymous voices.

Wanås Walk draws the participant into these different realities through the use of five narrative perspectives. These perspectives are Cardiff, an older woman, a soprano and baritone, an adult man, and several anonymous voices. The work begins with Cardiff speaking directly to the participant, sharing personal thoughts, giving directions, and describing her surroundings. At 1'27", the perspective shifts to an older woman describing a once-inhabited place (plausibly the Wanås Estate) now in disrepair. Whereas Cardiff's initial presence grounds the listener in the forest as she experienced it, the older woman connects them to the forest as it once was. Although neither Cardiff nor the older woman is present in the forest with the participant, they both describe objects and animals therein (e.g., stones, trees, and birds). It is likely that the participant will either see or hear some of these same things during the excursion.

After the older woman describes the post-war environment and Cardiff directs the participant to "take the path to the left, not the main one," a solo soprano enters in the background on the recording. The singer intones a series of modes on the vowel sound "ou." The melody initially outlines a Bb major pentatonic scale, but shifts to Bb major with the introduction of the leading tone (A). As if in response to the soprano, at 2'15" the baritone sings a Bb major pentatonic scale. His melody then changes to G aeolian with the introduction of the second scale

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[145] Scholars Rebecca Duclos and David Pinder have each examined Cardiff's use of technology to navigate multiple psychological spaces within a specific physical space. However, critical discussion of the temporal dimensions of the psychological materials engaged in Cardiff's audio walks is lacking in those two studies. See Duclos, "Reconnaissance/*Méconnaissance*"; and Pinder, "Ghostly Footsteps."

degree of that mode (A). The baritone occasionally hints at Bb major pentatonic, but does not change to Bb major like the soprano.

At 4'06", when the soprano and baritone return, Cardiff suddenly tells the participant to stop walking and to listen to the singers. It is as if the participant is unable to hear the singers on his or her own. Soon after the older woman remarks: "You can still hear them calling to each other if you listen." With the participant's attention directed to the soprano and baritone, they sing a chant-like duet using the same modes as the passage starting at 1'51". There is a distinctly older, modal style to the baritone melody, with its absence of the sixth scale degree (E) and frequent step-wise motion around the reciting tone (G). Such is the case at 4'22" when the baritone sings the pitches Bb2–A2–F2–G2–D2–F2–G2. The liturgical style of the duet is another way in which the past is evoked in *Wanås Walk*. The use of archaic melodic lines and call-and-response style makes the music seem as if it is from the time of the Northern Wars.

The adult man, introduced at 5'03", is the first character that Cardiff interacts with through speech. Preceding his entrance, she asks the adult man to tell her about a specific dream he had during childhood. Similar to words of the older woman, the adult man describes the conditions of war and events that took place. However, the dialogue between Cardiff and the adult man marks a larger shift in the work; that is, Cardiff's ability to communicate with ghosts. At 9'12", she enters into call and response with an anonymous voice whistling in the far left channel. After Cardiff leads the participant into a graveyard at 10'31", several male voices yell "hey" from different locations. Startled by their calls, Cardiff begins to breath heavily. The adult man whispers: "Breath into my mouth." In this moment, her breathing (left channel) and his (right channel) are heard in alternation in close proximity to the microphone.

Thus, over the course of *Wanås Walk* different narratives are introduced, cut off, and reappear. Certain sounds skew reality, such as recorded environmental sounds, the singers, and the anonymous voices yelling "hey." The spatialization of these sounds creates the effect of a live experience. In the case of the anonymous voices, it is unclear whether their calls are directed at Cardiff or at the person conducting the walk. In contrast, the older woman and adult man use storytelling to inform the listener of events that took place at Wanås. Cardiff serves as a mediator between the participant and these other characters. She not only shares her past experience of the forest, but also speaks directly to ghosts.

Narrative Perspectives at Play

"My mind is full of images from another place and another time. Do you know those moments when the past overlaps with the present, for just an instant?"
— Janet Cardiff, *Wanås Walk*

Cardiff's approach to narrative structure in *Wanås Walk* is similar to techniques used by early twentieth-century modernist literary figures. Novels by Virginia Woolf, in particular, share striking similarities to Cardiff's own approach to narrative. The alternation of blocks of content, abrupt shifts in time, and unconventional uses of syntax and punctuation (e.g., incomplete sentences and ellipses) pervade Woolf's texts. Scholars agree that this manipulation of conventional narrative structure was for Woolf, and others, a way to create "consensus" (to borrow from Elizabeth Deeds Ermarth) among the inconsistencies of human thought and behavior.[146] As Jessica Berman puts it: "[In *Three Guineas* (1938),] Woolf uses narrative fragmentation and hiatus as textual strategies to interrupt the forced fusion of sensibility and to

[146] Elizabeth Deeds Ermarth, *Realism and Consensus in the English Novel* (Princeton: Princeton University Press, 1983).

alleviate the misapprehension that there is true uniformity of perspective."[147] In other words, the use of these modernist techniques enables ambiguities to surface without questioning the coherency of the text. Juxtaposed, characters in a Woolf novel yield insight into the psychological self that may otherwise be left out when they are instead used in the service of better understanding a unified identity.

The Waves (1931) demonstrates how Woolf avoids representing reality in objective terms through the juxtaposition of different characters. The novel begins with a vivid third-person description of a nearby ocean and then the immediate environment (a house and garden), is followed by a series of discrete statements by six characters, and then returns to the immediate environment, where it is described by one of the characters (Louis) in first person. Several important elements of narrative are left unknown, namely the relationship among the characters, the exact location, and the date. Only the general setting (a beach house) and the time of day (night transitioning to dawn) are provided.

When the characters are introduced, they do not speak to each other.[148] Instead, they each name an object or sound and proceed to either describe or imitate it:

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[147] Jessica Berman, "Woolf and the Private Space," in *Virginia Woolf in Context*, ed. Bryony Randall and Jane Goldman (Cambridge, UK: Cambridge University Press, 2012), 471. Toril Moi extends this idea to the relationship between the author and her characters, asserting that Woolf avoids identifying herself with a specific character through the use of this technique. Moi, *Sexual/Textual Politics: Feminist Literary Theory* (London and New York: Routledge, 1986), 8. Lena Hammergren applies Woolf's approach to writing to her own work as a dance historian. Hammergren claims: "This perspective of different personas can make us understand that . . . the past and the present continuously and actively insinuate themselves into one another, resulting in an elusive identity both in regard to the 'I' of the text and to the history of which it is speaking." Hammergren, "Different Personas: A History of One's Own?" in *Choreographing History*, ed. Susan Leigh Foster, (Bloomington, IN: Indiana University Press, 1995), 191.

[148] This is not the case in other novels by Woolf. See, for example, *The Voyage Out* (1915) and *To the Lighthouse* (1927).

> ‘I see a ring,’ said Bernard, ‘hanging above me. It quivers and hangs in a loop of light.’
> ‘I see a slab of pale yellow,’ said Susan, ‘spreading away until it meets a purple stripe.’
> ‘I hear a sound,’ said Rhoda, ‘cheep, chirp; cheep chirp; going up and down.’
> ‘I see a globe,’ said Neville, ‘hanging down in a drop against the enormous flanks of some hill.’
> ‘I see a crimson tassel,’ said Jinny, ‘twisted with gold threads.’
> ‘I hear something stamping,’ said Louis. ‘A great beast’s foot is chained. It stamps, and stamps, and stamps.’[149]

It is as if this passage presents the thoughts of each character, instead of speech in a real-world social context. One interpretation is to consider these different characters as separate narrators; that is, where their observations are made at different times. Another way is to think about them as a single voice. When the first statement of each character is isolated, the excerpt reads: “I see a ring . . . I see a slab of pale yellow . . . I hear a sound . . . [and so forth].” In this way, the narrative “I” is divided among six voices.

Similar to the opening section of Woolf’s *The Waves*, Cardiff’s *Wanås Walk* has passages that present several different narrative perspectives in quick succession. For example, from 4’07”–4’50”, the listener is exposed to the immediate environment, the recorded sonic environment, as well as the perspectives of Cardiff, the older woman, and the singers. At 4’07”, the singers are accompanied by birdcalls; however, the birds quickly fade out and the singers are all that is heard on the recording. As the soprano and baritone sing a duet, the older woman posits: “some nights they call to the moon to take them away.” The singers fade out soon after. At 4’40”, an animal rustles nearby in the leaves just before the track fades out completely (the only such instance in the work). With the recorded track temporarily silent, external sounds are likely to penetrate through the headphones. At 4’50”, the listener is brought back to their immediate space when forest ambience and birdcalls fade in and Cardiff directs the participant to

[149] Virginia Woolf, *The Waves* (London: The Hogarth Press, 1931), 7.

continue on the path. Nature sounds are caught in a gap between the past and the present in this passage. It is difficult to know whether these animal and tree sounds, like the horse, are the same as those in the immediate area or if they are a personification of the past lovers and their environment. The brief moment of silence midway through the excerpt offers the only moment in the work for the participant to listen to the actual forest (albeit through over-ear headphones).

Although there is no direct connection between Woolf and Cardiff, both artists invite the reader/listener to think about different types of past. Woolf focuses on the psychological past, whereas Cardiff turns to a historical one. Both disrupt the narrative structure in order to capture the past not as a complete image but as a collection of fragmented perspectives. This lack of clear narrative raises questions regarding the identity of each character in *Wanås Walk*. Is the participant supposed to hear each voice as a representation of Cardiff? Are Cardiff, the older woman, and the female lover the same person?

Wanås Walk concludes with an attempt to claim that there is a sense of truth to these different perspectives. The older woman asserts that her story is real: "I am trying to tell you some truth by going back and remembering. To know that I really did live and now you walk in this place where I walked." Soon after, Cardiff makes a similar claim about her experience. However, rather than using plain language, she turns to touch, the most intimate of the senses, to confirm that what she has experienced is real. She states: "Dead leaves under my feet. Nettles against my bare legs. My shoes are wet through to my toes. The wind is on my face." Cardiff continues her description of sensed phenomena, but with a shift from touch to hearing: "The leaves are moving in the breeze. The birds are singing. There's a car in the distance. These things are real aren't they?" Her decision to use speech to connect herself—and the participant—to the "reality" of the forest is a technique similar to that in Westerkamp's *Lighthouse Park Soundwalk*.

However, the "reality" that Cardiff describes at the end of her work is different from that of Westerkamp. Cardiff describes sensed phenomena to ground herself in the forest, whereas Westerkamp uses the words of Emily Carr to politicize the changing soundscape of the Pacific Northwest and to inspire listeners to take action.

Although Cardiff does not comment on the "wellbeing" of the forest, she does use speech to direct listeners to aspects of her surroundings that she deems worthy of attention. This includes both giving directions to the participant and describing nearby objects—a moss-covered tree, a large stone, a compost pile, etc. In a way, Cardiff's voice plays a more authoritative role in *Wanås Walk* than Westerkamp's does in *Lighthouse Park Soundwalk*. The participant depends on Cardiff's directions for where to go and how to interact with their surroundings. Cardiff also uses speech to disorient the listener from their immediate environment. Her projection of multiple narratives onto the forest reconfigures daily aural and visual experience. The person conducting the walk is faced with the challenge of navigating their physical environment while at the same time making sense of what they hear. Through the combination of live participant experience and realistically spatialized speech and environmental sounds, *Wanås Walk* has a disjointed effect on listeners at the same time as it enhances their experience of a particular place.

Soundwalking Revisited

The three artists discussed in this chapter immerse listeners in outdoor nature settings. These are spaces where humans are not the dominant force. In other words, flora, fauna, and natural phenomena are more prominent than buildings and roads. These locations, as different as they may be (a wilderness reserve, a watercourse surrounded by farmland, and a sculpture park),

are all used for relaxation and repose. These spaces are also imbued with rich cultural history, an aspect that each artist draws upon. Westerkamp and Cardiff use historic voices in their works—Emily Carr and survivors of war, respectively. Simpson centers his piece on an iconic symbol, the willow tree, using touch instead of speech.

Aspects of the original concept of soundwalking carry over to all three works. Audiences enact a walk, either live or in their mind while listening to a recording, where the main purpose is to focus on the sounds around them as well as their relationship to those sounds. Westerkamp, Simpson, and Cardiff each use listening, walking, and sound performance to draw listeners closer to the natural world. For Westerkamp, soundwalking is a way to highlight the aesthetic appeal of nature while also directing attention to the growing noise pollution problem. Although Simpson is not as explicit with his environmental message, he also raises awareness to the sonic richness of nature. Simpson draws on soundwalking in order to "voice" the willow copse, in particular physical objects that are otherwise mute—leaves, twigs, branches, tree trunks, and stones. Cardiff looks for signs of the past in the present. For her, listening, walking, and sound performance enable exploration of the historical, temporal, and psychological layers of a particular place.

At the same time as *Wanås Walk* distorts everyday perception, it is the only art-based walk under consideration that physically positions listeners in an actual location. *Lighthouse Park Soundwalk* and *The Adoration of Willow*, "Stoke Bardolph" are experienced as recordings. In this way, *Wanås Walk* is similar to "A Vancouver Soundwalk" in its use of a predetermined route and cues for listening (see Figure 2.1). Both *Lighthouse Park Soundwalk* and "Stoke Bardolph" are improvised walks at the time of recording. Cardiff, on the other hand, sends participants out with a set of directions (i.e., the recording) for where to go and what to listen for.

However, unlike "A Vancouver Soundwalk," the listener is closed off from their surroundings in *Wanås Walk* through the use of over-ear headphones. The recording displaces them, not away from their immediate environment, but from their everyday perception of it.

Another aspect of soundwalking present in these works is focus on sounds in the environment that are not necessarily apparent to audiences. Both Westerkamp and Simpson focus on "hidden" sounds inherent in the environment. Westerkamp focuses on the rich timbral properties of flowing water through placement of the microphone in close proximity to a streambed; Simpson holds a twig near his ear and proceeds to bring out its resonant, pitched qualities by flicking it. In contrast, Cardiff directs listeners to another dimension of the forest, a realm of ghosts. She tries to convince the participant that these ghosts are actually there through her observation of and later interaction with them.

Although all three artists present these "hidden" sounds to audiences through their recordings, there is no audio processing on these tracks. Westerkamp and Cardiff use basic editing techniques such as crossfading and/or multitracking, while Simpson removes only his internal bodily sounds—coughing, sneezing, swallowing, etc. Through the decision not to process sounds, focus is given to the inherent sonic properties of sounds heard in the forest. For Westerkamp and Simpson, these are sounds encountered in both their immediate space and also heard in the distance—water and seaplanes in *Lighthouse Park Soundwalk* and water and a distant train in "Stoke Bardolph"). For Cardiff, it is imagined voices that reside in the forest. As discussed, the anonymous voices representing ghosts are just as realistic as environmental sounds in *Wanås Walk*.

Soundwalking draws participants outside of their habitual routines of listening in order to bring new awareness to not only the sonic environment but also their psychological self.[150] As John Levack Drever explains: "One of the underpinning goals of soundwalking is about circumnavigating habituation, in a process of de-sensitization and consequently re-sensitization, in order to catch a glimpse (*un coup d'oreille*) of the 'invisible, silent, and unspoken' of the everyday."[151] Artists such as Westerkamp, Simpson, and Cardiff use elements of soundwalking in order to bring some of the "invisible, silent, unspoken" aspects of the environment to the attention of listeners. Westerkamp focuses on the changing soundscape of the Pacific Northwest, a region under the threat of increased noise pollution. Simpson showcases the sonic potential of a willow copse near Stoke Bardolph through his physical contact with materials found on site. Cardiff is not concerned with environmental sounds per-se, but with the actual environment as a place inhabited with both real and imaginary voices. Although each artist engages the natural environment for different reasons in their work, all three transform how nature is experienced. By taking listeners on a walk (either an actual walk or a recorded one), Westerkamp, Simpson, and Cardiff revitalize nature settings as places of both active listening and dialogue.

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[150] This inquiry into human thought is not limited to art-based walks. Consider, for example, Dhomont's *Forêt Profunde*, an electroacoustic composition that draws on psychologist Bruno Bettelheim's analysis of children stories, *The Uses of Enchantment*. For more on Dhomont's work, see Chapter Four.

[151] Drever, "Soundwalking," 165.

Chapter 3 Rewilding the Stage and Soundscape in R. Murray Schafer's *The Princess of the Stars*

Canadian identity and nature are two prominent—and arguably inseparable—themes in the music and writing of R. Murray Schafer. In his collection of essays *On Canadian Music*, Schafer claims that Canadians have relied largely on colonial models for their identity, and, as a result, have failed to distinguish their culture.[152] Schafer's concern extends to the relationship between Canadians and the natural environment. Ellen Waterman explains:

> For Schafer, the central problem in the development of Canadian identity is the alienation of Canadians from the vast northern wilderness they inhabit. Only by seeking an integrated relationship with the land can Canadians develop an indigenous cultural identity.[153]

In the spirit of reconditioning Canadian audiences to the land they call home, Schafer has written several compositions for no less than an iconic Canadian setting; that is, the wilderness lake. These include *Music for Wilderness Lake* (1979), *Patria the Prologue: The Princess of the Stars* (1981), *Patria the Epilogue: And Wolf Shall Inherit the Moon* (1984–), and *Patria 9: The Enchanted Forest* (1994).[154] On site, Schafer deploys symbols and themes that imbue nature with elevated, if not spiritual qualities. Several of these symbols have existing association with the wilderness lake. For example, in *The Princess of the Stars* canoes are used to enact the drama

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[152] R. Murray Schafer, *On Canadian Music* (Bancroft, ON: Arcana Editions, 1984), viii–ix.

[153] Ellen Waterman, "R. Murray Schafer's Environmental Music Theatre: A Documentation and Analysis of 'Patria the Epilogue: And Wolf Shall Inherit the Moon'" (Ph.D. diss., University of California, San Diego, 1997), 72.

[154] Other contemporary composers that have written works for natural settings include David Dunn, John Luther Adams, and Emily Doolittle. Dunn's *Sky Drift* (1977), for a group of singers and a wind and brass ensemble, premiered in a dry lake bed in Anza-Borrego Desert State Park in California; Adams' *Inuksuit* (2009), for 9 to 99 percussionists, premiered on the grounds of the Banff Centre for Arts and Creativity in Banff, Canada; and Doolittle's *Reeds* (2010), for reed trio and dancer, premiered at an urban pond in St. John's, Newfoundland.

and the vocal calls at the start of the work emulate the Common Loon.[155]

Princess is the first composition by Schafer in which musicians not only explore acoustic phenomena at a rural lake but also converse with birds in the area and perform on found objects such as rocks and wood. In that way, *Princess* is not merely a work staged against an outdoor backdrop; rather, it calls for direct engagement with the environment. The work depends on dialogue between performers, listeners, the physical environment, and birds in the area for its full effect. These on-site interactions play a key role in the music and drama of *Princess*, and in this way, the environment is encountered differently than in art-based walks (see Chapter Two). Sound performance is also present in some art-based walks (e.g., *Lighthouse Park Soundwalk* and *The Adoration of Willow* Series), but the central idea of such works is that an individual engages with the environment through mobile listening. *Princess*, on the other hand, is a collective effort driven by music making.

The eighty-minute music-theatre work calls for four sound poets/actors, six dancers, solo soprano or mezzo-soprano, a double SATB chorus, instrumental ensemble, and approximately twenty canoeists. The canoeists enact the story by paddling the sound poets/actors and dancers around the lake to choreographed patterns. Where art-based walks offer a private, immersive experience of the natural world through active listening and occasional sound performance, *Princess* is a shared experience where performers actively engage their surroundings and the audience witnesses these encounters. This chapter examines how Schafer's outdoor theatre work re-imagines the performance setting of Western classical music and, in turn, sensitizes both performers and audience members to the natural world.

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[155] For discussion of the formation of colonial and post-colonial Canadian symbols, see Daniel Francis, *National Dreams: Myth, Memory, and Canadian History* (Vancouver: Arsenal Pulp Press, 1997), especially chapter six, "The Ideology of the Canoe: The Myth of Wilderness."

The inclusion of non-human sounds in the environment as part of the music and drama takes us one step towards "nature modified" on the continuum (see Introduction). Nature is not modified by technology (although Schafer does equip characters with megaphones of different sizes); rather, it is processed in terms of its recontextualization in the plot and music. Schafer portrays the performance site as grand and mythical through the projection of sounds into the environment and the movement of characters in canoes on the lake. By mapping a tale of mythic proportions onto the lake, any environmental, socio-political, and cultural issues associated with the body of water—or the larger land plot—are reduced. Consider, for example, Two Jack Lake, the site of the 1985 production of *Princess*. Although Two Jack Lake adheres to Schafer's required features for the performance site, the lake is anything but untouched wilderness. A canal runs from Two Jack Lake to the largest man-made lake in Banff National Park: Lake Minnewanka. Lake Minnewanka Scenic Drive passes by Two Jack Lake, and connects two campgrounds that are located near the shoreline. Furthermore, the area has a rich history of indigenous peoples dating back approximately 10,000 years. However, Schafer draws exclusively on the indigenous cultures of the Plains and Eastern Woodlands of Canada and the United States.

Schafer's borrowings from indigenous culture reflect his interest in creating harmony between humans and the natural world. By infusing the plot with First Nations stories, audience members and performers are encouraged to experience the wilderness lake as a place that is both sacred and rich in mythology.[156] Schafer also animates the outdoor performance setting through music. Specifically, he uses the lake as a site for staging a series of ritualized acts, similar to the

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[156] Victoria Adamenko has coined the term "neo-mythologism" to explain the use of ancient myths in twentieth-century music. See Adamenko, *Neo-Mythologism in Music: From Scriabin and Schoenberg to Schnittke and Crumb* (Hillsdale, NY: Pendragon Press, 2007).

willow copse in Simpson's *The Adoration of Willow* series. In the case of *Princess*, these acts include marking the sunrise and dawn chorus in the plot (the arrival of the Sun Disk and Dawn Birds, respectively), the activation of outdoor acoustics, interaction with birds on site, and the use of found objects such as logs and rocks. By drawing on First Nations legends and also enhancing the outdoor setting with musical sounds, Schafer mythologizes nature. The idea of myth is the means by which Schafer validates nature as having inherent value.

Schafer's interest in locating musicians outdoors and inviting them to actively listen to and perform with their surroundings stems from his dissatisfaction with Western classical music aesthetics, in particular those associated with the concert hall. His efforts to revitalize music theatre led to the development of a theory known as The Theatre of Confluence.[157] Similar to Richard Wagner's concept of *Gesamtkunstwerk*, Schafer's idea of a confluent theatre aspires to give the arts an equal part in shaping a staged work. However, Schafer critiques Wagner's concept on the basis that it maintains a hierarchical relationship among the arts, where music is still privileged as the "highest" form of art.[158] Schafer responded to this challenge by encouraging alternative ways of performing and experiencing a music-theatre work. Among these techniques is a multi-sensory engagement with the performance site, increased audience participation in the form of travel to the performance location and movement through the site during the performance, and, in the spirit of Cage, recognition of sounds of the environment as part of the work.

Kate Galloway and Ellen Waterman have both researched collaboration between

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[157] See "The Theatre of Confluence I," "The Theatre of Confluence II," and "The Theatre of Confluence III," in R. Murray Schafer, *Patria: The Complete Cycle* (Toronto: Coach House Books, 2002).

[158] For more on Schafer's and Wagner's conceptions of art see John Rea, "Richard Wagner and R. Murray Schafer: Two Revolutionary and Religious Poets," *Canada Music Book* 8 (Spring/Summer 1974): 37–51.

musicians and the environment in Schafer's works. Galloway considers aspects of ritual as well as audience and performer participation in a comparative analysis of four works from Schafer's *Patria* Cycle.[159] Waterman investigates the collaborative efforts of staging Schafer's *And Wolf Shall Inherit the Moon* from 1985 to 1996. In addition to documenting its performance history, Waterman claims that the epilogue to the *Patria* cycle is a culmination of Schafer's career-long development of the Theatre of Confluence.[160] This chapter builds on the work of both Galloway and Waterman in that it asks some additional questions of collaboration in Schafer's music. However, a point of departure for the present effort is to investigate musician-environment interaction in *Patria* through score and recording analysis, rather than participant-observation.

In terms of Schafer's conception of nature, Ellen Waterman asserts that he maintains a romantic aesthetic of nature.[161] Maria Anna Harley associates *Princess* with deep ecology, claiming that it "expresses a world-view according to which people do not have dominion over nature, but are a part of it, a world-view of profound and powerful connections between human self-awareness and the peaceful and symbiotic co-existence of all living beings."[162] Of particular interest is Schafer's integration of nature into *Princess* as a musical force and how the production is mapped onto a natural, opposed to an urban, environment. In light of Schafer's aim at

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[159] See Kathleen Anne Galloway, "'Sounding Nature, Sounding Place': Alternative Performance Spaces, Participatory Experience, and Ritual Performance in R. Murray Schafer's *Patria* Cycle" (Ph.D. diss., University of Toronto, 2010). Galloway has also considered the transformative powers of participating in any one of Schafer's outdoor productions and the notion of pilgrimage to the performance site. See "Roughing It in the Woods: Community and Emplaced Experience in the Cultural Practice of R. Murray Schafer's Patria," *MUSICultures* 39, no. 2 (2012): 30–60; and "Pathways and Pilgrims: The In-Between Spaces in the *Patria* Cycle," *Intersections: Canadian Journal of Music* 28, no. 1 (2007): 134–45.

[160] See Waterman, "R. Murray Schafer's Environmental Music Theatre."

[161] Ellen Waterman, "*Patria* at the Millennium," *TOPIA: A Canadian Journal of Cultural Studies* 6 (Fall 2001): 30–31.

[162] Maria Anna Harley, "Canadian Identity, Deep Ecology and R. Murray Schafer's 'The Princess of the Stars,'" In *Northern Soundscapes: Yearbook of Soundscape Studies*, ed. R. Murray Schafer and Helmi Jarviluoma, vol. 1 (Tampere, Finland: University of Tampere, Department of Folk Tradition, 1998): 136–37.

reconditioning humans to the soundscape,[163] the wilderness lake serves as a space to employ new compositional techniques, a way to cultivate acuity to sounds beyond the concert hall, and a means to comment—and even build—national identity.

Princess is not the first work by Schafer composed for a specific outdoor setting at a designated time. *Music for Wilderness Lake* positions three trombone quartets around the shore of a small rural lake at dawn and at dusk (see Figure 3.1).[164] Over the course of approximately twenty minutes the twelve musicians use sound to survey the body of water and surrounding terrain. The work sets out to create a dialogue between the performers and their outdoor location. Schafer explains in the introduction to the score: "*Music for Wilderness Lake* returns to a more remote era, to an era when music took its bearings from the natural environment, a time when musicians played to the water and to the trees and then listened for them to play back to them."[165] More than a spiritual offering, Schafer has the twelve trombonists explore the acoustic properties of the lake. Techniques include sustaining a pitch while turning slowly in a circle or while raising and lowering the bell of their instruments. In one instance, the ensemble is instructed to howl like wolves. With the three quartets half a kilometer apart, there is an approximately one-and-a-half second time delay among them. Thus, in order to sound together each group must attack at a precisely different time. In certain sections the performers are scored

[163] Schafer's work in soundscape education and research began with a series of booklets including *Ear Cleaning* (1967) and *The New Soundscape* (1969), developed further with his role as director of the World Soundscape Project in the 1970s, and culminated in his book *The Tuning of the World* (1977).

[164] Sound generally travels the greatest distance at dawn and at dusk, as wind is often minimal and sound refraction is at its peak due to thermal conditions (i.e., cool air near the surface of the lake and warm air higher up). *Music for Wilderness Lake* was premiered at O'Grady Lake (near Bancroft, Ontario) on September 22, 1979, by the *Sonaré* ensemble. The performance was recorded for radio play by the Canadian Broadcasting Corporation (CBC) and was made into a documentary film in 1980 by Fichman-Sweete Productions (now Bullfrog Films). See http://www.bullfrogfilms.com/catalog/lake.html (accessed 5 June 2014).

[165] R. Murray Schafer, "Music for Wilderness Lake" (Bancroft, ON: Arcana Editions, 1981), 2.

to enter subsequently, producing a full, consonant blend, while in other moments they are asked to enter simultaneously, creating a rough, competing sound texture.

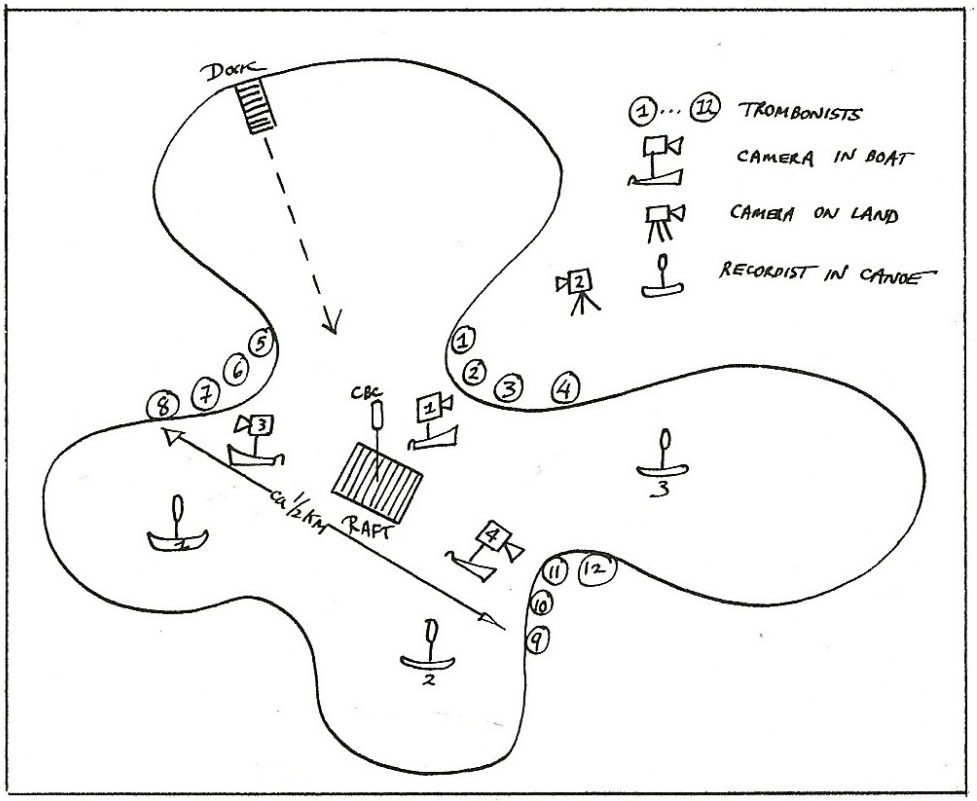

Figure 3.1 "Setup for the recording and filming of *Music for Wilderness Lake*." © 1981 R. Murray Schafer, "Music for Wilderness Lake," Bancroft, ON: Arcana Editions, 4. Used by permission.

Like *Music for Wilderness Lake*, *Princess* is written for a specific outdoor setting. The work is realized on a rural lake of a certain size and shape, during a particular season (autumn), and must start precisely fifty-two minutes before dawn.[166] *Princess* was premiered at Heart Lake outside Toronto in 1981, and has since been staged at Two Jake Lake (1985), and at Wildcat Lake (1997) and Bone Lake (2007), both part of the Haliburton Forest and Wildlife Reserve in

[166] "The lake should be about half a kilometer wide and a kilometer long with an irregular shoreline to allow the principal characters to enter in their canoes from 'off stage.'" R. Murray Schafer, *Patria: The Prologue* The Princess of the Stars (Toronto: Arcana Editions, 1986), 4.

Ontario. As Schafer remarks, "it is a different theatre every time."[167] This is in part due to air pressure, temperature, and wind direction, which shape the performers' sounds. In addition to atmospheric conditions, the contours of the shoreline and surrounding terrain, non-human sounds in the environment, and the position of the audience in relation to the sunrise also inform any production of *Princess*. For example, the sunrise was at "stage" center during the 1985 performance at Two Jack Lake (see Figure 3.2).[168] In contrast, the sunrise was at "stage" right during the 2007 production at Bone Lake.[169]

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[167] Schafer, *Patria: The Complete Cycle*, 106.

[168] The 1985 performance was part of the Banff School of Fine Arts Festival of the Arts (8–10 August), in conjunction with the Parks Canada Centennial.

[169] The layout for the 2007 production of *Princess* at Bone Lake can be found in Galloway, "Roughing It in the Woods," 43. Available from: http://journals.hil.unb.ca/index.php/MC/article/view/20356 (accessed 25 June 2014).

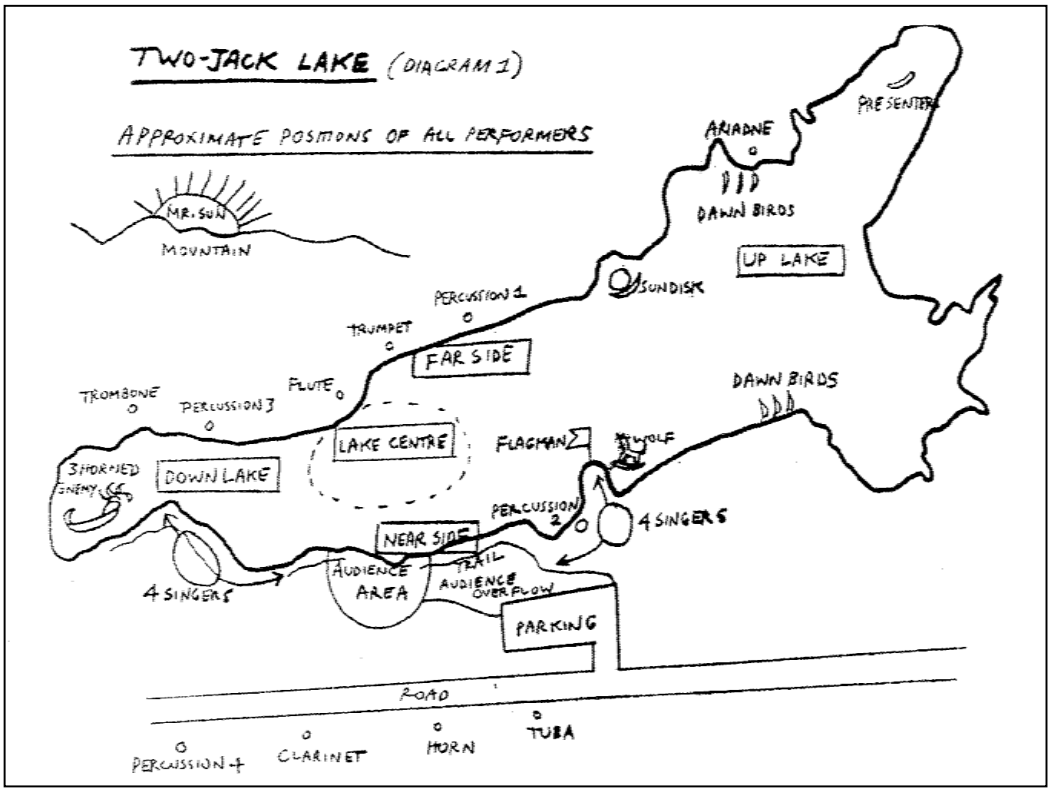

Figure 3.2 Layout for the 1985 Production of *Princess* at Two Jack Lake. Tim Wilson, "The Place of the Princess," *Banff Letters* (Spring 1985): 30. Available from the Banff Centre Library and Archives. Used by permission.

The position of the musicians also shapes the production. At Two Jack Lake Percussion 1 and 3 were located on the shore opposite the audience, while Percussion 2 was positioned to their immediate right and Percussion 4 was behind them to the left. At Bone Lake all four percussionists were positioned in front of the audience: Percussion 1 and 2 were located less than halfway down shore and Percussion 3 and 4 were closer to the far end of the lake, with 1 and 3 on the left side and 2 and 4 on the right. The flute, clarinet, brass quartet, and characters were also stationed differently for the 1985 and 2007 productions. Only the placement of the double chorus was consistent at Two Jack Lake and Bone Lake: four singers (SATB) were positioned to the immediate right of the audience and four were placed to the left at both locations.

Overview of the *Patria* Cycle and *The Princess of the Stars*

The Princess of the Stars is the Prologue to Schafer's music-theatre cycle, *Patria* (1966–; Patria is Latin for "homeland").[170] The musical forces, duration, performance location(s), and the role of the audience vary among the twelve works that currently make up the cycle. Some are performed in a wilderness setting, while others are realized in an urban environment. In *Princess*, the audience maintains a conventional role as silent onlookers.[171] In others works, such as *RA* (1983) and *The Enchanted Forest*, the audience functions as active participants in the drama. The longest work in the cycle, *And Wolf Shall Inherit the Moon* (known colloquially as the Wolf Project), sends a troupe of artists into Haliburton Forest and Wildlife Reserve.[172] Participants are divided into "clans" (each named after a totem animal native to the region) and, over the course of eight days, engage in a series of ritual activities. These include greeting the sun and four cardinal directions, dancing, storytelling, and performing various types of music. The clans convene on the final day to perform a ceremony whereupon Wolf is united with Ariadne (characters first introduced in *Princess*).

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[170] For an overview of the cycle see http://www.patria.org/arcana/arcdrama.html#wolf (accessed 5 June 2014).

[171] Schafer invites audience members to move freely around the production site as long as they remain quiet and do not disrupt the performance at hand. He explains: "What makes my pieces different is that the audience is actually moving to a location, sitting on a shore or on a beach. They're free to get up and walk around, they don't have to stay there. In fact a lot of people at the first *Princess* [at Heart Lake] got up and walked around the lake to hear it from the other side, which they're free to do." Tim Wilson, "The Place of the Princess," *Banff Letters* (Spring 1985): 31.

[172] A growing pool of dedicated participants has performed and developed this work since 1992. As material is added and revised with each performance, it is difficult to distinguish what material is attributed to Schafer and what belongs to others. For more on *And Wolf Shall Inherit the Moon* see Emily Doolittle, "Thoughts on R. Murray Schafer's Wolf Project," unpublished paper, 2001, http://emilydoolittle.com/writing.html (accessed 6 June 2014); Galloway, "Roughing It in the Woods"; Erin Elizabeth Scheffer, "The Self and the Wolf: An Examination of R. Murray Schafer's Wolf Project" (Master's thesis, Florida State University, 2010); Ellen Waterman, "Confluence and Collaboration Part One: Performing R. Murray Schafer's *And Wolf Shall Inherit the Moon*," *Musicworks* 70 (February 1998): 6–10; and Waterman, "Confluence and Collaboration Part Two: Performing R. Murray Schafer's *And Wolf Shall Inherit the Moon*," *Musicworks* 72 (October 1998): 16–24.

Though *Patria* explores different world cultures and time periods (ranging from ancient Egypt to Medieval Europe), several archetypes, symbols, and themes appear throughout the cycle. For example, *Patria* features four recurring characters: a masculine, instinctual hero who is sent on a series of journeys in search of spiritual power (Wolf/Theseus), an innocent princess who waits for the hero to redeem her (Princess/Ariadne), a sly creature who makes work for the hero and keeps the princess captive (the Three-Horned Enemy/Minotaur), and a venerating god that reigns over the protagonists (the Sun Disk/Ra).[173]

According to the ancient Greek myth "Theseus and the Minotaur," King Minos of Crete forced the Athenians to supply seven boys and seven girls every nine years in order to avoid additional sanctions. Those offered served as prey to Minotaur, a half-man half-bull that lived in the labyrinth on Minos' grounds. The sacrifice of Athenians ended when Theseus, the son of an Aegean ruler, was sent to Crete as one of the youths to be sacrificed. Once in the labyrinth he killed the Minotaur and managed to escape with the aid of Minos' daughter, Ariadne. Ariadne fell in love with Theseus upon his arrival, and gave him a sword and a ball of thread to help him in the labyrinth. Theseus unraveled the ball as he moved through the maze and retraced the thread after killing the Minotaur with the sword.

The character names and roles in that classical story parallel those in Schafer's *The Princess of the Stars*. Wolf is a hero that must battle a monster (in this case to rescue the Princess of the Stars, instead of saving a people), Three-Horned Enemy is a monster that controls a space (in this case a lake, instead of a maze), and the Sun Disk is a ruler (in this case of the universe, not a kingdom). There are two similarities between the Princess of the Stars and Ariadne: 1) she

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[173] Waterman, "*Patria* at the Millennium," 25. At moments in the cycle, the creature is destructive and evil, and in other instances that character is well intentioned. For discussion of the changing role of the Three-Horned Enemy, see Kirk Loren MacKenzie, "A Twentieth-Century Musical/Theatrical Cycle: R. Murray Schafer's *Patria* (1966–)" (Ph.D. diss., University of Cincinnati, 1992), 70.

is the daughter of a ruler and 2) a hero is infatuated with her. Unlike Ariadne, the Princess is not in love with Wolf, nor does she assist him over the course of Schafer's work. There are other ways in which Schafer's narrative differs from the classical story. For example, there is no sacrificial rite in *Princess* and the Three-Horned Enemy does not have human qualities—that character is amphibious with plated armor, a beak, and webbed feet. Schafer's narrative is more indebted to indigenous legends through the mythologization of natural phenomena, animals, and the sun and moon.

The Princess of the Stars tells the story of the Sun Disk's daughter, the Princess of the Stars, who has fallen from the sky and is held captive at the bottom of the lake by the Three-Horned Enemy. The work begins with an unaccompanied aria by the Princess at the far end of the lake (she is the only character not visible to the audience). During the aria, the Presenter is paddled in a single canoe from just beyond the position of the Princess. Upon his arrival in front of the audience, the Presenter informs them of the events leading up to the Princess' capture. He then turns the audience into trees—only through this transformation can they witness the actions of characters who, according to Schafer, are beyond the perception of humans. For the remainder of the work, the Presenter translates the language of the characters into English.[174] Wolf arrives at the lake to find the Princess with the help of six Dawn Birds. The Three-Horned Enemy challenges Wolf's efforts. As a fight ensues between the two characters, the Sun Disk interrupts, driving away the Enemy and commanding Wolf to embark on a journey that will lead him to the Princess. The Sun Disk orders the Dawn Birds to cover the lake with ice and to not sing until

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[174] The shoreline also separates the audience from the action, and in this way functions as a proscenium. For a rich discussion of correlations between wilderness space and theatre space see Adam Sweeting and Thomas C. Crochunis, "Performing the Wild: Rethinking Wilderness and Theater Spaces," in *Beyond Nature Writing: Expanding the Boundaries of Ecocriticism*, ed. Karla Armbruster and Kathleen R. Wallace, 325–40 (Charlottesville, VA: University Press of Virginia, 2001).

Wolf succeeds. The work concludes as it began, with the voice of the Princess heard in the distance.

Patria and Canadian Identity

Music scholars have discussed at length Schafer's engagement with Canadian identity in both his writing and music.[175] With regards to *Patria*, Ellen Waterman asserts that the significance of the cycle as a critical work does not fit a neat definition of Canadian art:

> *Patria* simultaneously occupies the terrain of cultural product, with effects that can be evaluated and critiqued within historical and current Canadian culture, and its own unified world in which archetypes, symbols, and themes (both musical and literary) circle endlessly back on themselves. For the composer, and for many of his collaborators, the symbolic world of Patria is the more vital. For cultural critics, however, Patria presents an essentialized worldview disturbingly out of touch with current Canadian society. In assessing Patria's place in Canadian art, it is the tension between these two points of view that is most interesting, for Patria raises important questions about what counts as "authentic" Canadian art and about the roles both imagination and memory play in creating cultural identity.[176]

As Waterman and others have noted, Schafer's universalizing of elements from indigenous cultures is problematic. For example, in *Princess* Schafer uses the legends of first peoples to explain natural phenomena (e.g., dew on the grass is the blood of the Princess who fell from the sky, and mist over the lake is a sign of her struggle as prisoner of the Three-Horned Enemy) and features a libretto with keywords from indigenous languages.[177] *And Wolf Shall Inherit the Moon* adopts the Medicine Wheel, features indigenous chants, and divides participants into clans

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[175] See, for example, Waterman, "R. Murray Schafer's Environmental Music Theatre" (especially chapter two); Harley, "Canadian Identity, Deep Ecology and R. Murray Schafer's 'The Princess of the Stars'"; Scheffer, "The Self and the Wolf," 17–30; and Waterman, "*Patria* at the Millennium," 28–29.

[176] Waterman, "*Patria* at the Millennium," 22.

[177] Schafer, *Patria: The Prologue* The Princess of the Stars, 87–88. The only characters that do not speak keywords from indigenous languages are the Three-Horned Enemy, who utters non-lexical vocables, and the Sun Disk, who uses an invented language reflecting qualities of Latin.

named after totem animals.[178]

Erin Scheffer asserts that Schafer's engagement with indigenous cultures is "undoubtedly Thoreauvian." She elaborates:

> In the process of creating music which explores First Nation's culture, Schafer changes the musicians and actors who participate in his *Patria Cycle,* especially the Wolf Project, into a semblance of Thoreau's "half savages," those who live civilized lives, go into the woods, and sing native chant, recite Micmac phrases and are divided into clans according to Iroquois governmental structure.[179]

Along this line of thought, Schafer's use of native languages, legends, and rituals is without question controversial. In the interest of writing music that is distinctly Canadian but also maintains its position in the Western art music tradition, he retains Western instruments, notation, and style, but fuses them with different aspects of indigenous cultures. Schafer's own "colonization" of indigenous cultures is ironic given his intentions are driven by a search for a Canadian identity not tethered to colonialism. Ultimately, the cost of freely using elements of First Nations culture in works such as *Princess* and *And Wolf Shall Inherit the Moon* is that questions of appropriation are raised.

Performer-Environment Interaction

The musicians and characters of *Princess* enhance our experience of nature through the types of sounds that they project. The vocal style of the characters as well as the music that corresponds to events in the story is primarily mimetic. Wolf slides between pitches and at times howls. The Three-Horned Enemy projects gruff articulations. The Princess sings glissandi, tremolos, and wide interval leaps—this is the only character performed by a classically trained

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[178] For background on the use of the Medicine Wheel and clan names in *And Wolf Shall Inherit the Moon* consult Waterman, "R. Murray Schafer's Environmental Music Theatre," 108–13.

[179] Scheffer, "The Self and the Wolf," 11–12.

singer. The Sun Disk performs in a manner similar to Wolf, but with more pronounced glissandi and a larger accompaniment, notably antiphonal singing and sustained cymbals and gongs. The six Dawn Birds feature music that corresponds to their movement on the lake. These vocal and instrumental parts consist of independent lines reminiscent of birdcalls, some actual species, others invented. In addition to their distinct singing styles, several characters are equipped with megaphones of different sizes. The Princess, the Sun Disk, and Wolf use non-electric megaphones. The Three-Horned Enemy uses a 20-watt megaphone and an optional walkie-talkie with additional walkie-talkies positioned in trees around the audience.[180]

Listeners familiar with soundscape studies may distinguish the contrasts in vocal style and amplification technology on the basis that some contribute to a balanced soundscape while others "pollute" it. This hierarchy of sound types is fundamental to Schafer's model of soundscape.[181] In *The New Soundscape* (1969), Schafer claims: "Motors are the dominant sounds of the world soundscape. All motors share one important feature: they are low-information, high redundancy sounds. That is to say, despite the intensity of their voices, the messages they speak are repetitive and ultimately boring."[182] Schafer contrasts monotonous motors with the more

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[180] Schafer, *Patria: The Prologue* The Princess of the Stars, 6.

[181] Central to Schafer's theory of soundscape is the changing relationship between Western society and the sonic environment. Through a series of historical developments traced to the Industrial Revolution, Schafer concludes that human-associated sounds now dominate the environment, in particular those produced by machines. In addition, the focus among industrialized societies on material wealth and economic progress has, for Schafer, bred inattention to and arguably detachment from the sounds of the environment. Recent scholarship has criticized Schafer's polarization of "hi-fi" and "lo-fi" soundscapes. For example, Ari Kelman claims that the concept of soundscape becomes a problem when prejudice is held against urban sounds. Ari Kelman, "Rethinking the Soundscape: A Critical Genealogy of a Key Term in Sound Studies," *The Senses and Society* 5, no. 2 (2010): 212–34. Timothy Ingold argues against the term "soundscape" altogether, claiming that sound is not an object of perception; rather, it is "the medium of our perception. It is what we hear in." Timothy Ingold, "Against Soundscape," in *Autumn Leaves: Sound and the Environment in Artistic Practice*, ed. Angus Carlyle (Paris: Double Entendre, 2007), 11.

[182] R. Murray Schafer, *The New Soundscape: A Handbook for the Modern Music Teacher* (Toronto: Clark & Cruickshank, 1969), 57–58.

complex sounds of birds.[183] Birdsong carries important information for not only birds (attracting a mate and territorial display) but also for humans (species identification and season). Some machine sounds have a communication role, such as the bell and steam whistles on a train, while others are the mere byproduct of a human action, for example an airplane or the rattling and scraping metal of a train.

This hierarchy based on content and decibel levels carries over to *Princess*. It is exemplified in the contrast between the delicate melodic lines associated with the Dawn Birds and the brash vocalizations of the Enemy. The polarity of the two characters also extends to the notation in the score. "Arrival of the Dawn Birds" and "Dance of the Dawn Birds" (Editing Units 8 and 9) feature a part-score in graphic notation and individual parts in either conventional or graphic notation. The part-score consists of hand-drawn lines that allude to the rich avian sounds of a dawn chorus (see Example 3.1).[184] The percussion parts are written as flat lines (akin to woodpeckers); the flute, clarinet, and trumpet lines feature contour (like many songbirds); and the choral parts consist of shapes, some of which look like birds in flight. The individual parts for flute, clarinet, and trumpet are in conventional notation, while the singers and percussion are in frame notation (these parts are discussed in detail later in this chapter).

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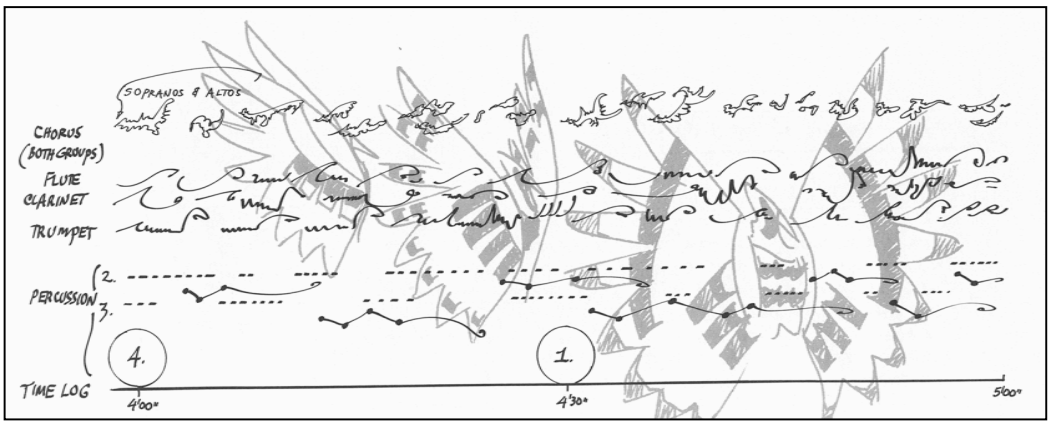
[183] See, for example, Schafer, *The New Soundscape*, 59. In a recent interview with Leath Tonino, Bernie Krause articulates that the presence of non-informative human-associated sounds has not only increased, but sounds such as airplanes and car traffic are proven to have negative impacts on other species. He asserts: "This sort of incoherent human noise can have a profound effect on certain organisms. It can cause chorusing frogs to lose their synchronicity. It can mask the sounds of other creatures, who may miss their chance to claim territory or locate a mate. The disruption and confusion also create a perfect opportunity for predators to make their move." Leath Tonino, "Call of the Wild: Bernie Krauss on the Disappearing Music of the Natural World," *The Sun* 465 (September 2014): 5. See also Bernie Krause, *The Great Animal Orchestra: Finding the Origins of Music in the World's Wild Places* (New York: Little, Brown and Company, 2012), especially chapter seven, "The Fog of Noise."

[184] The visual layout of this section resembles Schafer's *Snowforms* (1981). *Snowforms* consists of a graphic score with hand-drawn lines that emulate the contours of snow-covered hills. A comparison may also be made between Schafer's part-score and a spectrogram representing a hi-fi soundscape rich with animal activity.

The use of these two types of notation concurrently is not common in contemporary music. One interpretation is that Schafer uses conventional notation to create linearity or forward motion in the music and graphic notation to blend human performers in with the spontaneity of nature. "Spontaneity" is created here by the rate and spatialization of birdcalls audible over any given period of time. Human performers emulate these randomized elements of bird activity in "Arrival of the Dawn Birds" and "Dance of the Dawn Birds" by deciding when, and for the singers and percussionists what to play.

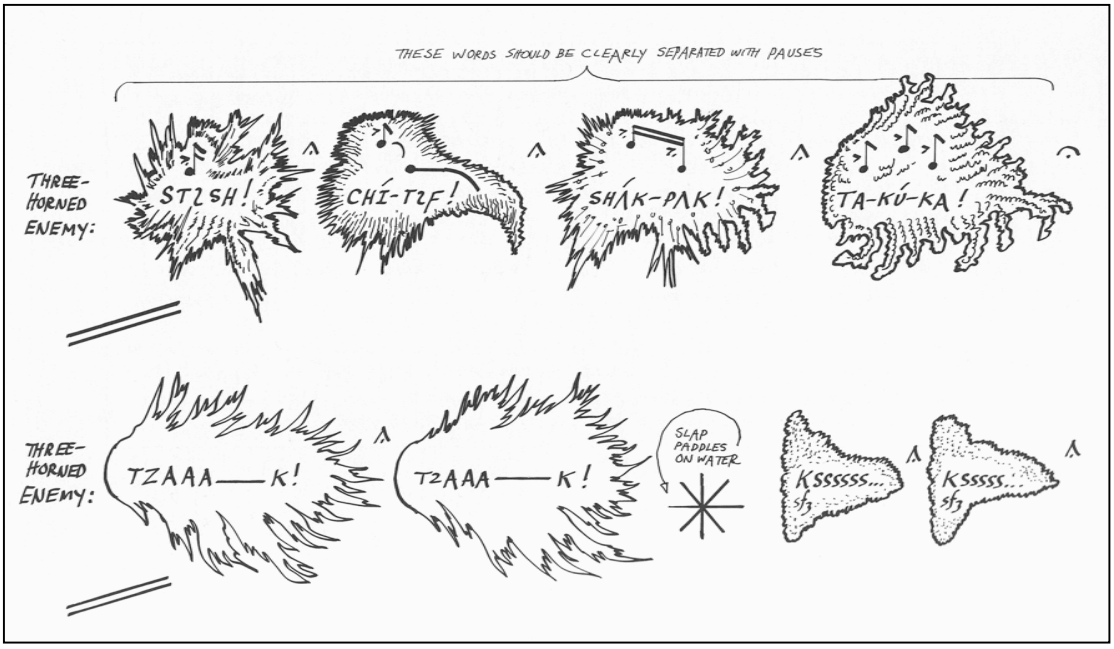


Example 3.1 Graphic Score for Music Associated with the Dawn Birds. © 1986 R. Murray Schafer, *Patria: The Prologue* The Princess of the Stars, Bancroft, ON: Arcana Editions, 35. Used by permission.

In contrast to the music associated with the Dawn Birds, the Three-Horned Enemy presents a series of sound masses with no text explaining how to interpret them.[185] As seen in "Aria of the Three-Horned Enemy" (Editing Unit 12; see Example 3.2), the rough shape of each vocal burst suggests a crude form of noise comparable to motors. In line with Schafer's

[185] Schafer also uses graphic notation for Wolf and the Sun Disk. These parts feature accent, rhythm, and intervals (represented with numbers and + and – signs). In contrast, the Enemy is provided with accent, rhythm, and relative intervals (represented by the amount of space between two note heads). Schafer provides a brief note on page 6 in the preface to the score explaining the parts of Wolf, the Enemy, and Sun Disk. However, there is no mention of specific musical elements, numbers, or + and – signs. For discussion of these elements see MacKenzie, "A Twentieth-Century Musical/Theatrical Cycle," 132.

understanding that motors lack important information, the Enemy pollutes the outdoor performance location through its projections. The potential for the Enemy to disrupt acoustic space is even more apparent when compared to the acoustical fineness of the music associated with the Dawn Birds. Given its role as trickster in *Patria*, however, the Enemy may symbolize the power and temptations of technology, in addition to noise pollution. The Enemy's use of an electronic megaphone enhances its abilities beyond the limits of the human voice; that is, its vocalizations penetrate the environment at a level only attainable through modern-day technology. Where the Enemy uses electronic amplification to bolster its identity, other characters turn to non-electronic megaphones and the acoustics of their immediate environment, in particular echoes.



Example 3.2 Graphic Score for the Three-Horned Enemy. Schafer, *Patria: The Prologue* The Princess of the Stars, 50. © 1986 Arcana Editions. Used by permission.

Echo and Reverberation

The unaccompanied aria that opens the work ("Aria of the Princess," Editing Unit 1) exemplifies one of the key ways in which Schafer directs musicians to engage their surroundings: the activation of outdoor acoustics. Over the course of approximately seven minutes, the soprano/mezzo-soprano explores echoes and reverberation around the lake.[186] Echo and reverberation are both categories of sound reflection. Echo entails the discernable repetition of sound waves (i.e., the reflection of sound off of a surface is audible as a repeated sound event). In contrast, reverberation involves the repetition of sound waves at a rate where they are not discernable (i.e., the reflection of sound is more closely spaced in time than echo, resulting in an overlap of sound events). Schafer's integration of environmental acoustics in the "Aria of the Princess" is arguably Thoreauvian, like his treatment of indigenous cultures in the work (see Erin Scheffer's observation above). The soloist's voice is thrown back from remote surfaces and, at times, the sense of space between her voice and the distant terrain closes and a sensation of union is created.

Thoreau ruminates on the sounds of New England in a number of his journal entries. These include natural phenomena, animals, his own sounds (namely his voice and flute playing), and other human-associated sounds (trains, bells, wagons, etc.). For Thoreau, human sounds are

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[186] These echoes vary depending on the physical attributes of the performance location as well as atmospheric conditions. Two commercially-available recordings demonstrate this variability: *Patria – R. Murray Schafer*, "Aria of the Princess," performed by soprano Wendy Humphreys, recorded September 8, 1995, Opening Day, ODR 9307, 1996, CD; and *Canadian Composers Portraits: R. Murray Schafer*, "Aria of the Princess," performed by Wendy Humphreys, (date unknown; possibly September 12-14, 1997), Centrediscs/Centredisques, CMCCD 8902, 2002, CD. The first was recorded at Lake Muskoka, near Gravenhurst, Ontario, and the second at Wildcat Lake near Haliburton, Ontario. The echo at Lake Muskoka is less prominent than at Wildcat Lake. Also, bird activity is abundant on the Lake Muskoka recording. The Wildcat Lake recording presents heavy rain, occasional birdcalls, wind interference, and (at 7'30") an overhead airplane. Note that the microphones were likely placed further away from the singer at Wildcat Lake, as the voice sounds more distant than on the Muskoka recording.

improved by the attributes of the environment.[187] In other instances, he perceives both human and non-human sounds as a larger whole. In his journal entry of 11 January 1855, he writes:

> I hear faintly the cawing of a crow far, far away, echoing from some unseen wood-side [. . .] It mingles with the slight murmur of the village, the sound of children at play, as one stream empties gently into another, and the wild and tame are one. What a delicious sound![188]

As this encounter demonstrates, Thoreau viewed human sounds as aesthetically pleasing when mixed with non-human sounds. Furthermore, he understood instances where the physical terrain shaped environmental sounds as a type of enhancement.

Jeff Todd Titon notes that, for Thoreau, echo is a signal of "co-presence"; that is, of a sound associated with its source as well as a sound restated.[189] Titon writes of this acoustic phenomenon:

> Echo, I have been thinking, is to hearing what reflection is to seeing. Reflection challenges our normal perception of space. Echo transforms our perception of both time and space. Both are doublings (though not exact imitations); original and near-copy are both present, the reflection simultaneously with the original, the echo later, though usually overlapping in time. (That is, the original sound remains in memory, if not still present to the ear, when the echo is heard.)[190]

In the context of *Princess*, echoes empower the Princess by resounding her aria far beyond the lake. Her voice is slowed down, amplified, and the timbre modified. If we understand timbre as that which defines her identity from the perspective of sound, then in these moments the echo is

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[187] There are numerous places in his journal where Thoreau revels in the appeal of echoes. See, for example, "The Echo of the Sabbath Bell Heard in the Woods," in *The Journal of Henry D. Thoreau*, ed. Bradford Torrey and Francis H. Allen, vol. 1 (New York: Dover Publications, 1962), 83.

[188] Torrey and Allen, eds., *The Journal of Henry D. Thoreau*, 822.

[189] Jeff Todd Titon, "Echo and Reflection," *Sustainable Music Blog*, 30 August 2012, http://sustainablemusic.blogspot.ca/2012/08/echo-and-reflection.html (accessed 2 August 2014). On the phenomena of echo, Thoreau writes: "The echo is, to some extent, an original sound, and therein is the magic and charm of it. It is not merely a repetition . . . but partly the voice of the wood." Henry D. Thoreau, *Walden: A Fully Annotated Edition*, ed. Jeffrey S. Cramer (New Haven and London: Yale University Press, 2004), 120.

[190] Titon, "Echo and Reflection."

simultaneously its own entity and also a heightened version of the original—we hear the Princess, but we also hear the mountains actively shaping her voice. While some listeners may interpret the dual presence of the voice of the Princess and the "voice" of the physical environment as a form of synergy, this is not a union between a human voice and nature. Instead, the echo assists the Princess in her call for help; it passes her message out beyond the lake.[191]

Schafer uses different lengths of pause between phrases to explore acoustic space in "Aria of the Princess." Sustained notes followed by a longer pause permit distinct echoes. Extended figurations followed by a short pause create strong reverberation. One example of the alternation between echoes and reverberation is from 2'13"–3'20" (see Example 3.3). At 2'13" a quick succession of notes unfolds, gradually building to fortissimo. After a long pause (represented by a curved fermata), Schafer presents a series of sustained notes followed by increasingly shorter breaks (first single-and-double inverted triangle fermatas and then commas). At 3'07", the vocal line builds to arguably the most prominent echoes heard in the aria, where a triple forte Eb freefalls by an octave. This glissando is repeated twice as a sequence descending by perfect fifth. Schafer deems the echoes stimulated at the end of this section important, as he writes at the bottom right of the score: "pause for echoes."

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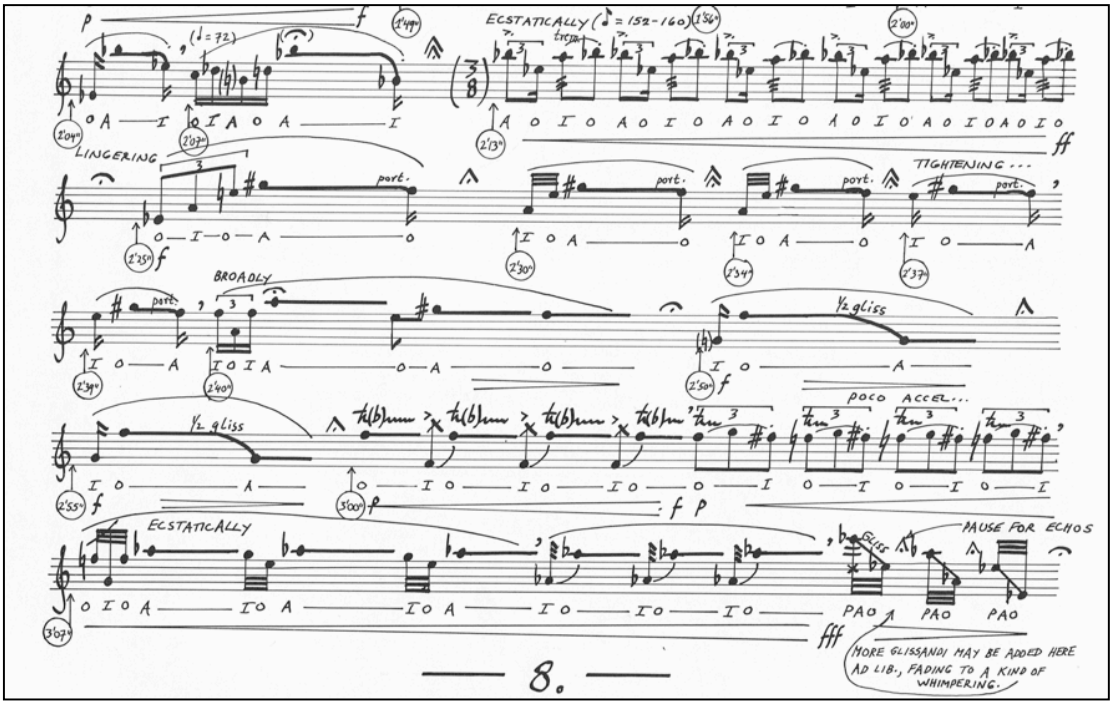
[191] It is tempting to compare the Princess of the Stars to Eurydice: both are trapped, awaiting the rescue of someone driven by love (Wolf, in the case of *Princess*; Orpheus, in the case of the myth of Orpheus and Eurydice). However, in *Princess* the echo resounds the voice of the prisoner, not the hero. Furthermore, the Princess has greater control of the echo than that of Orpheus in canonic musical settings. For example, in Monteverdi's *L'Orfeo* the echo silences Orpheus. For more on echoes in opera see, Daniel K. L. Chua, "Untimely Reflections on Operatic Echoes: How Sound Travels in Monteverdi's *L'Orfeo* and Beethoven's *Fidelio* with a Short Instrumental Interlude," *The Opera Quarterly* 21, no. 4 (2006): 573–96.



Example 3.3 “Aria of the Princess” at 2’13”. Schafer, *Patria: The Prologue* The Princess of the Stars, 8. © 1986 Arcana Editions. Used by permission.

Schafer diversifies the echoes that the singer potentially triggers through the use of both pitch and interval. In terms of pitch content, “Aria of the Princess” is based on the prime and retrograde form of an all-interval twelve-tone row known as a “wedge” series (see Figure 3.3).[192] The row is used throughout the *Patria* cycle as a unifying device; hence, it is commonly referred to as the “*Patria* row.” Although Schafer refers to *Princess* as “almost completely a 12-tone piece of music,” the composition is not strictly serial.[193] In “Aria of the Princess” he follows the row sequence, but is flexible in his application of twelve-tone techniques. For example, Schafer often elaborates on a given pitch class in the row using the previous pitch class before

[192] For discussion of this “wedge” series in other works in the *Patria* cycle see MacKenzie, “A Twentieth-Century Musical/Theatrical Cycle,” 138–46; and Stephen Adams, *R. Murray Schafer*, Canadian Composer Series, no. 4 (Toronto: University of Toronto Press, 1983), 140–44.

[193] Tina Pearson, “Beyond *RA*: R. Murray Schafer in Conversation,” *Musicworks* 25 (Fall 1983): 9. Several sections of *Princess* are freely composed, such as “Battle on the Water” (Editing Unit 13) and “Arrival of the Sun Disk” (Editing Unit 14).

proceeding through the sequence. In other scenes, such as "Dance of the Dawn Birds," pitch collections from the row are used, but the row is not stated in its entirety. In this way, Schafer rejects the strict control that serial techniques can offer, and instead uses the "wedge" series as a formal device.

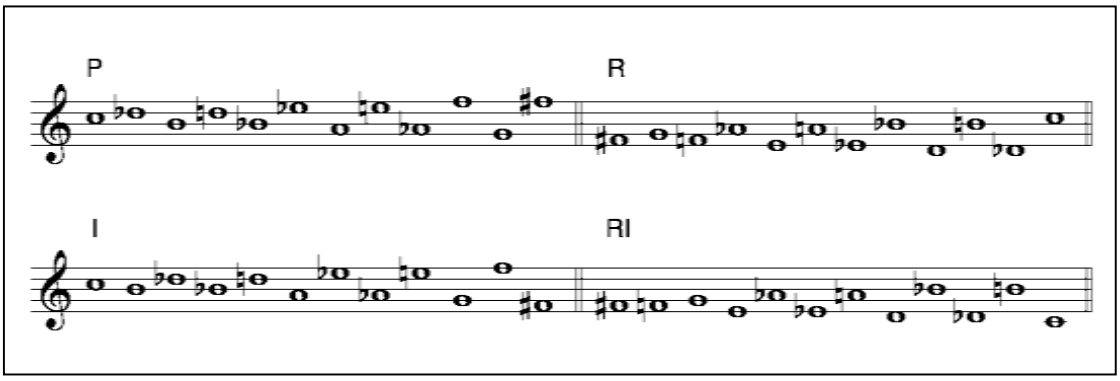


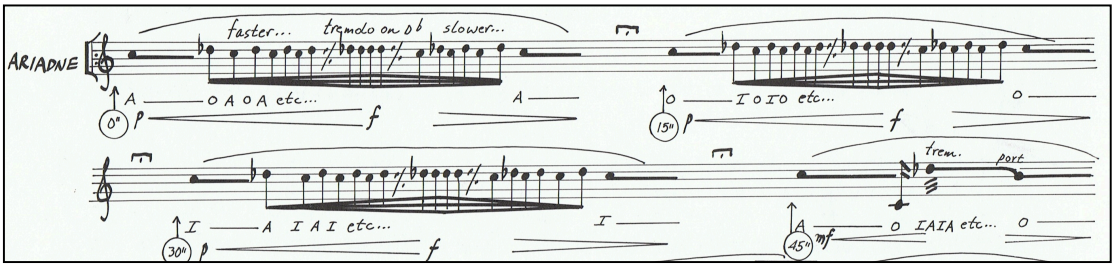
Figure 3.3 *Patria* Row.

The "wedge" series is distinct in terms of its measured interval displacement; that is, the space between pitch classes widens consistently regardless of row transformation. The *Patria* row starts on middle C and expands by semitone in alternating directions. Schafer utilizes this quality of expansion by structuring the aria as a loose palindrome. The prime form of the row unfolds until 3'07", where the row folds back in retrograde. This is particularly applicable in an outdoor context. As the intervals widen the singer activates a variety of echoes, and as they close back towards middle C those same echoes are triggered, but are now narrower in scope.

Another important feature of this row is the tritone, in particular the Eb–A, which serves as a lynchpin for the series. The Eb–A tritone creates a pole in the middle of the row, where the corresponding tritone for each pitch expands outward (Eb–A, Bb–E, D–Ab, etc.). Schafer uses tritones primarily to create momentum leading to a resting point that is followed by a change in pitch content, sometimes the introduction of new pitch classes in the series. Such is the case at 2'13" where the Eb–A tritone features prominently in a brisk, repeated motive (see Example

3.3). This passage builds to fortissimo where (after an extended pause) new pitch classes are introduced (E–Ab[written G#]–F).[194] The same effect is created at 5'55, but with the order as Eb–A. The only other appearance of tritones is at the end of the aria, where the soloist fades out on F#–C.

As central as tritones are, of greater interest to Schafer is the interval between neighboring pitch classes. For example, the aria begins with the voice moving between C and Db (the first two pitch classes of the row in prime form) (see Example 3.4). The singer sustains a C5, crescendos and accelerates through a C5–Db5 oscillation, peaks on a Db5 tremolo, decrescendos and slows down through the same C5–Db5 oscillation, and fades on C5 to a square fermata.[195] By extending the amount of time spent on each pitch class, Schafer allows the singer ample time to spend with the echo stimulated by each pitch class.



Example 3.4 "Aria of the Princess" at 0'00". Schafer, *Patria: The Prologue* The Princess of the Stars, 8. © 1986 Arcana Editions. Used by permission.

The Princess repeats her aria while the Presenter is paddled from the far end of the lake towards the audience during "The Dawn Light Breaks" (Editing Unit 2). This section extends the dialogue between the Princess and the environment to include the Presenter, double chorus, and

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[194] This is the only passage in the aria where three new pitch classes are stated in sequence. Schafer consistently spends time acclimatizing a new pitch class to others before it before introducing the next in the row.

[195] Maria Anna Harley points out that such passages share characteristics with the call of the Common Loon. Harley, "Canadian Identity, Deep Ecology and R. Murray Schafer's 'The Princess of the Stars,'" 128.

four percussionists. The Presenter pauses three times on the lake (at approximately two-minute intervals), reciting "KÁ-NI-O-TAI" and "NÍ-O-TAI" to the audience ("KÁ-NI-O-TAI" and "NÍ-O-TAI" are variations on the Onondaga and Seneca word for "lake"). Following each recitation, select voices from the two SATB groups (positioned on opposite sides of the lake) repeat the music sung by the Princess but with indigenous words for "lake," "princess," "moon," "wolf," and "star." The soprano and alto in Group One are the first to enter, followed by the soprano and alto in Group Two, and finally the tenors and basses in both groups.[196]

The performers not only stimulate new echoes, but also echo the Princess by responding to her calls. Schafer writes in the score: "At times a singer may also echo another singer who has previously echoed the Princess. The effect of the echoes should be gradually accumulative, but never to the point where the aria of the Princess is obscured."[197] As the musicians transmit the voice of the Princess around the lake, it is a challenge to discern whether the message is from a mythic or a human source. This effect is created through the distribution of musicians and their position away from the immediate shore of the lake (see Figure 3.2)—not to mention that this scene is also performed pre-dawn. Schafer encourages the audience to not associate sound with source during this scene, and to allow the spatial richness of the Princess' voice echoing around the lake to saturate their ears.

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[196] A similar effect is created during "Arrival of the Sun Disk" (Editing Unit 14), where the two SATB groups not only stimulate echoes but also echo each other antiphonally. In the score Schafer writes: "The singers should be spread out somewhat for this section. Also they should turn continuously in different directions in order to take advantage of varying echoes and reverberation." Schafer, *Patria: The Prologue* The Princess of the Stars, 58.

[197] Schafer, *Patria: The Prologue* The Princess of the Stars, 10.

Interspecies Dialogue

In addition to stimulating outdoor acoustics, Schafer turns to birds in the area for musical effect. The dawn chorus is a key feature of "Arrival of the Dawn Birds" and "Dance of the Dawn Birds" (Editing Units 8 and 9), and any production of *Princess* must be timed accordingly.[198] Audience members may identify certain birds imitated by the double chorus, while others are "unrecognized or mythical."[199] The music for the double chorus consists of transliterations of birdsongs; that is, syllables used by ornithologists to imitate bird species. (Schafer is mindful here not to conform birdsong to Western notation through the use of rhythm and pitch.) The flute, clarinet, and trumpet also participate in this interspecies dialogue, but with invented birdsong motives. Like "Aria of the Princess," these parts are based on the *Patria* row. Schafer isolates pitches in both prime and retrograde orderings to imitate birdsong. The percussion is arguably the most convincing in terms of its imitation of species (specifically woodpeckers and sapsuckers) due to its timbre and emphasis on rhythm (versus melody). Through the use of both transliterations and stylized motives, Schafer creates a texture where musicians co-inhabit acoustic space with birds, but enhance what is heard in nature alone.

While the imitation of birds using a twelve-tone row may seem restrictive (even unnatural), the stylistic features of these melodic figures are convincingly avian. For example,

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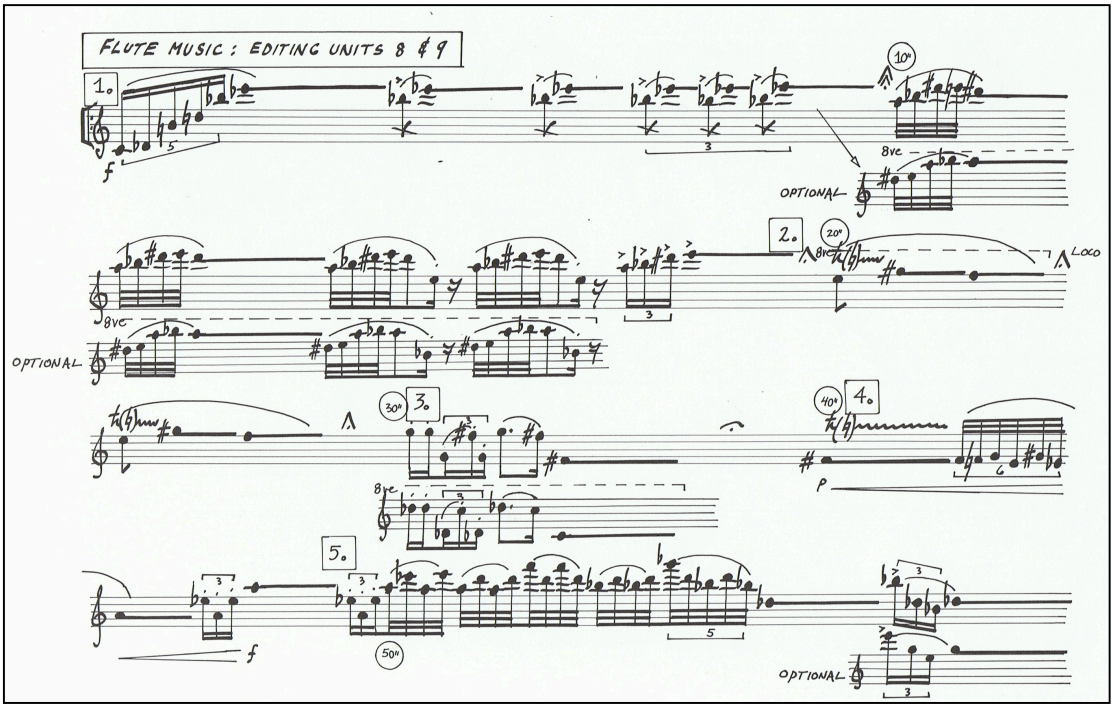
[198] Note that bird activity in September (when *Princess* is performed) is reduced compared to May when bird migration is at its peak. In the midst of global climate change, bird species present at future performance sites in Canada may change in the future. Species range will shift north to more habitable environments, thus enhancing the performance of *Princess*, but carrying with it the irony of "original" habitat loss. See "The Audubon Birds and Climate Change Report," http://climate.audubon.org/ (accessed 13 October 2014).

[199] Schafer, *Patria: The Prologue* The Princess of the Stars, 88. During the 1985 Two Jack Lake performance it would have been possible to hear the birds mentioned in the score excluding the Common Yellowthroat, which does not inhabit Alberta. Several birds not transcribed may also have been audible during the autumn performance, notably the Marsh Wren and Nighthawk. For a detailed explanation of which musicians imitate which bird(s) consult Harley, "Canadian Identity, Deep Ecology and R. Murray Schafer's 'The Princess of the Stars,'" 126–28.

the opening flute passage shares rhythmic and intervallic qualities with a number of North American birdsongs (see Example 3.5). These include sustained notes, quickly repeated dyads, and arabesque-like figurations. As the flute introduces new stylized birdsong motives (marked by numbers), the clarinet and trumpet enter in canon sixty-seconds apart, where their entrances are announced by the tam tam in Percussion 4. They preserve the rhythm and intervals played by the flute, but change the pitch content. Such is the case with the opening passage up to 0'10", which follows the retrograde form of the row (as opposed to prime form in flute).[200] Upon the arrival of the Dawn Birds at the center of the lake (now the start of "Dance of the Dawn Birds"), the sopranos and altos enter, followed by the tenors and basses. The horn and tuba later join with rising and descending dyads that correspond to the wing motion of the Dawn Birds. The ensemble builds at the same time as the dawn chorus, and the dense layering of musicians enhances (if not overrides) the bird activity.

[200] Other motives include a G–F# dyad displaced at the octave (at rehearsal number 3), a retrograde of the first three pitches (B–Db–C) in the form of a sextuplet (at rehearsal number 6), and a retrograde of pitches two through eight (E–A–Eb–Bb–D–B–Db) (at rehearsal number 11).



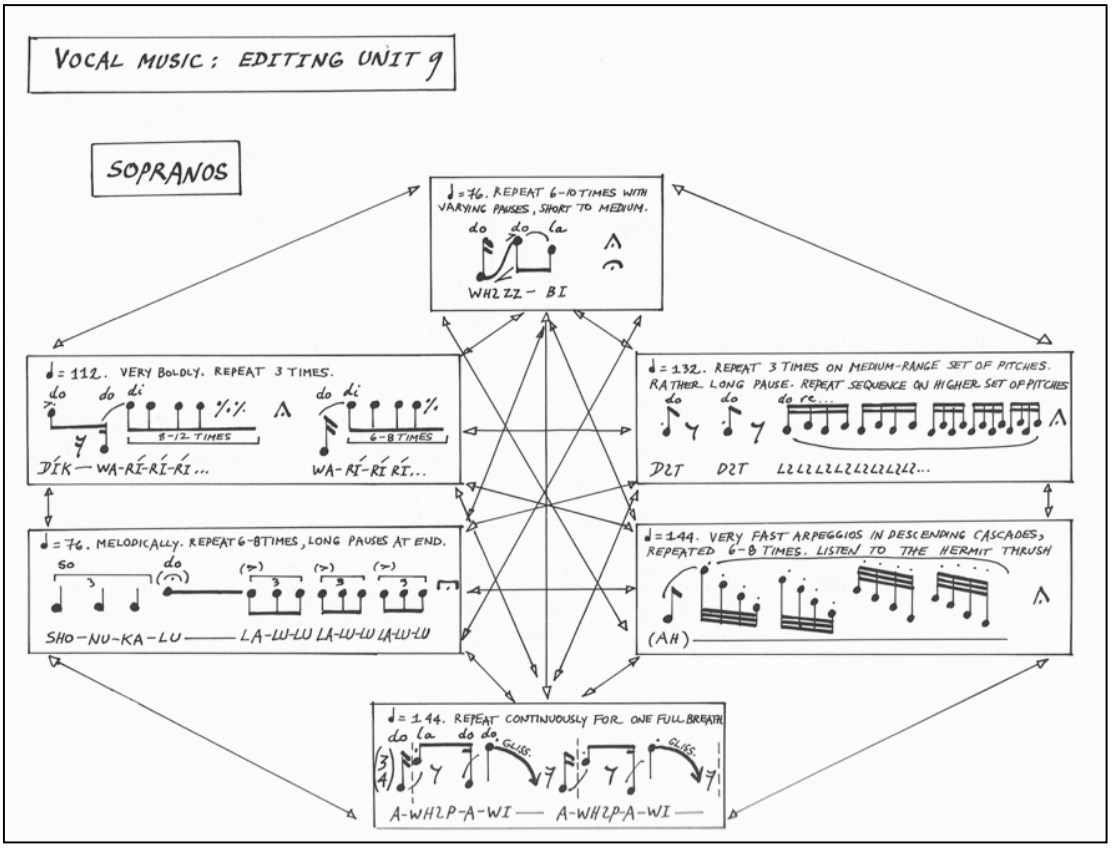
Example 3.5 Music for Flute, "Arrival of the Dawn Birds." Schafer, *Patria: The Prologue* The Princess of the Stars, 37. © 1986 Arcana Editions. Used by permission.

Although the music is inspired by the soundscape, the sonic environment is instilled with distinctly human qualities. This is not only through the use of a twelve-tone row and a canon in the flute, clarinet, and trumpet, but also through the use of frame notation in the double chorus and Percussion 2 and 3 (see Example 3.6).[201] Each part consists of six frames connected by arrows.[202] After the completion of a given frame, the musicians are given the option to move to any of the other five frames. The tempos for each part also vary. The sopranos and altos play up to four different tempos and the tenors and basses pick from among five; the flute, clarinet, and trumpet follow duration times marked on the score; the percussionists decide on their own

[201] For more on frame notation see Erhard Karkoschka, *Notation in New Music: A Critical Guide to Interpretation and Realisation*, trans. Ruth Koenig (London: Universal Edition, 1972), 55–61.

[202] Schafer is not the first composer to use these notation symbols. For example, John Cage's *Concert for Piano and Orchestra* (1958) features arrows (at letter "J"), overlapping frames (at letter "K") and long hand-drawn lines connected by pitches where performers determine what to play in between (at letter "M").

tempo; and the horn and tuba follow the physical movement of the Dawn Birds' wings. The measurement of repetition also varies, ranging from an exact number of repeats to "one full breath."



Example 3.6 Music for Sopranos, "Dance of the Dawn Birds." Schafer, *Patria: The Prologue* The Princess of the Stars, 40. © 1986 Arcana Editions. Used by permission.

We might say that this section of *Princess* emulates the organization of a dawn chorus through layering and chance elements. The accumulation of different tempos and repetitions, along with randomization, creates music that builds like a dawn chorus.[203] The location, number,

[203] Einojuhani Rautavaara's *Cantus Arcticus* Op. 61 (Concerto for Birds and Orchestra) (1972) and John Luther Adams' *Songbirdsongs* (1974–79) are two other examples that capture the spontaneity of bird activity in nature. In the third movement of *Cantus Arcticus*, "Swans migrating," four groups of musicians enter subsequently over a field recording of swans—Rautavaara writes in the score that the performers are "only summarily synchronized musically." For each of the nine movements in

and rate of birdcalls during a dawn chorus are not pre-determined, but the number and rate steadily increase. Likewise, the flute joins the initial birds of the dawn chorus, followed by the clarinet and trumpet, and then the chorus and percussion, which represent other species. As musicians are added to the texture, the ensemble emulates the emergent properties of the dawn chorus.

Rewilding the Stage and Soundscape

"By mythologizing the fluctuations of nature we have intensified our own experience of it. We begin to flow with it rather than against it. We no longer spite it or shut it out as we do in covered theatres. This is our stage set, and we have become one with it, breathing it, feeling it in all its mystery and majesty."

—R. Murray Schafer[204]

The Princess of the Stars creates a heightened experience of nature by staging a mythic story on a lake where musician-environment interaction plays a key role. At times, performers explore outdoor acoustics. In other instances, they interact with fellow performers or birds. Schafer invites us to reconsider concert-hall aesthetics through his use of unconventional compositional techniques in an outdoor setting and also by giving nature an active role in his work. *Princess* also revisits how we understand our place in the environment as humans; specifically, how we shape the natural world and what we might do to improve the quality of the soundscape. This enhanced experience of nature through music overlaps with the concept of rewilding.

The idea of rewilding entails the physical restoration of ecosystems as well as reconditioning our relationships to those ecosystems.[205] Michael Soulè and Reed Noss assert in

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Songbirdsongs, two piccolos and three percussionists choose from a number of birdsong motives. The musicians are also given choice (to an extent) over when to enter.

[204] Schafer, *Patria: The Complete Cycle*, 108.

their formulation of rewilding successful ecosystem restoration is not dependent on science-based conservation efforts alone. They emphasize that human values play an important role, in particular "the ethical issue of human responsibility" and "the subjective, emotional essence of 'the wild' or wilderness."[206]

George Monbiot weighs further the human element when he states that rewilding enables not only "the mass restoration of ecosystems" but also "the rewilding of our own lives." Monbiot continues:

> I believe the two processes are closely intertwined—if we have spaces on our doorsteps in which nature is allowed to do its own thing, in which it can be to some extent self-willed, driven by its own dynamic processes, that, I feel, is a much more exciting and thrilling ecosystem to explore and discover, and it enables us to enrich our lives, to fill them with wonder and enchantment.[207]

In an effort to restore the dynamicism of ecosystems, Monbiot asks us to reconsider how we manage the natural environment. Do we continue to maintain outdoor spaces according to aesthetic preferences, or do we reduce our involvement and let nature take its own course? Proponents of rewilding argue that a hands-off approach not only increases biodiversity and

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[205] Michael Soulè and Reed Noss define rewilding as "the scientific argument for restoring big wilderness based on the regulatory roles of large predators." Michael E. Soulè and Reed Noss, "Rewilding and Biodiversity: Complementary Goals for Continental Conservation," *Wild Earth* 8, no. 3 (Fall 1998): 22. Thus, large areas of land must be preserved for large predators as well as corridors to connect these spaces. Ibid., 22. The Yellowstone to Yukon Initiative (Y2Y) is one example of a contemporary effort to establish a single wildlife corridor—it aims to expand and connect protected parks from Colorado, USA, to the Yukon, Canada. Soulè and Noss' efforts for restoring ecosystems are in response to human abuse to the environment through "overgrazing, riparian habitats, irrigation and hydroelectric projects, [etc.]." They assert that "[rewilding] is one essential element in most efforts to restore fully functioning ecosystems. Repairing all past insults requires a comprehensive effort." Ibid., 24. Caroline Fraser informs us that the term was likely coined by Dave Foreman but first appeared in Jennifer Foote, "Trying to Take Back the Planet," *Newsweek*, 5 February 1990. Caroline Fraser, *Rewilding the World: Dispatches from the Conservation Revolution* (New York: Metropolitan Books, 2009), 356.

[206] Soulè and Noss, "Rewilding and Biodiversity," 24.

[207] George Monbiot, "The Great Rewilding: A Conversation with George Monbiot," by Jennifer Sahn, *Orion* (January/February 2014), http://www.orionmagazine.org/index.php/articles/article/7966. See also George Monbiot, *Feral: Searching for Enchantment on the Frontiers of Rewilding* (Chicago: University of Chicago Press, 2014).

improves the resiliency of ecosystems but also invites us to revisit how we conceptualize the natural world.

Although Schafer's concerns are not with species imbalance (not to overlook his use of a large predator as a protagonist—Wolf), imbalances in human-environment relationships are a central theme in his outdoor theatre work. He sets out to recondition (or at least reawaken) those involved in a *Patria* production to the soundscape by positioning each person at the center of the environment, where attention is paid to all sounds with equal attention.[208] According to Sabine Breitsameter, Schafer's model of soundscape shifts our understanding of the sonic environment away from time to space. She explains: "Schafer turns away from a selective attitude of eavesdropping (listening to a certain content or signal, and ignoring others), but wants to foster an evenly suspended attention to any sound. This 'mosaic approach' to the auditory world favours an overall auditory awareness: all at once – nothing should be ignored."[209] The distribution of musicians in *Princess* promotes this kind of suspended, omnidirectional listening.

In addition to cultivating spatial and auditory awareness, Schafer features music in *Princess* that is "driven by its own dynamic processes." The score has degrees of freedom in it, created by the inclusion of chance elements. Such is the case in "Dance of the Dawn Birds," where singers and percussionists choose from among several frames to play. As the physical contours and atmospheric conditions of the lake assure that nature itself makes each performance

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[208] For a close reading of Schafer's model of soundscape, see Sabine Breitsameter, "Ways of Listening, Figures of Thought: On the History and Perspective in R. Murray Schafer's *The Tuning of the World*," trans. Norbert Ruebsaat, in *Ways of Listening, Figures of Thought: A Festschrift for R. Murray Schafer on the Occasion of His 80th Birthday*, ed. Sabine Breitsameter and Eric Leonardson, Dieburg Series on Acoustic Ecology, vol. 3, 17–36 (Darmstadt: Service Printmedien, 2013).

[209] Sabine Breitsameter, "Schafer's and McLuhan's Listening Paths: Convergences, Crossings, and Diversions." *Soundscape: The Journal of Acoustic Ecology* 11, no. 1 (2011): 20.

of *Princess* distinct, the use of chance elements in "Dance of the Dawn Birds" guarantees that performers help create a different performance each time.

Schafer is not concerned with the destructive powers of nature, but rather with the potential for human action. In accordance with the concept of rewilding, human responsibility comes with humility. Soulè and Noss assert:

> Wilderness is hardly "wild" where top carnivores, such as cougars, jaguars, wolves, wolverines, grizzlies, or black bears have been extirpated. Without these components, nature seems somehow incomplete, truncated, overly tame. Human opportunities to attain humility are reduced.[210]

Likewise, a balanced soundscape required that humans revisit their sonic presence in the work so as to avoid perpetuating models of domination, and thus deterioration. Writing about *Princess*, Schafer asserts: "…as we participate with these forces [of nature], allowing them to influence us in every way, is it not possible to believe that we as performers and audience are influencing them as well?"[211] Although the production may temporarily disrupt—if not scare away—nearby animals, Schafer affirms that mounting an outdoor work that features musician-environment interaction is a productive way to recondition both audience members and performers to nature.

In order to embrace the natural world more fully, both the audience and those involved in the production must first surrender to it. The audience sacrifices the comforts of the concert hall, and performers permit the environment to shape their sounds. They commit to the performance regardless of the weather and allow the environment to shape their music. In exchange, musicians are given the opportunity to participate in the soundscape in new ways (as both listeners and sound makers). It is at locations such as Two Jack Lake that nature is arguably free to self-govern (at least more than in heavily populated areas), and where nature is perceived in its

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[210] Soulè and Noss, "Rewilding and Biodiversity," 24.
[211] Schafer, *Patria: The Complete Cycle*, 106.

most pristine form for many audience members. For example, witnessing the canoes and mythical characters at an iconic nature setting such as Two Jack Lake at pre-dawn would arguably stir a greater sense of "wildness" than experiencing the work at a lake in an urban setting, where sound and light pollution may detract from this sensation. In this way, *Princess* is more than a retreat from city conditions. It creates an all-sensorial wilderness experience that can be understood as a method in which to instigate rewilding.

Chapter 4 From Representation to Transformation: Environmental Sounds as Symbols in Two Electroacoustic Works

With electroacoustic music, it is possible to insert any sound into a composition. Environmental sounds are among those most commonly used in the Western art music tradition. In the current discussion of nature in contemporary sonic art, the procedure of capturing real-world sounds and using them as compositional material raises a number of questions regarding the relationship between sound and source in electroacoustic music. Should listeners associate a recognizable sound with its original context? Or, should they experience it as a decontextualized sound? These are not only questions of how listeners experience recorded sounds, but also how composers intend for them to be heard. For example, in the tradition of musique concrète, recorded sounds are supposed to lose their associative properties before they function as musical material. According to Pierre Schaeffer: "As long as meaning predominates, and is the main focus, we have literature and not music."[212] Schaeffer reinforces this perspective when he remarks that it is easier to turn certain sounds into musical objects than others. He uses a bell and train as examples:

> The manipulation of the bells removed from them their identity as bells. They became unidentifiable. I had obtained a musical element that was pure, composable, and had an original timbre [. . . .] With the trains I was a long way from the field of music and, in effect, trapped in the field of drama.[213]

In order to transform the sounds of trains into music, Schaeffer spliced and looped the original recording.[214] By excerpting a desired portion of a train sound and repeating it, the train lost its associations with storytelling and reached its musical potential as a subject for a study in rhythm

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[212] Journal entry of 10 May 1948, Pierre Schaeffer, *In Search of a Concrete Music*, trans. Christine North and John Dack (Berkeley, CA: University of California Press, 2012), 13.

[213] Journal entry of 15 May 1948, Ibid.

[214] "I needed to take an 'extract' from the train and demonstrate its existence by repetition." Journal entry of 15 May 1948, Ibid.

and timbre.

Since Schaeffer's fundamental work with recorded sounds, composers have taken different approaches to using environmental sounds in electroacoustic music. Some build on the commitment to the sonic characteristics of source material in musique concrète, while others embrace the signifying properties of recorded sounds in order to engage real-world concepts and scenarios. This chapter investigates how two contemporary composers, Hildegard Westerkamp and Paul Rudy, utilize both the sonic characteristics and the referential aspects of recorded sounds in works that aspire to recondition listeners to the natural environment. Before examining works by Westerkamp and Rudy, it is important to consider two prominent approaches to composing with recorded material: acousmatic music and soundscape composition.

Schaeffer used the term "acousmatic" (French: "acousmatique") to describe the separation of a sound source from its audible effect in musique concrète.[215] The word "acousmatic" is derived from the Greek word "akousmatikoi," meaning "listeners." Schaeffer revived the term "acousmatic" from the story of the Pythagorean veil. The disciples of Pythagoras were said to listen to their teacher from behind a curtain (or in the dark, according to a different version of the story) so as to focus on the content of his speech and avoid visual distraction. Schaeffer saw parallels between the curtain that separated Pythagoras from his disciples and the space between listeners and recorded sounds as experienced on radio and recordings. The acousmatic situation of audio reproduction validated the use of real-world sounds as decontextualized sonic material in musique concrète. As well, the separation of sound and source made possible the disciplined practice of reduced listening; that is, where the

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[215] A complex history of the reclamation of this term in France can be traced from Guillaume Apollinaire to Jérôme Peignot. For a detailed discussion of this history, see Brian Kane, *Sound Unseen: Acousmatic Sound in Theory and Practice* (New York: Oxford University Press, 2014), 46–51, 73–79.

tendency to identify the source of a sound is suppressed in order to engage its musical qualities. Applications of the term "acousmatic" gradually changed as Schaeffer's colleagues started to explore new methods of composing with and listening to recorded sounds. The adjective/verb once used to describe musique concrète became the name of a genre.

Acousmatic music developed from the musique concrète of the 1950s. Until 1958, musique concrète was associated with the Groupe de Recherches Musique Concrète (GRMC) led by Schaeffer and Pierre Henry. At this time, Schaeffer formed a larger research collective called the Groupe de Recherches Musicales (GRM), which included the GRMC, the Groupe de Recherches Image, the Groupe de Recherches Technologiques, and the Groupe d'Etudes Critiques.[216] With the interdisciplinary atmosphere of the GRM, composers started to critique the commitment to reduced listening in musique concrète. They claimed that reduced listening, by its definition, placed unnecessary demands on listeners. Schaeffer gradually distanced himself from the GRM as a new generation of composers started to conduct more interdisciplinary work.[217] In 1966, he stepped down as its director, passing the position on to François Bayle. In 1974, Bayle coined the term "musique acousmatique" in order to distinguish his own unique approach to musique concrète, which calls for a complex array of loud speakers and a darkened space, from works that use live electroacoustic instruments such as the ondes Martenot and synthesizers. Although the term has maintained its association with music played through loud speakers and more recently headphones, acousmatic compositions no longer focus exclusively on

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[216] Several key members of the GRMC resigned during the transition to the GRM, including Philippe Arthuys and Pierre Henry. Luc Ferrari, François-Bernard Mâche, Bernard Parmegiani, and Iannis Xenakis were among those to join the GRM at the invitation of Schaeffer. Évelyne Gayou, "The GRM: Landmarks on a Historic Route," *Organised Sound* 12, no. 3 (2007): 207.

[217] Of particular interest to several new members was the relationship between sound and image in acousmatic music. See François Bayle, *Musique acousmatique: Propositions… …positions* (Paris: Buchet/Chastel, 1993); and Michel Chion, *Audio-Vision: Sound on Screen*, trans. Claudia Gorbman (New York: Columbia University Press, 1990).

the isolation of sonic content but also engage the signifying properties of source material.[218]

Luc Ferrari was the first composer associated with the GRM to acknowledge sound sources in his work. With *Presque rien n°1 ou Le lever du jour au bord de la mer* ("Almost nothing no. 1, or daybreak at the seashore") (1967–70), he recognizes both the sonic characteristics and the associative properties of his source materials. *Presque rien n°1* consists of field recordings from the coastal town of Vela Luka, Yugoslavia (now Croatia). Given the lack of studio processing, it may seem that *Presque rien n°1* is more a documentary than a musical composition. The work, however, is anything but unedited in terms of the ways in which material are assembled. Ferrari layers excerpts from multiple recordings with the sounds mixed equally to the foreground. At 8'55", for example, insects, a motor, human voices, and two notes on a wind instrument are introduced. Each sound source is perceived as equidistant from the listener, regardless of their proximity to the microphone in reality. The work comes across as "flat" as a result of this lack of spatial depth. Ultimately, listeners are given several options for engaging *Presque rien n°1*. They can experience it through associative listening (experiencing seaside sounds in context), reduced listening (focusing on the musical aspects of found sounds), or an alternation between both.[219]

Since Ferrari's exploration of the tenuous divide between decontextualization and

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[218] Simon Emmerson and Joanna Demers use the term "post-Schaefferian electroacoustic music" to refer to developments from musique concrète, perhaps to avoid any confusion between Schaefferian notions of "acousmatic" and post-Schaefferian applications of the concept. See Emmerson, *Living Electronic Music* (Farnham, UK: Ashgate, 2007), 7; and Demers, *Listening through the Noise: The Aesthetics of Experimental Electronic Music* (Oxford: Oxford University Press, 2010), 14. However, both acousmatic music and soundscape composition can be thought of as post-Schaefferian electroacoustic music on the basis that these genres recognize the associative properties of recorded sounds. Thus, the term "acousmatic music" is used in this chapter to refer to electroacoustic music that explores abstract topics and scenarios. This is in contrast to soundscape composition, which maintains a strong connection between source material and a specific real-world context.

[219] For more on *Presque rien n°1*, see Eric Drott, "The Politics of *Presque rien*," in *Sound Commitments: Avant-Garde Music and the Sixties*, ed. Robert Adlington, 145–66 (Oxford: Oxford University Press, 2009); and Kane, *Sound Unseen*, 123–26.

referentiality, composers have used real-world sounds to explore more abstract concepts. Topics range from child psychology (Francis Dhomont, *Forêt Profonde* [1994–96]) to geomorphology (Bernard Parmegiani, *La Création du Monde* [1982–84]), and from the human condition (Trevor Wishart, *Red Bird: A Political Prisoner's Dream* [1973–77]) to maritime culture and mythology (Natasha Barrett, *Trade Winds* [2004–06]). In order to lead listeners through more abstract scenarios, acousmatic composers treat sounds as signifiers. For example, in Wishart's *Red Bird* the sound of birds taking flight can be heard as a metaphor for freedom or escape. When heard at key moments in a composition, such sonic signifiers can play a powerful role in a work's narrative. Take for instance the transition in the second movement of Barrett's *Trade Winds*, "Submerged," to the third movement, "Open Ocean." At 1'51", organ music is heard along with bells, human voices (distant chatter and a ship captain), and various water sounds (splashes, crashes, bubbles, etc.). Barrett explains in the liner notes that the organ music represents Captain Nemo (from Jules Verne's *Twenty Thousand Leagues Under the Sea*).[220] As a visual reference, one interpretation of this composite of recorded sounds is the Nautilus submarine rising to the ocean surface. At the same time, the source material can be appreciated in absolute terms, where the organ, bells, voices, and water sounds are heard as a collage of sonic elements.

Engagement with both referential and musical properties is not unique to acousmatic music; it is also an important feature of soundscape composition. Soundscape composition is generally positioned in the tradition of acousmatic music, although its origins lie in soundscape studies.[221] One plausible explanation for the inclusion of soundscape composition in the

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[220] Natasha Barrett, liner notes to *Trade Winds*, Aurora, ACD 5056, 2007.

[221] For different perspectives concerning the association of soundscape composition with musique concrète, see Mitchell Akiyama, "Transparent Listening: Soundscape Composition's Objects of Study," *Canadian Art Review* 35, no. 1 (2010): 54–62; and Frank Dufour, "'Musique Concrète' as One of the

acousmatic tradition is that early soundscape works consist of recorded sounds. A more practical parallel between the two genres is the technology used to record and play back source materials. Both Luc Ferrari and members of the World Soundscape Project (WSP) captured sonic footage using the Nagra tape recorder and stereo playback. To focus on recorded sound is to consider one subgenre of soundscape composition. Another approach is digital signal processing, as seen in works by Barry Truax and by Damián Keller. Starting in the 1990s, Truax began combining manipulated found sounds and granulation (see *Pacific* [1990] and *Basilica* [1992]).[222]

The earliest soundscape compositions are found on the 1973 LP *The Vancouver Soundscape*, an album assembled by members of the WSP. Several works on the LP center on a single sound type, similar to Schaeffer's use of the multiple sounds associated with a single source in *Étude aux chemins de fer* (from *Cinq études de bruits*, 1948). However, compositions on *The Vancouver Soundscape* differ from those by Schaeffer in terms of how sounds are handled. These early works by members of the WSP do not feature the studio processing techniques that pervade Schaeffer's etudes. Instead, they consist of unmodified field recordings ranging from a few seconds to several minutes in duration.

The lack of studio processing in early soundscape compositions is explained by the WSP's strong interest in the original environment in which sounds were recorded, including any environmental or social associations. The works on *The Vancouver Soundscape* LP were meant to not only recondition listeners to the sounds of a specific place but also to inspire them to improve the overall quality of its soundscape; that is, to seek out sounds that are socially deemed

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Preliminary Steps to Acoustic Ecology," *Soundscape: The Journal of Acoustic Ecology* 8, no. 1 (Fall/Winter 2007): 17–20.

[222] A concise history of soundscape composition can be found in Barry Truax, "Genres and Techniques of Soundscape Composition as Developed at Simon Fraser University," *Organised Sound* 7, no. 1 (2002): 5–15.

pleasant and desirable and reduce those that are regarded as unwanted noise. As WSP member Barry Truax puts it: "[T]he successful soundscape composition has the effect of changing the listener's awareness and attitudes toward the soundscape, and thereby changing the listener's relationship to it. The aim of the composition is therefore social and political, as well as artistic."[223] In order to sensitize listeners to the sonic environment, several tracks on the LP present different forms of a single sound type. This taxonomic approach encourages listeners to notice variety where, in daily life, sounds are often attributed to their sources without reflection on their minute sonic details and real-world significance.

Take, for example, the gradual intensification of water-land interaction on "Ocean Sounds." At 6'04" in duration, the composition begins with gently lapping waves on a sand beach, transitions to rougher waves against a rock shoreline, and concludes with full surf on a sand beach. Through a comparison of these excerpts in terms of the different types of wave sounds, the duration between each wave crash, and their loudness, listener awareness is raised to the environmental conditions that create these varied forms of ocean sounds. The sounds on "The Music of Horns and Whistles" are marked by their societal function as well as developments in technology, rather than by changes in environmental conditions. Over the course of approximately three minutes, sixteen different horns and whistles (two steam- and fourteen air-powered) are heard in sequence. With a context-based approach to listening, observations of differences in timbre, frequency, intensity, or sound source (train, ferry, freighter, the "O Canada" horn) raise questions concerning the meaning of certain sounds. For example, what types of horns are signals of safety? What types symbolize modernity? Do certain types represent

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[223] Truax, *Acoustic Communication*, 237.

power? For listeners that share a connection with a historic Vancouver soundscape, specific horns may stir nostalgia.[224]

Shortly after publishing *The Vancouver Soundscape*, members of the WSP conducted a nation-wide soundscape study, from which several new compositions were developed using sounds sourced during their tour. These were later broadcast as *Soundscapes of Canada*, a series of ten one-hour radio programs first aired on CBC-FM "Ideas," October 21 to November 1, 1974. Some of these compositions maintain focus on the sounds associated with a particular source, similar to Schaeffer's *Étude aux chemins de fer*. These include Bruce Davis' *The Bells of Percé*, which centers on the church bells in Percé, Québec, and Peter Huse's *Directions*, which examines dialects and accents across Canada. Other works present a strong sense of physical movement and/or time-lapse, like *Presque rien n°1*. Such is the case with Barry Truax's *A Maritime Diary*, a recordist-led excursion through three coastal communities in Eastern Canada in search of soundmarks, and *Summer Solstice*, a condensed version of a 24-hour stationary field recording made near Westminster Abbey, in Mission, British Columbia.

Attention to the social and environmental conditions of the soundscape is maintained across *The Vancouver Soundscape*, *Soundscapes of Canada*, and more recent works. Barry Truax offers four criteria for a work to qualify as a soundscape composition, each of which reiterates context:

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[224] In 2011, sound artist Danny McCarthy created the sound installation *Found Sound (Lost at Sea)* in response to Ireland's decommission of its few remaining lighthouse foghorns. Soon after, Orlando Gough composed the large-scale outdoor work *Foghorn Requiem* (2013) to mark the UK's decommission of its last land-based foghorns.

> (a) listener recognisability of the source material is maintained, even if it subsequently undergoes transformation; (b) the listener's knowledge of the environmental and psychological context of the soundscape material is invoked and encouraged to complete the network of meanings ascribed to the music; (c) the composer's knowledge of the environmental and psychological context of the soundscape material is allowed to influence the shape of the composition at every level, and ultimately the composition is inseparable from some or all of those aspects of reality; and ideally, (d) the work enhances our understanding of the world, and its influence carries over into everyday perceptual habits.[225]

In order to help restore listeners' relationships to the environment, soundscape composers turn to locations that they deem worthy of attention. The locations represented range from threatened or damaged environments to places of historical or mythological significance. Some works start and end in an actual location (e.g., Westerkamp, *Kits Beach Soundwalk*, 1989), while others remain in an imagined environment—one that is still associated with a tangible place (e.g., Truax, *Chalice Well*, 2009). Certain sounds undergo significant processing as a soundscape composition moves through different physical spaces. For example, in Westerkamp's *Beneath the Forest Floor* (1992) a deep low-pitched pulse is heard several times during the work—the liner notes inform listeners that this is a processed raven call. Nonetheless, soundscape compositions maintain an environmental context by presenting manipulated material alongside or in close proximity to recognizable real-world sounds. In the case of *Beneath the Forest Floor*, the raven call is heard in alternation with unmodified sounds such as flowing water, birds chirping, and an insect landing on a microphone.

The centrality of context in soundscape composition may seem to distinguish it from acousmatic music.[226] However, the boundary separating these two genres is not always clear in

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[225] Truax, *Acoustic Communication*, 240.

[226] The association of source material with a real-world environment has been the primary means by which proponents of soundscape composition differentiate it from acousmatic music. See, for example, Barry Truax, "Soundscape Composition as Global Music," 103–109; and Darren Copeland,

practice. One reason for the blurry line is that acousmatic composers have explored the associative properties of real-world sounds and soundscape composers have abstracted source materials. Scholars have taken different positions regarding what conditions separate the two genres. According to Sherry Lee, it may no longer be relevant to distinguish acousmatic music and soundscape composition on the basis of referentiality, since referential elements figure prominently in works from both genres.[227] To support her argument, Lee positions Dhomont's acousmatic work *Forêt Profonde* next to Westerkamp's soundscape composition *Beneath the Forest Floor.* Both pieces center on a forest, as their titles suggest. Dhomont's forest is imaginary; it is a place of fairy tales. Westerkamp's forest is also filled with enchantment and danger, but it is an actual location—the Carmanah Valley on Vancouver Island, British Columbia.

Forêt Profonde positions listeners in a series of chambers that inquire into psychological thought, specifically childhood and memory. Dhomont draws on an array of source material to construct a sonic environment for each room, including excerpts of fairy tales and Bruno Bettelheim's *The Uses of Enchantment* (a Freudian study of fairy tales), animal sounds (birds and frogs), children playing, and the occasional excerpt from Schumann's *Kinderszenen*, Op. 15. In *Beneath the Forest Floor*, listeners are better able to visualize an actual forest as a number of sounds help to create context. These include animals (birds, insects, squirrels), wind through a canopy, creaking trees, a stream, and a chainsaw. As Lee notes, Westerkamp is also interested in

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"For Awareness of Associations," *eContact!* 1, no. 4 (October 1998), http://cec.sonus.ca/econtact/Ecology/Copeland.html.

[227] Sherry Lee, "*Forêt profondes*: Contested Spaces in Electroacoustic Music," paper presented at the Annual Meeting of the American Musicological Society, Indianapolis, 4–7 November 2010. In line with Lee's argument, James O'Callaghan has observed the use of both acousmatic and soundscape techniques in the music of Denis Smalley. See James O'Callaghan, "Soundscape Elements in the Music of Denis Smalley: Negotiating the Abstract and the Mimetic," *Organised Sound* 16, no. 1 (2011): 54–62.

the psychological experience of the forest. Westerkamp explains in the liner notes to *Beneath the Forest Floor*:

> It moves us through the visible forest, into its' shadow world, its' spirit; into that which effects our body, heart and mind when we experience forest [. . . .] [I]t hopes to encourage listeners to visit a place like the Carmanah, half of which has already been destroyed by clear-cut logging. Aside from experiencing its huge stillness a visit will also transmit a very real knowledge of what is lost if these forests disappear: not only the trees but also an inner space that they transmit to us—a sense of balance and focus, of new energy and life. The inner forest, the forest in us.[228]

Westerkamp directs attention to the "inner space" of the Carmanah by manipulating the call of a raven. The bird is heard several times over the course of the work as a deep, resonant pulse. This mysterious sound alternates several times with brief unmodified recordings of the forest. Through this oscillation between glimpses of an actual location and an otherworldly impression of it, *Beneath the Forest Floor* immerses listeners in a place they may or may not already know.[229]

Lee claims that there is an overt ethical agenda to soundscape composition.[230] She argues that soundscape works encourage listeners to experience a specific place in a particular way, therefore restricting how recorded sounds are heard. As per Westerkamp's liner notes, the investment of *Beneath the Forest Floor* is twofold: 1) to raise awareness to human disturbance in places such as the Carmanah Valley and 2) to strengthen listeners' emotional bonds to

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[228] Hildegard Westerkamp, liner notes to *Transformations*, Empreintes Digitales, IMED 9631, 1996.

[229] Lee asserts that *Beneath the Forest Floor* becomes acousmatic in the 2003 Gus Van Sant film *Elephant*, a film based in part on the 1999 Columbine High School massacre. An excerpt from Westerkamp's composition is featured in a scene in which the camera tracks figures in a school corridor. In the context of the film, the soundscape work loses its original association with the Carmanah Valley.

[230] Joanna Demers and Brandon Labelle have also discussed the aestheticization of the environment in soundscape composition, what Demers calls "truth content" and Labelle as "primary sound"—the latter in reference to Schafer's term "ursound." See Demers, *Listening Through the Noise*, 121–123; Labelle, *Background Noise*, 204; and Schafer, "Ursound," 19–22. This topic is discussed in greater detail later in this chapter.

environments deemed worthy of protection. Acousmatic music, on the other hand, is not seen to prescribe interpretation to real-world sounds. Instead, acousmatic works are thought to encourage listeners to experience sounds in their own way by inviting them into more abstract spaces. According to Lee: "Acousmatic music's places . . . are manifestly imaginary and, as such, create a sonic environment that is neither idealized nor othered but composed of memory and the lived experience of inhabited spaces."[231] Although both *Forêt Profonde* and *Beneath the Forest Floor* use real-world sounds to explore the human psyche, the way in which listeners experience space in *Beneath the Forest Floor* is arguably under greater control by the composer than it is in *Forêt Profonde*.

Different from Lee's position, John Levack Drever asserts that soundscape composition is reduced to a form of "sonic tourism" or "sonic fetishism" when it is listened to acousmatically.[232] Drever positions soundscape composition next to ethnography in an attempt to rescue it from its assumed place in the acousmatic music tradition. He points out several common features between soundscape composition and ethnography, notably the use of fieldwork to highlight the social, political, and environmental conditions of a given location. As an artist-ethnographer, the soundscape composer no longer shapes recorded sounds at will, but is rather in conversation with them. Drever concludes that by breaking down traditional power-relations between the observer and the observed, the soundscape composer challenges the tendency to use environmental sounds solely for musical purposes.[233]

Joanna Demers exposes some of the limitations of ethnographic practices in soundscape composition in her discussion of Westerkamp's *Kits Beach Soundwalk*. As narrator, Westerkamp

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[231] Lee, "*Forêt profondes*: Contested Spaces in Electroacoustic Music."

[232] John Levack Drever, "Soundscape Composition: The Convergence of Ethnography and Acousmatic Music," *Organised Sound* 7, no. 1 (2002): 21.

[233] Ibid., 25.

explains that her intention is to give voice—and therefore power—to "the quiet, intimate voices of nature."[234] Demers problematizes *Kits Beach Soundwalk* as ethnographic on the basis that subjective decisions were central to the creative process. She asserts:

> Once sounds are inscribed onto a recording, they, too, assume objectified status, becoming rigid and unchangeable. No matter how inclusive or diverse soundscapes claim to be, they reflect the same sorts of authorial choices made in any other determined work, in which some materials are retained whereas others are discarded.[235]

Given that a soundscape work cannot escape its inscription as a recording and the creative decisions that go into capturing and manipulating sounds, it may seem that soundscape composition remains in close proximity to acousmatic music on the basis of format and authorship.

Demers critiques the authorial control of soundscape composition by positioning it not in the context of mediated acousmatic works but rather in relation to unmediated field recordings, in particular those by Francisco López and Toshiya Tsunoda. López and Tsunoda, like Westerkamp, use site-specific environmental sounds and often announce in track titles and/or liner notes where the recordings were made. Their works, however, depart from soundscape composition in terms of the desired mode of listening. Both artists use a variation of reduced listening where the source and cause of a sound is acknowledged and often described before attention is given to its intrinsic acoustic properties.[236] López encourages listeners to focus on the sonic makeup of environmental sounds by presenting recordings of extended duration (up to

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[234] Westerkamp, liner notes to *Transformations*.

[235] Demers, *Listening through the Noise*, 123.

[236] Ibid., 127. Traditionally, reduced listening disassociates a sound from its source and cause prior to its placement in a musical context. For more on López's and Tsunoda's work, see López, "Profound Listening and Environmental Sound Matter," in *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner, 82–87 (New York: Continuum, 2006); Toshiya Tsunoda, "Field Recording and Experimental Music Scene," trans. Yuko Zama, *Erstwords Blog*, 7 July 2009, http://erstwords.blogspot.ca/2009/07/field-recording-and-experimental-music.html; and Demers, "Field Recording, Sound Art and Objecthood," *Organised Sound* 14, no. 1 (2009): 39–45.

seventy minutes) and diffusing them live in a concert-hall setting fit with a circular seating arrangement, blindfolds for audience members, and a massive speaker array. Tsunoda's recordings are a fraction of the duration of those by López and exist as documents to be played at the leisure of the listener. Still, Tsunoda disassociates sounds from a real location in order to explore their acoustic properties. A number of his recordings capture a specific sound source in close proximity, such as plastic flapping in the wind, air fluctuations through a pipe, and wind passing between metal rails. Acousmatic field recordings such as those by López and Tsunoda do not assert the real-world significance of environmental sounds but instead transmit the living energy that exists within their vibrations. In contrast, soundscape composition positions source material in a musical space only to return to its original source and context with renewed awareness.

Brian Kane offers a perspective on real-world sounds in electroacoustic music that is informed by a theory and practice of listening, and less by issues of format and compositional intent. He is not concerned with soundscape composition specifically; however, his critique and expansion of the Schaefferian notion of acousmatic sound has ramifications for the genre. According to Kane, an acousmatic sound exists when source, cause, and effect are spaced apart, but not completely detached or isolated. He claims:

> When source, cause, and effect are simultaneously present, acousmatic sound *is not*. Or similarly, when the effect becomes an 'essence,' detached from the cause and effect, acousmatic sound *is not*. Thus, the very acousmaticity of sound—its quality of being acousmatic—depends on the spacing of source, cause, and effect. Acousmatic sound exists structurally between these two possibilities. This neither-heteronomous-nor-autonomous sound can neither be reduced to its source nor reified as an object in its own right. It only *is* when source, cause, and effect are spaced.[237]

It is through this active spacing of source, cause and effect that acousmatic sound obtains its

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[237] Kane, *Sound Unseen*, 149, italics in original.

appeal. When the search to identify or explain the cause of a sound proves unsuccessful, listeners might attribute more imaginative associations to it. This tripartite model can be effectively applied to soundscape composition, but arguably with different results. Soundscape composition negates the ontological distinction between source and cause. Unlike acousmatic sound, according to Kane's criteria, sounds heard in soundscape composition uphold their original source and context.

Kane sheds light on this difference between soundscape and acousmatic techniques when he positions acousmaticity next to R. Murray Schafer's concept of schizophonia.[238] Although schizophonia and acousmaticity are both broadly defined as the separation of a sound from its source, they can be distinguished from each other according to degrees of space in Kane's formation. Schizophonia directs attention to the split between a recorded sound and the actual environment, whereas acousmaticity illuminates the space between source, cause, and effect. As such, in schizophonia a sound is a replication of an original sound heard out of context. In contrast, an acousmatic sound is, as Kane asserts, "neither-heteronomous-nor-autonomous," but somewhere in between. Although schizophonia and acousmaticity differ in terms of the space between source, cause, and effect, both types of sound present these three components in relation.

As defined by Kane, the use of acousmatic sound in soundscape composition may seem to contradict the aesthetic aims of the genre. It is not uncommon, though, for soundscape composers to emphasize the unique sonic characteristics of environmental sounds through studio processing. For some sounds this includes not only their physical properties but also musical

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[238] Ibid., 7, 225. Schafer's initial use of the term "schizophonia" is not in reference to soundscape composition, but with the storage and transmission of sounds more broadly. He notes that schizophonia is a "nervous" term; for it illustrates that in contemporary society fewer sounds are emitted directly from their source. Schafer, *The New Soundscape*, 43–47.

qualities such as rhythm and melody. Although listeners may still be able to recognize the identity of a sound and/or the processing techniques being used, the manipulation of sonic material directs attention away from source and cause to effect. Acousmatic moments can potentially change how listeners perceive real-world sounds within a social and spatial context through abstraction. However, when the space between source, cause, and effect is emphasized, awareness of the original source should still remain in mind. If sound sources are separated altogether from sonic material, then a musical work risks losing its identification with a particular natural source, a key feature of soundscape composition.

The two compositions considered in this chapter, Hildegard Westerkamp's soundscape composition *Talking Rain* (1998) and Paul Rudy's acousmatic work *In Lake'ch* (2007), incorporate soundscape and acousmatic techniques even though they are associated with one or the other genre. A logical explanation for Westerkamp's and Rudy's identification with one of the two traditions is their professional affiliation. Westerkamp was involved in the World Soundscape Project in the 1970s and is a founding member of the World Forum for Acoustic Ecology. Rudy teaches and writes on both electroacoustic music and sound in film and has collaborated with such acousmatic composers as Jonty Harrison and Trevor Wishart. Another way that each composer identifies with a specific genre is through the quotation of pre-existing recordings—borrowings that pay homage to others working in one or the other genre. In *Talking Rain*, among other compositions, Westerkamp excerpts recordings from the sound archive of the World Soundscape Project. Similarly, Rudy quotes two earlier acousmatic works in his *In Lake'ch* (2007): Michel Chion's *Requiem* (1993) and Dhomont's *Un autre Printemps* (2000).[239]

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[239] According to Rudy, the fifth movement of *In Lake'ch*, "Pandemic," presents a time-shrunk version of an entire movement from Bernard Parmegiani's *De Natura Sonorum* (1975). Paul Rudy, Skype interview by author, 27 February 2012. The Parmegiani reference is not discussed in this chapter as a

Of interest here is how composers such as Westerkamp and Rudy use both soundscape and acousmatic elements and in what way their use of these elements supports a particular conception of nature.

Both works guide listeners through different physical spaces, a key feature of soundscape composition. *Talking Rain* explores rainy locales in coastal British Columbia, Canada; *In Lake'ch* traverses thirteen musical environments that allude to major stages in human and geological history. Although Rudy does not focus on specific places in *In Lake'ch*, his work does share the ethical concerns of soundscape composition. Like Westerkamp, he uses environmental sounds to expose the adversarial relationship between humans and the natural world and, in turn, offers an alternative model of participation where humans are in harmony with nature. On the surface, Westerkamp and Rudy seem to romanticize the natural world. However, a closer look at *Talking Rain* and *In Lake'ch* reveals that there is more that informs each composer's conception than an idealized image of nature and the human relationship to it. Westerkamp turns to acoustic ecology, a discipline committed to raising awareness of balances and imbalances in the soundscape. In contrast, Rudy looks to Mayan cosmology, specifically their model of the galaxy spanning between Earth's inner core and the galactic core. Before examining how Westerkamp and Rudy use soundscape and acousmatic techniques, it is important to consider the idea of transformation, a central theme to both works.

From Representation to Transformation

This chapter considers three types of transformation in *Talking Rain* and *In Lake'ch*:

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quotation, since it is transformed beyond recognition—Rudy reduces the movement to a few seconds. The author wishes to thank the composer for bringing the Chion, Dhomont, and Parmegiani examples to his attention.

sound, environment, and self.[240] In the context of electroacoustic music, transformation is generally understood as the manipulation of source material using studio technology. The physical transformation of recorded sounds has been central to the theory and practice of electroacoustic music since the genesis of musique concrète. Early efforts to categorize types of sound transformation in music can be traced from Pierre Schaeffer's initial research on the perceived properties of recorded sounds to his examination of the combination of sounds in his *Traité des objets musicaux* (1966). Since Schaeffer's foundational work, elaborate theories of sound transformation have been developed, notably those by Denis Smalley and Trevor Wishart.

Smalley's theory of spectromorphology considers the ways in which sound spectra can be modified over time. He applies different analytical tools to categorize the manipulation of individual sounds as well as the interaction of multiple sounds in space and time.[241] Wishart addresses some of the same topics as Smalley, including the morphology of sounds and types of spatial motion. In addition, Wishart explores how sounds can be used to create metaphor through their association with a specific action, emotion, or idea, what he calls "sound-images." While Smalley's spectromorphology is a useful tool for articulating the timbral, temporal, and spatial behavior of sounds, for our purposes Wishart's discussion of metaphorical discourse proves helpful in explaining how recorded sounds can be used to create extramusical meaning.[242]

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[240] Perhaps not out of coincidence, the album featuring Westerkamp's most well known works is titled *Transformations*.

[241] Smalley's four "orders of surrogacy" explain degrees of sound abstraction created through studio processing, and his five "motion types" explain how sounds relate to other sounds in space and time. For more on spectromorphology, see Denis Smalley, "Spectro-morphology and Structuring Processes," in *The Language of Electroacoustic Music*, ed. Simon Emmerson (London: Macmillan, 1986), 62–93; "Defining Transformations," *Interface* 22 (1993): 279–300; and "Spectromorphology: Explaining Sound Shapes," *Organised Sound* 2, no. 2 (1997): 107–26.

[242] See Trevor Wishart, *On Sonic Art* (York: Imagineering Press, 1985), 163–76.

Both the acoustic and semantic properties of individual sounds are transformed in *Talking Rain* and *In Lake'ch* through studio processing. Techniques include hi- and lo-pass filters (attenuating frequencies above or below a designated cutoff frequency), pitch shifting (transposition), and time shift and reversal (playing a sound slower, faster, or backwards). Another way in which individual sounds are transformed is in terms of their associative properties. Both the type of sound heard and the context in which it is presented influences the associations brought out. For example, in the first movement of *In Lake'ch*, "Prologue: The Pangaea," squelching and bubbling are presented alongside the sounds of wood being torn apart and rocks rolling underwater. Water can be heard as destructive when placed next to these force-driven sounds. In contrast, in the final movement ". . . a terminus of blue" flowing water is combined with resonant overtones; here, water is soothing and cleansing. In *Talking Rain*, quiet, gentle water and animal sounds are prominent in the A and A' sections, while loud, abrasive water and city sounds dominate the B section. Although Westerkamp and Rudy transform individual sounds in some of the same ways, their reasons are different. As to be discussed, Westerkamp aims to bring renewed attention to the original contexts and inherent meanings of source material, whereas Rudy ascribes meaning to sounds through metaphor.

The environment is also transformed in the two compositions under consideration. This process unfolds throughout the ABA' structure of each work. *Talking Rain* and *In Lake'ch* both open in a natural environment, transition to an urban setting, and conclude in a pristine space.[243] *Talking Rain* begins in a rural setting dominated by rain and animals (frogs and birds), with the

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[243] A number of soundscape compositions follow an ABA' structure. For example, in *Beneath the Forest Floor* the A and A' sections present nature sounds recorded in an old-growth forest, while the B section is marked by chainsaws. Other works begin in a recognizable environment, move to an abstracted one, and return to the initial setting, such as Westerkamp's *Kits Beach Soundwalk* and Barry Truax's *Pendlerdrøm* (1997)—an urban beach and train station, respectively.

occasional passing car and distant foghorn. *In Lake'ch* opens in a primordial space defined by grinding, splintering, and bubbling sounds. It is midway through each work that the process of transformation becomes apparent, as listeners are positioned in a polluted environment. *Talking Rain* places listeners in the city, where tires on wet pavement, car horns, and screeching brakes stand out. *In Lake'ch* throws them in a dense tapestry of machines. *Talking Rain* concludes in the same temperate rainforest in which it began, but now with processed church bells and, for the first time, human footsteps. *In Lake'ch* ends at a utopian space defined by triads, resonant overtones, and gently flowing water. The closing musical space in each work symbolizes what Westerkamp and Rudy perceive to be an ideal human-environment balance.

Finally, the self (or the individual listener) can be transformed over the course of *Talking Rain* and *In Lake'ch*. Each composition takes listeners on an acoustic journey through different sonic environments that vary in terms of human presence and impact. The movement from a nature setting to a polluted urban environment and back encourages self-discovery. Joseph Campbell claims that in stories from different cultures and time periods a message of transformation is often presented in the darkest moment:

> One thing that comes out in myths, for example, is that at the bottom of the abyss comes the voice of salvation. The black moment is the moment when the real message of transformation is going to come. At the darkest moment comes the light.[244]

While it is speculative to refer to sounds in Westerkamp's and Rudy's works as "voice[s] of salvation," there are sounds that play an important role in the progression from the B section to the A' section. In *Talking Rain*, sustained bells signal the departure from a busy urban area and the arrival at an unpopulated coastal setting. In the tenth movement of *In Lake'ch*, "Hidden Catalyst," flowing water, a flute motive, and prayer bowls emerge from the scraping and

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[244] Joseph Campbell and Bill Moyers, *The Power of Myth*, ed. Betty Sue Flowers (New York: Doubleday, 1988), 39.

splintering sounds that define the previous movement, "Veiled Dead Zones." Each work concludes in a mythic space, inviting listeners to reflect back on the soundscapes that they encountered. Some listeners may give thought to which sonic environments they wish to maintain, which ones they desire to abandon, and those that they want to create. Others may not only consider their relationship to the outside environment but also their relationship to themselves.

Environmental Sound as Ecological Message: Hildegard Westerkamp, *Talking Rain*

From trickles to rushes, to drips, to spats, *Talking Rain* brings to life an iconic sound of the Pacific Northwest.[245] Over the course of seventeen and a half minutes, the composition traverses different soundscapes where rain is a constant, yet diverse, presence. Westerkamp explains the role of rain in the work:

> Rainsounds from the westcoast of British Columbia, Canada are the basic compositional materials for *Talking Rain.* Through them I speak to you about this place. The raincoast. A lush and green place. Made that way by rain. Nourished by rain, life-giving rain. The ear travels into the sonic formations of rain, into the insides of that place of nourishment as well as outside to the watery, liquid language of animals, forests and human habitations.[246]

As a symbol of sustenance, water not only supports life but also energizes the environment through its physical contact with different surfaces and its interaction with other sound sources. Several passages in *Talking Rain* highlight the timbral, rhythmic, and/or melodic properties of rain. In other sections, rain converses with animals in the soundscape. Whether heard on its own or positioned next to other sounds, rain delivers an ecological message; that is, it speaks to the interrelationships among sounds within a real-world environment.

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[245] CBC Radio commissioned *Talking Rain* for the program *Westcoast Performance*. The work premiered on 20 April 1997.

[246] Hildegard Westerkamp, liner notes to *Harangue I*, Earsay Productions, es9800, 1998.

The sounds used in *Talking Rain* may be divided into the three following categories based on their source:[247]

"Natural"
Birds: bald eagle, common raven, glaucous-winged gull, red-winged blackbird
Pacific tree frog
Various water textures

Electro-mechanical
Foghorn
Holy Rosary Cathedral bells
Royal Trust chimes
Vehicles: car horn, car on wet pavement, logging truck, motorboat, traffic

Human physiological
Footsteps on organic material
Man yells "what"

Westerkamp uses a combination of her own recordings from Deep Cove, Lighthouse Park, Tofino, and her home in Vancouver, those made by Norbert Ruebsaat on Haida Gwaii (Queen Charlotte Islands), and those recorded by members of the World Soundscape Project on Vancouver Island and in downtown Vancouver.[248]

Although *Talking Rain* alludes to different locations in coastal British Columbia, the majority of sounds in the composition are not unique to the province. For example, flowing water, rain, and ocean sounds are, of course, present in places around the globe. As well, the habitat range of animals heard in the work extends beyond BC.[249] It is the sounds of the city that portray an actual place. Three sounds in the composition are considered "soundmarks," sounds

[247] "Natural" is used in quotation marks for the reason that *Talking Rain* features water in contact with both organic and manufactured material.

[248] Hildegard Westerkamp, personal interview by author, Vancouver, British Columbia, 8 March 2012.

[249] The Pacific tree frog has the most limited range of the species represented in *Talking Rain*. It can be found from the West Coast of Oregon to Southern Alaska.

that are meaningful and often unique to a community.[250] These are the foghorn, Holy Rosary Cathedral bells, and Royal Trust chimes. Of these soundmarks, the Holy Rosary Cathedral bells are most strongly associated with Vancouver.[251] However, it is likely that only those familiar with the Vancouver soundscape will associate the Holy Rosary bells with the city—tuned bells that are rung in the style of change ringing are found worldwide. If *Talking Rain* does not clearly evoke a particular location, what then does this composition communicate about coastal BC? Moreover, what is the role of acousmatic sound in this acoustic journey through the "rain" coast? *Talking Rain* is divided into three sections based on a sense of movement through different environments (see Diagram 4.1).[252] The sounds heard in the first and third sections represent nature settings, while those experienced in the second section suggest a bustling urban center. The transition passages between nature and city locales are marked by an accumulation of one or more types of sounds. The ambient noise level also helps to distinguish sections in *Talking Rain*. A foghorn serves as a measuring device of ambient noise over the course of the work. The horn is sounded at intervals of approximately thirty seconds for the duration of the composition. When audible, the foghorn confirms that the listener is in a hi-fi soundscape, an environment where quiet and distant sounds are audible due to a strong signal-to-noise ratio. When inaudible, the

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[250] Barry Truax, ed., *Handbook for Acoustic Ecology*, The Music of the Environment Series, Document No. 5 (Vancouver, BC: A.R.C. Publications, 1978), 119.

[251] The Royal Trust chimes are omitted from *The Vancouver Soundscape* book and LP. Though foghorns are common in the Vancouver soundscape, the one heard in *Talking Rain* is an electric buoy horn recorded near Tofino, on Vancouver Island. Hildegard Westerkamp, e-mail correspondence with the author, 31 May 2015. For more on Vancouver soundmarks, including the Holy Rosary Cathedral bells, see Schafer, ed., *The Vancouver Soundscape*, 37–41; and "Vancouver Soundmarks" (Track 6, CD 1) and "Pacific Fanfare" (Track 5, CD 2), *The Vancouver Soundscape*, Cambridge Street Records, CSR 9701, 1996.

[252] Katharine Norman has used the metaphor of walking to discuss the formal structure of *Talking Rain.* She explains that certain sounds lead the listener down a trail that suddenly ends, while other sounds return to a path already traversed. For Norman, it is the footsteps at the end of the work that brings listeners back to a real environment. See Norman, *Sounding Art: Eight Literary Excursions through Electronic Music* (Farnham, UK: Ashgate, 2004), 97–98.

listener is in a lo-fi soundscape, an environment where quieter and distant sounds are easily masked as a result of a weak signal-to-noise ratio. Based on the audibility of the foghorn, the A and A' sections both qualify as a hi-fi soundscape, whereas the B section fits the definition of a lo-fi soundscape.

The transition sections in *Talking Rain* resist classification according to hi-fi and lo-fi conditions for the reason that it is difficult to situate sounds in a real-world context. For example, during the transition from the A to the B section the sheer number and variety of water textures present is unrealistic. Furthermore, these sounds are equidistant from the microphone; like *Presque rein*, there is a general lack of spatial depth. Similarly, during the transition from the B to the A' section, bells, cars, and ocean waves are combined in a way that is not feasible in reality.[253]

Section	Start Time	Setting	Ambient Noise Level
A	0'00"	Inland nature setting	Hi-fi
Transition	7'29"	(various water sounds)	---
B	9'14"	Downtown Vancouver	Lo-fi
Transition	10'45"	(cars, bells, and waves)	---
A'	12'33"	Coastline --> Inland nature setting	Lo-fi --> Hi-fi

Diagram 4.1 Formal Overview of *Talking Rain*.

In addition to environmental conditions, sections of *Talking Rain* can be distinguished in terms of the timbral qualities of sounds. Mid and high frequencies are prominent in the A section and towards the end of the A' section. These include water droplets striking soft surfaces (plant matter, soil, and pools of water), frogs croaking, and eagles calling. In contrast, mid and low frequencies stand out in the B section, such as rain hitting hard surfaces (asphalt and concrete), church bells, and car horns. It is not only the physical impact of water on hard surfaces but also

[253] Although *Talking Rain* does not present lo-fi nature sounds, they do exist in the natural world—a waterfall, windstorm, periodical cicada brood, etc.

its reflection off nearby buildings that defines the presence of water in the urban environment. Upon entering the city, subtle drips and trickles are replaced by the broadband textures of cars driving over wet pavement and the composite sound of rain in concrete corridors.

Acoustic Ecology and the Problem of Noise

The appeal for quiet, natural sounds in acoustic ecology is supported by the negative connotations of noise in the discipline. Traditionally, soundscape researchers attribute the problem of noise to human activity, in particular developments since the Industrial Revolution. This ethical investment in the soundscape can be traced from the early publications of R. Murray Schafer, in particular *Ear Cleaning* (1967) and *The Book of Noise* (1968), to the research of the World Soundscape Project, where both qualitative and quantitative research methods were used to assess changes in the Vancouver soundscape. As the title of Part V of *The Vancouver Soundscape* alludes, in the early 1970s Vancouver had—and acoustic ecologists might argue still has—a "Noise Pollution Problem."[254] Schafer offers steps for improving soundscapes: "the first task is to learn how to listen," the second is to document the soundscape, and the third is to "engage in redesigning it."[255] This three-step model assumes that Western society has a poor relationship to the sonic environment and that change is needed.

This critical stance on noise carries over to soundscape composition. As Brandon LaBelle explains: "Noise disrupts this feedback loop [between the individual and the sonic environment], blocking out the movements of information, unsettling sound from its place [. . . .] Noise then is

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[254] A recent article in a British Columbia newspaper suggests that Vancouver continues to have a "noise pollution problem." See Paul Luke, "As Vancouver's summer swings into gear, how much noise is too much?" *The Province*, 25 July 2015, http://www.theprovince.com/health/Vancouver+summer+swings + into+gear+much+noise+much/11241260/story.html.

[255] Schafer, ed., *The Vancouver Soundscape*, 65–66.

understood to operate on the level of information: it remains a *dis*informing antagonist."[256] Heard in this way, as an intrusion, noise becomes noise pollution. It not only lacks information but also jeopardizes the audibility of other—arguably informative—sounds. Connotation and auditory masking are two ways in which noise interferes with the transmission of information in a soundscape composition. Connotation is defined as the implied meaning of a sound. Masking is a physical phenomenon where the actual loudness of one sound affects the perception of another sound. Listeners may categorize a sound as noise merely by its audibility, even if it is not masking another sound. Common examples include air and road traffic, construction, electrical hums, music, and ventilation systems.

The sounds that qualify as noise in *Talking Rain* are limited to those from mechanical sources, in particular the passing car. The noise of motor vehicles is attributed to their association with pollution as well as their potential to disrupt acoustic space via honking, revving, screeching, and skidding. Consider the opening to *Talking Rain*, where a car on wet pavement masks the sound of rhythmic water droplets. Immediately after the car passes, the droplets are replaced by a light, broadband rain texture (see Figure 4.1). In passages later in the work, a vehicle either covers sounds temporarily (e.g., 8'28" and 9'27") or activates a shift in environmental context (e.g., 1'52" and 9'13"). From the perspective of information, the initial appearance of the car in *Talking Rain* is representative of noise pollution through its control of acoustic space. To interpret the car as noise is to experience it as a dominating force, one with the power to oppress other sounds. Within a social and spatial context, the car exceeds the

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[256] LaBelle, *Background Noise*, 21, italics in original. Noise is a controversial topic with diverse applications. For different perspectives, see Jacques Attali, *Noise: The Political Economy of Music*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1985); Douglas Kahn, *Noise, Water, Meat: History of Voice, Sound, and Aurality in the Arts* (Cambridge, MA: The MIT Press, 1999); and Hillel Schwartz, *Making Noise: From Babel to the Big Bang and Beyond* (Brooklyn, NY: Zone Books, 2011).

baseline of what is regarded as a "natural" ambient noise level.

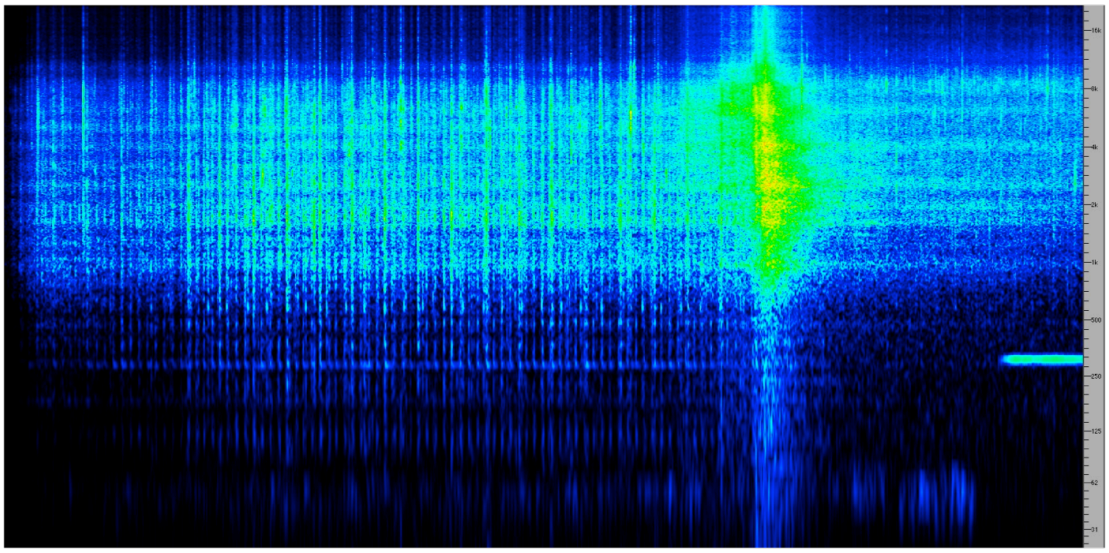

Figure 4.1 Spectrogram of Car on Wet Pavement at 0'23".

Other man-made sounds avoid being categorized as noise due to their cultural meaning. Such is the case with foghorns and church bells, two sounds featured in *Talking Rain*. Both sounds deliver important information and are considered soundmarks.[257] Based on their connotation and cultural significance, foghorns and church bells complement the overall aesthetic of *Talking Rain*. In addition to these human-associated sounds, the urban environment complicates the perception of rain as a natural sound. Although it is found in both rural and urban settings, some listeners may interpret rain as less natural in the city. One reason is that the majority of water sounds in an urban location are created by an impact or interaction with manufactured surfaces such as concrete, glass, and metal. In contrast, rain comes into contact

[257] Historically, foghorns are signals of safety, arrival, and homecoming. Bells have strong associations in the European tradition as a signal of time—for worship, celebration, work, etc. On the history and culture of bells in Europe, see Alain Corbin, *Village Bells: Sound and Meaning in the Nineteenth-Century French Countryside*, trans. Martin Thom (New York: Columbia University Press, 1998); Michelle E. Garceau, "'I Call the People.' Church Bells in Fourteenth-Century Catalunya," *Journal of Medieval History* 37 (2001): 197–214; and Alexander Fisher, *Music, Piety, and Propaganda: The Soundscapes of Counter-Reformation Bavaria* (Oxford: Oxford University Press, 2014), esp. 192–205.

with organic surfaces more frequently in rural environments, even if humans are responsible for the source of contact (e.g., mulch and non-native plants). However, "natural" rain and "unnatural" rain cannot be distinguished by sound source alone. As will be discussed, even the sound of rain on a non-organic surface such as a plastic garbage container can be aesthetically pleasing.

Acousmatic Sound in *Talking Rain*

Several sections of *Talking Rain* focus on the intrinsic acoustic properties as well as the musical features of environmental sounds. These aspects are highlighted through the use of different studio techniques, which includes processing individual sounds and establishing dialogue between two or more sounds. Sections where emphasis is on sonic content also create space between source, cause, and effect, to use Kane's terminology. As such, passages in the work can be heard as acousmatic. Although sound sources may still be identifiable, it is sound itself—not the semantic properties of recorded material—that stands out. Listeners are encouraged to consider the inner activity of environmental sounds as well as the sonic properties that link and distinguish them, rather than follow a series of realistic events.

However, Westerkamp does not abstract environmental sounds to the degree that they are cut off from the real world. She is conscious to maintain a connection between an acousmatic space and an environmental one:

> "[P]rocessing is only there to emphasize things that are already there. So I'm not really trying to invent anything new. I'm just trying to extract what's there and exaggerate it a bit [. . . .] I'm never really interested in the kind of sound processing that leads me too far away from the original sound, *unless* it really makes connections."[258]

It is as if the signifying properties of environmental sounds are revealed in *Talking Rain* through

[258] Norman, *Sounding Art*, 85, italics in original.

the enhancement of acoustic elements. Westerkamp "exaggerates" source materials only to relocate them to an actual location with renewed vitality.[259] One example of this foray into acousmatic sound and later emergence of a real-world context is the transition from the A to the B section. At 7'29", listeners are submerged in a soundscape of trickles, drips, pats, and plunks. It is difficult to formalize a real acoustic space due to the number and variety of water sounds. Sounds are identifiable, but their combination is unrealistic. Immersion is created in this passage through a sensation of closeness to sound sources. This is in part due to the close proximity of water sounds to the microphone. Immersion is further enhanced by studio processing, such as the quasi-pitched droplets transposed to a low register and rain against a hard surface with emphasis on its higher partials.

Processed and interwoven, the sounds of water lose their identification as sound events, a term coined by R. Murray Schafer to describe a sound that obtains its meaning from its social and environmental context.[260] Instead, these water sounds are tied to Pierre Schaeffer's concept of the sound object (*objet sonore*), a sound that acquires meaning from its acoustic properties. The transformation of sonic material from sound event to sound object actively traces spacing in Kane's tripartite model. The spacing of source, cause, and effect of water sounds in the first transition section is acousmatic in quality. The exact place from which they originate is unknown—the liner notes only inform listeners that these sounds are from coastal British Columbia. Furthermore, water sounds undergo studio processing such that their cause and the effect do not align with a real-world source.

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[259] Labelle, *Background Noise*, 206.

[260] Schafer coined the term "sound event" as a contradistinction to Schaeffer's term *objet sonore* ("sound object"). Schafer, *The Tuning of the World*, 131. For further discussion of these two concepts, see Francisco López, "Schizophonia vs l'objet sonore: Soundscapes and Artistic Freedom," unpublished manuscript, last modified January 1997, http://www.franciscolopez.net/schizo.html (accessed 8 June 2015); and Gabriele Proy, "Sound and Sign," *Organised Sound* 7, no. 1 (2002): 15–19.

This tapestry of modified and unmodified water sounds inevitably leads back to a tangible place, as per the criteria of soundscape composition.[261] Urban sounds are gradually introduced into this abstract space starting at 8'29". The first sounds to mark the transition to the city are a passing car (the same one as at the start of the work) followed by an oscillating hum and rhythmic water droplets (the latter of which are also heard at the beginning of the composition). These three sounds gradually replace the polyphony of manipulated water sounds. Listeners arrive in the city soon after with the announcement of screeching brakes and a spike in ambient noise.

Consistent with the acousmatic experience, several passages in *Talking Rain* emphasize the musical qualities of real-world sounds. Musical features can be attributed to the properties of individual sounds as well as the interaction between two or more sounds. One example of intrinsic musical characteristics is water droplets striking a plastic surface in a rhythmically regulated pattern. This is first heard at the beginning of the piece and again at the transition from the A section to the B section. Transcribed, these recurring droplets present steady quarter-notes in a brisk 4/4 meter with an accent on the downbeat—referred to hereafter as "'4/4' water droplets." From the recording it is difficult to know whether Westerkamp manipulated the droplets to create this rhythm or if it was naturally occurring. She affirms that this passage is unprocessed:

> I spent about an hour recording all these detailed sounds around [my friend's] house—she lived in a very forested environment. And there was one recording, where a rain drop went down onto a plastic . . . garbage can and it went . . . *Ta* ta ta ta, *Ta* ta ta ta, *Ta* ta ta ta, *Ta* ta ta ta . . . . and that's the beginning of the piece.[262]

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[261] See fn 166.
[262] Norman, *Sounding Art*, 79–80, italics in original.

Whether these water droplets are deemed natural or not by listeners, their musical properties are hard to resist. The ear starts to settle on the rhythm, accent, and meter of an otherwise acoustic phenomenon. Yet, this moment in acousmatic sound is cut short by a passing car. Similar to the transition from the A to the B section, the vehicle activates a shift from acousmatic to schizophonic sound. With its entrance, listeners are given contextual information for the first time in the composition. Prior to the car passing, the "4/4" water droplets are heard in isolation; that is, disassociated with a tangible place. The car transports listeners from the musical space of "4/4" water droplets to a realistic environment of broadband rain.

Another way in which the musical properties of recorded sounds are brought out is through the interaction of unrelated sources. This is exemplified by the dialogue between a raven and water droplets striking a water surface from 4'17" to 4'50". The raven-water droplet passage remains distinct in *Talking Rain*, for it is the only moment in the composition that presents an extended dialogue between two distinct sound sources. The raven first enters with a three-note motive: the pitches E–E–B heard as two eighth notes followed by a quarter note. The water droplets respond with a varied form of the motive; faster and on the pitches D–D–B. Soon after, these two sounds engage in rhythmic interplay with single-note onsets. This passage is followed by a different animal-water texture: frogs and water trickling. Unlike the raven-water droplet pair, these two sounds are linked by timbre alone.

The musical features of environmental sounds supplant semantic content in both the "4/4" water droplet and the raven-water droplet examples. Although both can occur in reality hypothetically, to experience environmental sounds independent from their real-world origins in soundscape composition is to engage them on acousmatic terms. The raven and water maintain their separate identities but start to showcase their shared intervallic and rhythmic properties. The

raven call takes on a liquid quality, and the water droplets mimic the bird.[263] This confluence can be traced to early electroacoustic works, but with contrasting sounds. For example, in Karlheinz Stockhausen's *Gesang der Jünglinge* (1955–56) and Bernard Parmegiani's *De natura sonorum* (1975) electronically generated sounds are combined with recorded human-associated sounds—a boy's voice and musical instruments, respectively. *Talking Rain* extends this practice by drawing attention to both shared and distinct acoustic properties of two recorded live sounds. The significance of the brief interaction between the raven and water droplets is explained not by their associative meaning but by their sonic content.

Towards an Ecological Message

It is not until the end of *Talking Rain* that listeners arrive at a hi-fi environment where human-associated sounds are on the scale of an old-growth temperate rainforest. (As discussed in Chapter Two, these forests are famed for their stillness.) This moment of arrival is marked by footsteps at 15'38". The individual (the composer?) pauses briefly and then quietly carries on. In the spirit of acoustic ecology, the audibility of footsteps symbolizes balance between humans and the soundscape. Members of the World Soundscape Project used this sound as a way to measure ambient noise during a soundwalk through city streets:

> Begin by listening to your feet. When you can hear your footsteps you are still in a human environment, but when you become separated from their sound by the ambient noise, you will know that the soundscape has been invaded and occupied.[264]

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[263] For a remarkably liquid-like birdcall, consider that of the male Brown-headed Cowbird (*Molothrus ater*). Though its call is not featured in *Talking Rain*, it can be heard throughout coastal British Columbia in the summer.

[264] Schafer, ed., *The Vancouver Soundscape*, 71. The sound of footsteps also figures prominently in Claude Schryer's soundscape composition *Vancouver Soundscape Revisited* (1996). Over the course of nine brief movements, he positions the listener in nine environments using archival recordings from the World Soundscape Project Database. Some of these are hi-fi environments, such as "Eagle" (Part 1) and "Walk" (Part 5). Others are lo-fi environments, including "Noise" (Part 4) and "Industry" (Part 6).

Footsteps in *Talking Rain* also signify a sustainable form of human presence, although the sonic environment that concludes Westerkamp's composition is far removed from the urban soundscape described above. The individual is listening actively, represented by the brief pause, and is also conscious of the sounds he or she is producing—these are careful footsteps, deliberate and slow in pace. Westerkamp invites listeners to think about the impact of humans on the soundscape by concluding the work in a tranquil forest where human and non-human sound sources cohabit acoustic space. Are some forms of activity more sustainable than others? Which human sounds enhance the soundscape and which disrupt it? More than a quiet nature setting, the closing section of *Talking Rain* is a place of inner reflection and repose.

In accordance with the theme of transformation, it is only after listeners have traversed different environments that they are prepared to re-enter a balanced soundscape such as an old-growth forest. This is not to say that the physical spaces encountered earlier in the work do not offer valuable lessons. Ecological messages can be found throughout the piece. Some speak to the relationships among sounds within an environmental context, while others comment on the rich sonic and musical qualities of sound itself. The manipulation of individual sounds and the pairing of others has the potential to transform how listeners experience real-world sounds in daily life. Ultimately, Westerkamp's composed environments promote aural acuity. Perhaps the next time an individual is in a nature setting and hears two sounds simultaneously, they will take a moment to experience an interaction between them, or perhaps the intrinsic properties of a particular sound will grasp their full attention.

Sandwiched by two tracks dominated by machine sounds, the quietude of "Walk" can be interpreted as a moment of repose.

Environmental Sound as Metaphor: Paul Rudy, *In Lake'ch*

Paul Rudy's *In Lake'ch* is the first installment of six CD-length works that make up his *2012 Stories* (2007–).[265] Each CD can be experienced as a stand-alone work, or the entire collection can be played in sequence for a total of five hours and forty minutes. *2012 Stories* explores themes of human transformation, healing, and reconciliation as well as changing perceptions of the environment. These themes are articulated in both the track titles and liner notes. For CDs 2–6, track titles are used in the notes as prose. This helps to both explain the meaning of individual track titles (especially those unfamiliar to listeners) and create a narrative thread across the composition. Consider, for example, the reference to tracks 1–4 in the liner notes to *Kuxan suum* (CD 2) (track titles are in bold):

> Perhaps a new ***grammar of harmony*** can free us to forget the ***Verduns*** of our past and avert their re-enactments. ***The invisible island*** . . . that is the circular pattern of life and energy . . . of the family of light . . . knows without being caught, ***Tikkun olam***, or "repairing the earth."[266]

In Lake'ch is the only work in the collection that does not reference track titles in the liner notes. Instead, Rudy provides a description of the themes of the work and the resources that inspired them, including the poetry of Nathan Bartel, the Mayan calendar, and the music of several acousmatic composers.

At fifty-eight minutes in duration, *In Lake'ch* focuses on the treatment of the environment as commodity and the human capacity to cultivate a more sustainable relationship with it through self-reflection. Rudy explains: "[*In Lake'ch*] is about human evolution from a base existence of

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[265] *In Lake'ch* was composed over the course of nine days in 2007 at the Wurlitzer Foundation in Taos, New Mexico. For general information on this and other works in the collection, see http://paulrudy.net/compositions (accessed 9 July 2015).

[266] Paul Rudy, liner notes to *Kuxan suum*, Twisted Trail Music, TTM 2, 2008, bold and italics in original.

materialism toward a higher horizon of spiritualism nurtured by resonant light."[267] The path traced by Rudy is not one of the individual but rather a collective journey. This is reflected in the work's title, a Mayan word that translates literally as "I am another yourself." Rudy draws from both Mayan cosmology and the acousmatic tradition in order to explore themes of human transformation.

The Mayan calendar (also known as the Tzolken) informs both the formal and narrative structures of *In Lake'ch*.[268] There have been diverse disciplinary approaches to the calendar, including archeology, anthropology, ethnology, and orthography. The interpretation of artist, poet, and historian José Argüelles, however, illuminates some key aspects of form and extramusical reference in Rudy's *In Lake'ch*.[269] In *The Mayan Factor: Path Beyond Technology*, Argüelles draws on archeology and modern science, among other fields to construct a Mayan galactic view that takes into account historical events outside of Mayan culture. In basic terms, the calendar charts the transformation of civilization from material reality to divine harmony over the course of thirteen cycles (or *baktun*) (see Figure 4.2). In Argüelles' words:

> In this total planetary endeavor [i.e., the complete activity of the thirteen *baktun* cycles], humans are the sensitive atmospheric instruments galactically utilized in a process whose objective is the transformation of the 'material field' of the planet. The end of this transformation is to raise the overall planetary field to a higher, more harmonic level of resonant frequency.[270]

In Lake'ch also consists of thirteen "cycles" (i.e., movements) and the theme of transformation from darkness to light (see Diagram 4.2). Despite thirteen sections in each, there is not a one-to-

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[267] Ibid., italics added.

[268] Paul Rudy, Skype interview by author, 27 February 2012. The title of each movement is from a manuscript by poet Nathan Bartel.

[269] The author would like to thank Rudy for introducing him to Argüelles' work.

[270] José Argüelles, *The Mayan Factor: Path Beyond Technology* (Rochester, VT: Bear & Company, 1996), 118.

one correspondence between the titles of movements and the major *baktun* events.[271] In addition, there is a notable gap in time between the thematic content of the first movement of *In Lake'ch* ("Prologue: The Pangaea") and the first *baktun*; the supercontinent of Pangaea formed approximately 300 million years ago, whereas the first *baktun* began in 3113 B.C.

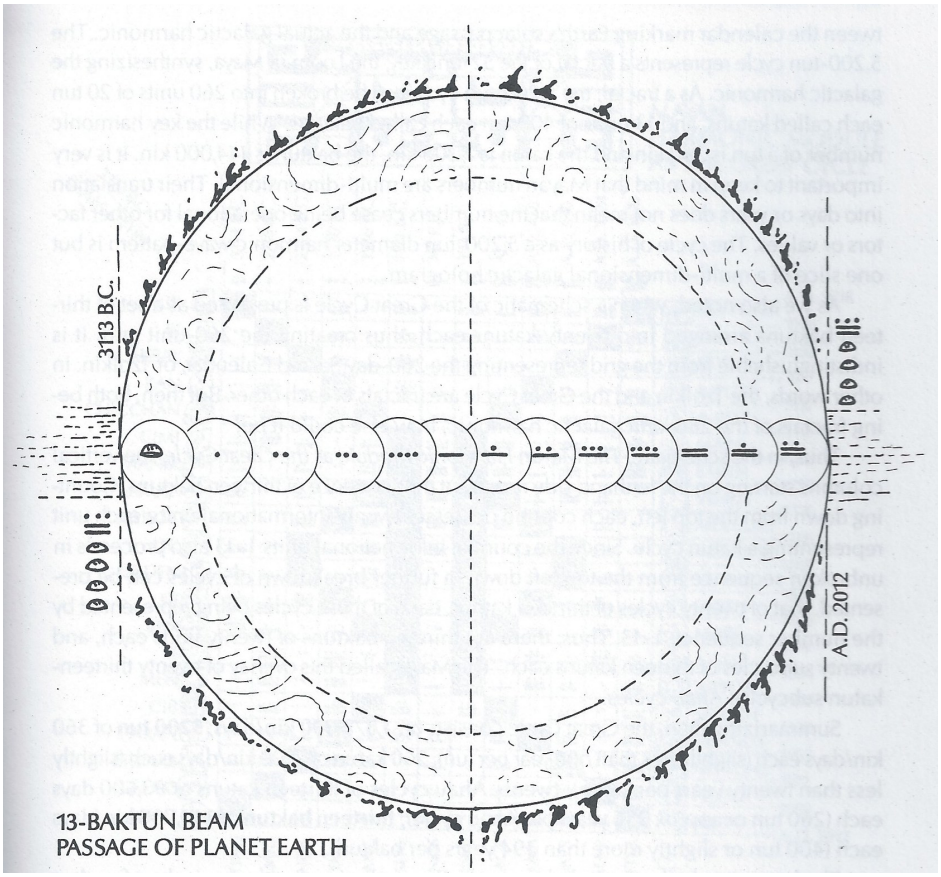

Figure 4.2 Thirteen Cycles of the Mayan Calendar. © José Argüelles, *The Mayan Factor: Path Beyond Technology* (Rochester, VT: Bear & Company, 1996), 111. Used by permission.

[271] Compare the track titles in Rudy's work to the heading and short description of each baktun in Argüelles, 114–17.

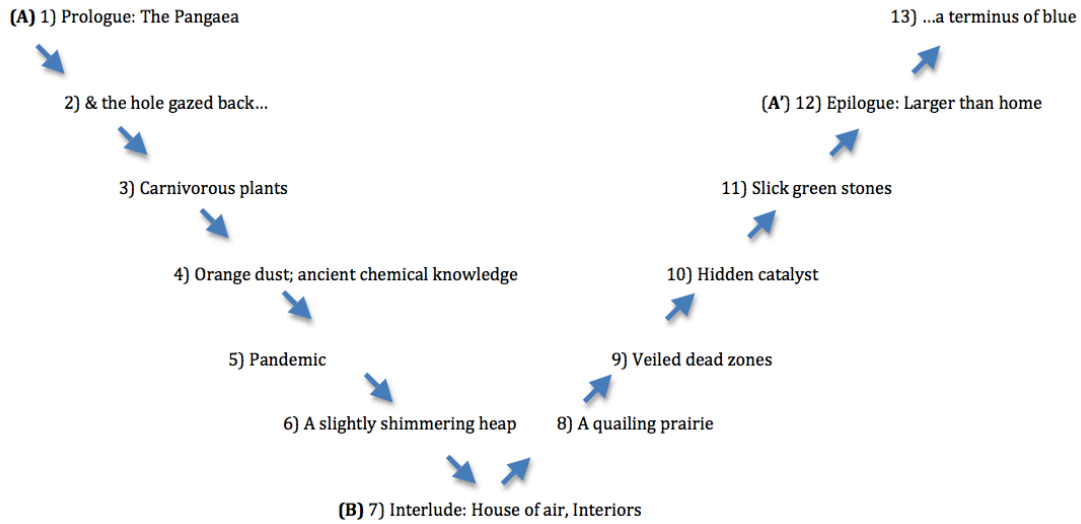

Diagram 4.2 Formal Overview of *In Lake'ch*. Adapted from a hand-written note by Paul Rudy. Used by permission.

Another position from which to consider *In Lake'ch* is Argüelles' illustration of Mayan planetary evolution according to the "Galactic Channel, Resonant Field Model" (see Figure 4.3).[272] A cosmic beam spans five dimensions between Earth's inner core and the galactic core. The three inner dimensions are reptiles, mammals, and humans. *In Lake'ch* can be divided such that its formal structure also reflects three spatial contexts. Rudy's composition shares a more convincing connection to the classical elements, rather than tracing an evolution from cold-blooded animals to *homo sapiens*. Based on both the types of sounds heard and the track titles and liner notes, *In Lake'ch* alludes to the elements earth (Tracks 1–6), air (Tracks 7–11), and aether (Tracks 12–13).[273] Each track explores a geologic or human stage within these three realms, stretching from the splintering of the supercontinent of Pangaea (Track 1) to collective

[272] Aspects of this model are found in subsequent compositions in Rudy's *2012 Stories*. For example, the cosmic beam running through these levels, "kuxan suun" (or "road to sky"), is the title of the second work in the series.

[273] The correlation between music and the elements can be traced in cultures around the world since ancient times. Compare the formal structure of Rudy's *In Lake'ch* to Boethius' classification of "musica mundana" (or "music of the spheres") in *De institutioune musica* (1492) and Robert Fludd's slightly different model in *De Musica Mundana* (1617).

consciousness (Track 13: ". . . a terminus of blue"). Like Argüelles' "Galactic Channel," *In Lake'ch* reflects environmental context and verticality in its initial descent and later ascent through different periods in geologic and human history. As well, the trajectory from darkness towards light over the course of thirteen *baktun* cycles—and the linearity and measured time that marks this process—is present in *In Lake'ch*.

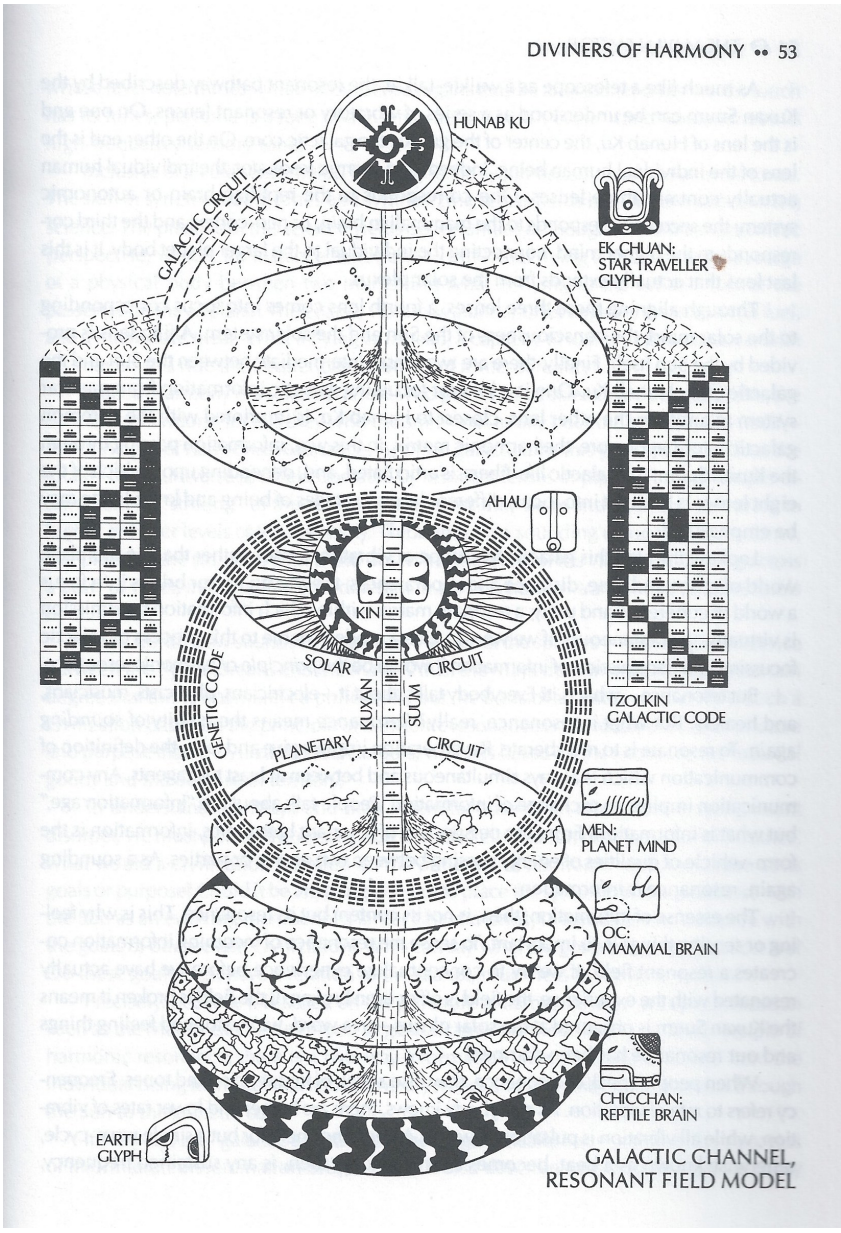

Figure 4.3 "Galactic Channel, Resonant Field Model." © José Argüelles, *The Mayan Factor: Path Beyond Technology* (Rochester, VT: Bear & Company, 1996), 53. Used by permission.

Exploring Past, Present, and Future Worlds

In Lake'ch features a diverse and somewhat unusual array of source material. Several sounds in the work are easily identifiable and have strong associative properties, such as bells, birds, and trains. Others are more difficult to identify and have little or no established connotation, including an egg frying, rocks rolling, and wood splintering. Rudy combines and processes these and other sounds in ways that blur the boundary between soundscape and acousmatic sections. This ambiguity contrasts with the clearer lines between the two in Hildegard Westerkamp's *Talking Rain*. Even movements that allude to a physical setting in their title, such as "Prologue: The Pangaea" (Track 1) and "A quailing prairie" (Track 8), locate listeners in a sonic space far removed from any tangible place.

At the same time, Rudy does maintain an environmental context—a key element of soundscape composition. *In Lake'ch* leads listeners through both exterior and interior spaces. For example, at the beginning of "Carnivorous plants" (Track 3) bird activity, ambient noise, and a church bell suggest an outdoor space. As the movement unfolds, this realistic setting gives way to an imaginary interior space: the bird activity is transformed into dogs barking, the ambient noise disappears, and several "internal" sounds enter—a dog gnawing on a bone and a human chewing with their mouth open. Audiences can experience these sounds within an environmental context, real or imagined, focus on the acoustic properties of sonic content, or alternate between these two modes of listening.[274]

The opening movement further exemplifies the use of both soundscape and acousmatic

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[274] In an interview with the author, Rudy remarks: "I like to provide a palate of all of these possibilities [of interpretation]. Rather than try to limit these possibilities, I try to maximize them, and let the listener find their own way through the work. It's like a narrative without a story. You can make a story if you want, or you can just listen to the sounds, or you can go back and forth. And that to me is the most interesting music." Paul Rudy, Skype interview by author, 27 February 2012.

techniques in *In Lake'ch*. As the title refers, "Prologue: The Pangaea" thematizes a landmass that precedes civilization. The initial sounds of the movement are an octave-displaced flute motive (C#4–C#2–C#4–C#5), water poured in a controlled manner, and a repeated pitch (C#4) played on a synthesizer. Each of these sounds is enhanced with technology: bass is added to the flute; the water has a tinted, metallic quality; and the synthesizer features reverberation. Heard acousmatically, these recognizable sonic sources and causes are underdetermined. Barred from context, the flute, water, and keyboard create a resonant, synthetic world of studio-generated music. In relation to a program narrative of geologic history, however, these sounds are explained by an unreal reality: the formation of a supercontinent. It is as if a higher power is behind these sounds, creating Pangaea with hands (water pouring) and breath (air passing through the flute).

To experience "Prologue: The Pangaea" as a sonic representation of a geologic period calls for listeners to now associate identifiable sounds with imagined sources and causes, as opposed to realistic ones. This change in source-cause relation is different from Daniel Teruggi's position that unidentifiable sounds generate non-existing causes in acousmatic music. He asserts:

> [T]he perception of a sound whose cause is unknown or unrecognizable for our perception, induces the listener to imagine non-existing causes and to perceive music as a complex creative phenomena in which musical sense and musical sounds have to be interpreted simultaneously, with generally very little relation with our perceptive reality [. . . .] The question is not to find out how sounds are made but how their combination will generate imaginary perceptions of imaginary realities in our mind.[275]

Unlike Teruggi's observation that listeners visualize their own sources in acousmatic music, Rudy encourages listeners to associate identifiable sounds with specific imaginary sources as well as particular environmental or psychological conditions through the use of a program. The track titles and liner notes accompanying *In Lake'ch* are central to this formation of narrative

[275] Daniel Teruggi, "What about Acousmatics?" *Journal of Electroacoustic Music* 7 (1993): 17.

elements. Supplemental materials provide listeners with the needed images to detach real-world sounds from their original source and map them onto a distant place and time, such as Pangaea.

Sound and Metaphor in *In Lake'ch*

As "Prologue: The Pangaea" demonstrates, recorded sounds can expand beyond their immediate identification with real-world sources to take on additional meanings. A sound may convey an abstract idea or concept, or it may help to evoke a physical space with which it is not normally associated. However, as John Young has observed, there is greater room for the interpretation of environmental sounds when they are heard as symbols rather than as real-world phenomena. In his words, "Where conventional reasoning may tend to be finite in the way an idea is expressed, symbolic connotations are flexible, less bounded and elude precise definition."[276] Young uses the example of a door to explain how recorded sounds can take on symbolic meaning. Heard as an everyday sound, a door opening or closing suggests physical movement between spaces. As a symbol, a door is detached from its immediate association and linked to abstract concepts, such as discovery or closure.[277]

Trevor Wishart's work on sound and metaphor is helpful when considering how source materials take on extramusical meaning in a composition such as *In Lake'ch*. In perhaps his best-known piece *Red Bird: A Political Prisoner's Dream* (1973–77), Wishart explores the mental and physical state of a political prisoner. The work is set in two environments: a factory and a garden. Wishart refers to the factory as "closed" and the garden as "open" in order to reinforce themes of imprisonment and freedom. Within the two settings, individual sounds are linked to a particular concept, emotion, or idea, what Wishart calls a "sound-image." For example, machine

[276] Young, "Imagining the Source," 80.
[277] Ibid.

sounds are intended to convey industrial society and mechanization. In contrast, a flock of birds taking flight is meant to evoke freedom and imagination.[278] A network of sound-image relationships emerges as the work unfolds. These relationships are built on both the metaphorical implications of source materials as well as the physical transformation of certain sounds into different ones. For example, in several places the phoneme "lis" (from the phrase "Listen to reason") is morphed into birdsong. According to Wishart, the voice "takes flight" through its transformation and is connected to the concept of imagination through metaphor.[279]

Similarly, in Rudy's *In Lake'ch* environmental sounds can be said to convey images beyond their immediate identity. Consider, for example, the dog gnawing on a bone heard midway through "Carnivorous plants" (Track 3). As the movement unfolds, a repeated D4 on a tuned metal bowl, punctuated mallet strokes on wood and stone, a seed shell shaker, and an unidentifiable clicking sound with prominent echo are presented alongside the dog. These percussive sounds share no immediate connection to the animal on the basis of their social and environmental context. However, listeners can relate them to the canine if they are heard as part of the narrative event in which the dog is gnawing with pleasure and indulgence.[280] For example, at 2'59", the dog rustles and huffs with enthusiasm following the introduction of the shaker and clicking sound, only to give attention back to its prized possession. One interpretation, then, is that both the shaker and the clicking sound are distractions. Yet, they seem not to lead the dog away from its bone; that is, until the dog fades out and the clicking sound transitions to the next movement.

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[278] Wishart, *On Sonic Art*, 169. He organizes these sound-images according to four categories: "machines," "birds," "animal/body," and "words." Ibid., 170.

[279] Ibid., 165.

[280] In Western culture, a dog bone is regarded as a material reward given to a domestic canine as a gesture of acknowledgment or affection. This connotation of gnawing is generated not only from the dog's enjoyment of its treat but also from the human that provided the reward.

In the larger narrative of *In Lake'ch*, the dog's gratification from the bone is temporary; once the treat is consumed another is desired, and so the cycle repeats. Consumption and materialism are central themes in *In Lake'ch*. As suggested by the Mayan calendar, the ultimate reward of spirituality exists beyond Earth in a cosmic realm. The sounds of dogs play an important role in tracing this process from base materialism to spiritual sustenance over the course of the work. "Carnivorous plants" is arguably the only movement where dog sounds are associated with pleasure and indulgence. "A quailing prairie" (Track 8), for instance, is dominated by the more discomforting sounds of dogs howling and whining. However, the sounds of canines are absent from "Veiled dead zones" (Track 9) to the end of the work. One interpretation of this progression from pleasure (dog with bone), to discomfort (dog whining), to death (absence of dogs), is that a world driven by animal instinct is unsustainable emotionally, environmentally, and spiritually. While "Veiled dead zones" represents the environmental repercussions of over-consumption and materialism, it also becomes the starting point for movement to a realm of spiritual light, starting with "Hidden catalyst" (Track 10).

Trains and water are two other sound sources that go beyond basic identification to create more symbolic images. For example, in "Pandemic" (Track 5) the train symbolizes industrial power through train wheels scraping on tracks, railroad crossing bells, and pressurized steam. Discussed in detail later in this chapter, additional sounds such as wood splintering and a digital scream reinforce this image of industrial strength. In contrast, the train signals arrival in "Epilogue: Larger than home" when a train horn is accompanied by a rising metallic glissando, wind chimes, and sustained harmonics on a violin. Along similar lines, water is associated with industrialization in the form of steam in movements midway through the work, including "Pandemic" and "A slightly shimmering heap" (Track 6). Flowing water, in contrast, suggests

themes of healing and replenishment in later movements, such as "Hidden catalyst" (Track 10) and ". . . a terminus of blue." These juxtapositions of the train as a threat and as a signal of safe arrival and water in steam and liquid forms also play an important role in the work's narrative of human evolution from materialism to spiritualism.

"Veiled dead zones" is the turning point where peak production and consumption give way to self-awareness. It is difficult to say what type of "dead zone" Rudy is referring to in the title to Track 9. The obscurity of this space is emphasized by the notion that it is covered (or "veiled"). In ecology, a dead zone is a marine environment (often a coastal area) that supports little or no life as a result of pollution released from human activity.[281] Rudy's "Veiled dead zones" refers to another type of environment associated with pollution: an outdoor industrial space, possibly a rail yard. A sawtooth wave, screeching brakes, a train horn, railroad crossing bells, and pressurized steam prevail for much of the five-minute movement; that is, until 3'40" where a collection of resonant, synthesized tones (A4–E5–A5–E6–A6)—possibly derived from the train horn—and a rolling object replace these mechanical and, in the case of the sawtooth wave, synthetic sounds. The sawtooth wave makes a brief return at 4'20", only to fade out within seconds of its appearance. Soon after, the sound of the rolling object decrescendos. With only the resonant tones remaining, a new sound is introduced at 4'58": water being poured into a glass. Its opposition to industrial sounds, including steam, strengthens the interpretation of liquid water as a symbol of rejuvenation. The water filling a glass brings renewal and life to a movement that is otherwise defined by the "dead" sounds of industry.

Rudy also uses excerpts from two existing acousmatic works in order to explore recorded sounds as symbols. The string motive at 1'04" and 3'01" in "Slick green stones" (Track 11) is

[281] Robert J. Diaz and Rutger Rosenberg, "Spreading Dead Zones and Consequences for Marine Ecosystems," *Science* 321, no. 5891 (August 2008): 926–9.

the one from the beginning of Dhomont's *Un autre Printemps* (2000). The sawtooth wave at the opening to "Veiled dead zones" is from "Pater Noster-Agnus Dei" in Michel Chion's *Requiem* (1993). Rudy's quotation of Dhomont is twice removed from the original source. *Un autre Printemps* presents a modified excerpt from the first movement of Vivaldi's Violin Concerto No. 1 in E Major, Op. 8, RV 269, "Spring."[282] Dhomont extracts the first and seventh notes from the opening ritornello (E4 and B4) and adds reverberation and equalization. In addition to modifying a recording of the original work, he positions the quotation immediately after a water splash—the first sound of the composition. *Un autre Printemps* maintains the theme of springtime, but it enhances Vivaldi's programmatic scene with actual environmental sounds.

Rudy preserves the sonic content of the string motive while composing new material around it. "Slick green stones" begins with birdcalls and footsteps on snow and a hard surface, sounds that maintain the theme of seasonal change from Vivaldi's Concerto as well as Dhomont's *Un autre Printemps*. It is not until 1'04" that the Dhomont quotation is first heard. It is preceded by the sound of footsteps instead of the water splash in the original. As well, a rolling marble—a signature sound of Dhomont—accompanies the string motive in *In Lake'ch*.[283] The marble is filtered in such a way that it shares pitch content with the strings.

As "Slick green stones" unfolds, the rolling marble is transformed into trickling water and, starting at 1'27", a solo violin presents a series of sustained tones over a flickering metallic

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[282] This is one of several quotations from Vivaldi's Concerto No. 1. For more on musical borrowing see Peter J. Burkholder "Borrowing," *Grove Music Online*, *Oxford Music Online*, Oxford University Press, http://www.oxfordmusiconline.com/subscriber/article/grove/music/52918 (accessed 16 July 2015); Raúl Minsburg and Fabián Beltramino, "The Quotation in Electroacoustic Music," paper presented at the Electroacoustic Music Studies Network, Paris, France, 3–7 June 2008; Richard Beaudoin, "Counterpoint and Quotation in Ussachevsky's *Wireless Fantasy*," *Organised Sound* 12, no. 2 (2007): 143–51; and David Metzer, *Quotation and Cultural Meaning in Twentieth-Century Music* (Cambridge, UK: Cambridge University Press, 2003).

[283] See, for example, *Points de fuite* (1982) and *Vol d'Arondes* (1999).

texture. It is plausible that this melodic passage is derived from the original string motive using pitch shift. The intervallic space expands with each subsequent pitch, first a major third (C#5–A4), then a perfect fourth (A4–D5), followed by a perfect fifth (D5–G4).[284] However, the violin breaks this pattern when it returns to the initial C#5 by a tritone (G4–C#5). The tritone does not resolve to D5, but instead descends to an augmented second (C#5–Bb4). The outward expansion of the melodic content resumes with the restatement of a perfect fifth (Bb4–F5) and then a minor sixth (F5–A4). Upon the statement of a minor sixth, this interval expansion stops and the entire pitch collection (G–A–Bb–C#–D–F) is gradually layered. It is difficult to explain this passage in terms of harmonic function, although B4 (the second pitch in the Vivaldi sample) comes close to serving as a fundamental. This dense texture of violin tones then crescendos over a high-pass filter, leading to a restatement of the original string motive. The motive is immediately followed by a pulsating E4 (the first pitch in the Vivaldi), which transitions directly to the penultimate movement, "Epilogue: Larger than home" (Track 12). While the entire violin passage departs from the initial motive in terms of its placement in the movement and the inclusion of additional sounds, the excerpt upholds a connection to the Dhomont. "Slick Green Stones" maintains the instrumentation (violin), playing technique (sustained tones), and to an extent the pitch content (emphasis on B4 preceding the restatement of the quotation at the E4 immediately following it) of *Un autre Printemps*, and by extension the first movement of Vivaldi's Concerto No. 1.

"Veiled dead zones" also makes use of the sawtooth wave from Chion's *Requiem* (1993), specifically the opening to "Pater Noster-Agnus Dei." With this connection to the Mass for the Dead, Rudy's "dead zone" takes on a religious tone. The original sawtooth wave is gradually veiled over the course of the first minute of the movement through layering and also the

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[284] Coincidentally, this same technique is used in Schafer's *Patria* cycle. See Chapter Three.

introduction of the train horns, railroad-crossing bells, and scraping railcar wheels described earlier, something not heard in *Requiem*. The original waveform occasionally surfaces from this synthetic/industrial soundscape. In contrast, Chion alternates the sawtooth wave with a female voice whispering a prayer inside a cathedral with faintly audible church bells. Once aware of this connection to Chion's *Requiem*, listeners are able to relate "Veiled dead zones" to the idea of death as a rite, in addition to envisioning a ravaged landscape.

Chion's setting deals with the suppression of living humans by those in power, rather than the traditional Requiem Mass theme of lament for the deceased.[285] Reference to The Lord's Prayer—by way of the sawtooth wave quotation—is made at a time of chaos and desperation in *In Lake'ch*. The railroad crossing bells, brakes, and horn evoke peak industrial activity. Within a Christian context, however, the sawtooth wave relates to the theme of death in Rudy's work. Its unnatural (i.e., synthetic) quality and unstable slow-fast waveform complements the grating sounds of trains. (This wave type also creates a sharp blade-like imprint when visualized on a spectrogram.) Death is evoked through the replacement of "living" sounds (such as birds, dogs, and human footsteps) with machines and synthetic sounds. Accordingly, water droplets at 4'45" and water being poured into a glass at 4'57" can be heard as salvation from the harsh sounds dominating much of the movement. Although these water sounds are not directly symbolic of deliverance from sin through faith in Christ (central themes in the text of the Requiem Mass, especially the "Pater Noster" and the "Agnus Dei"), the failure of the sawtooth wave to return after the introduction of water in its liquid form does suggest a transition from a dark and polluted industrial setting to a place of healing.

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[285] In his words: "The Requiem was composed whilst thinking about the troubled minority of the living, rather than the silent majority of the dead." Michel Chion, liner notes to *Requiem*, Empreintes Digitales, IMED 9312, 1993.

In Lake'ch maintains a strong connection to the acousmatic tradition through the direct quotation of two acousmatic works, Dhomont's *Un autre Printemps* and Chion's *Requiem*. In addition, Rudy uses several sounds that bring to mind existing compositions through shared timbral and/or stylistic qualities. For instance, the prolonged passage featuring the sound of wood splintering in "Prologue: The Pangaea" recalls rope tension in "Premieres forces" from Bernard Parmegiani's *La Création du Monde* (1982–84). Perhaps more iconic in reference is the rhythmic drive and wide range of train sounds in "Veiled dead zones," which recollect Pierre Schaeffer's *Étude aux chemins de fer* (1948). Through the use of direct quotation in addition to source materials similar to those used in canonic works, *In Lake'ch* pays homage to the acousmatic tradition and, at the same time, brings sounds and techniques from that tradition into conversation with contemporary ecological concerns.

Certain source materials change meaning over the course of *In Lake'ch*. Such is the case with railroad and water sounds. For example, in "Pandemic" and "Veiled dead zones," the train exhibits its physical power in the form of pressurized steam, scraping railcar wheels, and railroad-crossing bells. In the context of a composition about changing relationships to the environment and self, the train initially portrays control over the natural environment. However, in the final movement of *In Lake'ch*, "Epilogue: Larger than home" (Track 12), the train takes on a different meaning. It is no longer associated with transportation within a physical landscape but with transcendence to a spiritual realm beyond Earth. This change in meaning takes place precisely at 0'18", where a train horn enters at the climax of a rising glissando played on a synthesizer. The horn echoes throughout an imaginary celestial space, which is evoked through wind chimes, sustained harmonics on a violin, and a pulsating waveform. Here, the train is no longer associated with a real-world source and function (i.e., a machine that ships goods and

services from one location to another) but rather with a symbolic space, possibly the edge of the cosmic core according to the Mayan calendar.

This dual image of the train as a disruptive force and as a signal of arrival in *In Lake'ch* speaks to two predominant conceptions of railroads in Western culture: displacement and progress. Historian Maury Klein observes of the perception of trains in the United States between the Civil War and World War I:

> Not all Americans saw the locomotive as a benign symbol. Some took a darker view, interpreting the engine of progress as an engine of destruction that disrupted what sense of order there was in American life and warped social values by infecting men everywhere with a particularly virulent strain of restlessness and materialistic ambition. To these critics the locomotive became a metaphor for the price of industrial progress.[286]

In order to associate the sounds of trains with this so-called "darker view" (i.e., "restlessness and materialistic ambition") there should first be an understanding of what forms of locomotion are deemed environmentally sustainable. In other words, a baseline of comparison is needed. Footsteps in "Slick green stones" represent an alternative and arguably less impactful form of locomotion. Like those heard in the conclusion to Westerkamp's *Talking Rain*, footsteps in "Slick green stones" symbolize balance between humans and the environment. However, where *Talking Rain* evokes an actual soundscape with human sounds on scale with those of a temperate rainforest, Rudy presents footsteps as a metaphor for human evolution beyond industrialization and materialism to a world where humans are in greater harmony with both nature and self.

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[286] Maury Klein, *Unfinished Business: The Railroad in American Life* (Hanover, NH: University Press of New England, 1994), 20–21. See also Remo Ceserani, "The Impact of the Train on Modern Literary Imagination," *Stanford Humanities Review* 1, no. 1 (1999), http://web.stanford.edu/group/SHR/7-1/html/ceserani.html; Benjamin Fraser and Steven D. Spalding, eds., *Trains, Culture, and Mobility: Riding the Rails* (Lanham, MD: Lexington Books, 2012); and Richard White, *Railroaded: The Transcontinentals and the Making of Modern America* (New York: W. W. Norton and Company, 2012).

"Slick green stones" marks the first time in which footsteps are heard on a surface other than snow. At 0'28", the terrain changes from snow to a hard surface—possibly concrete or marble. Prior to this passage, walking is audible in "Pandemic" (Track 5) and "A quailing prairie" (Track 8), two movements where machinery and barking dogs figure prominently. In "Slick green stones," however, Rudy presents footsteps alongside a flock of birds. Although the hard surface maintains the image of a man-made environment, the machines and dogs are absent. Within the larger narrative of the work, the transition from one surface to another via walking—along with vibrant bird activity—helps to propel *In Lake'ch* from an ecosystem damaged by human activity ("Veiled dead zones") to a transcendent realm (". . . a terminus of blue").

Footsteps in "Slick green stones" also call into question the association of mechanized forms of transportation with efficiency and progress, an idea suggested by movements featuring harsh industrial sounds (Tracks 5–6 and 8–9). That humans should reduce machine sounds and give more attention and respect those of nature is an idea that is central to soundscape studies. However, where Schafer, Westerkamp, and others direct attention to pre-industrial soundscapes to inspire change, Rudy progresses beyond Earth altogether in *In Lake'ch*. He turns to walking as a way to symbolize human evolution beyond the (mis)treatment of the environment as a material resource to a place of healing that lies outside the physical world. Thus, when the train returns in "Epilogue" it is stripped of its former meaning as a symbol of power and economic progress and is repurposed as a signal of arrival at a celestial space of peace and harmony.

In this line of thought, railroad and water sounds in *In Lake'ch* have the potential to create what political scientist Doris Graber calls "condensation symbols"; that is, "a name, word, phrase, or maxim which stirs vivid impressions involving the listener's most basic values and

readies the listener for action."[287] Graber's usage of the term "symbol" is different from its conventional application. A condensation symbol serves the purpose of bringing together multiple, often varied, examples under a single term, whereas a symbol more often represents a specific idea. Communication scholar David Zarefsky explains: "condensation symbols designate no clear referent but serve to 'condense' into one symbol a host of different meanings and connotations which might diverge if more specific referents were attempted."[288] He continues: "Condensation symbols are particularly useful when applied to ambiguous situations because they enable an individual to focus on the specific aspects of the situation that are most meaningful."[289] In a work such as *In Lake'ch*, environmental sounds can be classified under a particular condensation symbol based on both their semantic and acoustic content. Different from the one-to-one correlation of sound and image through metaphor, condensation symbols bestow multiple environmental sounds with cultural, economic, environmental, political, and/or religious significance.

Trains and water are two sound sources that demonstrate how an electroacoustic work such as *In Lake'ch* can activate thinking about real-world topics and issues, and in Graber's words "read[y] the listener for action." One passage in *In Lake'ch* that showcases the train as a condensation symbol is from 0'00"–1'44" in "Pandemic" (Track 5). In this section, scraping railcar wheels, railroad crossing bells, and the release of pressurized steam are heard alongside a

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[287] Doris Graber, *Verbal Behavior and Politics* (Champaign, IL: University of Illinois Press, 1976), 289.

[288] David Zarefsky, *President Johnson's War on Poverty: Rhetoric and History* (Tuscaloosa: University of Alabama Press, 1986), 11. Quoted in James Jasinski, *Sourcebook on Rhetoric: Key Concepts in Contemporary Rhetorical Studies* (London: Sage Publications, 2001), 98.

[289] Ibid. For a discussion of condensation symbols in environmental studies, see James G. Cantrill, "Perceiving Environmental Discourse: The Cognitive Playground," in *The Symbolic Earth: Discourse and Our Creation of the Environment*, ed. James G. Cantrill and Christine L. Oravec (Lexington, KY: The University of Kentucky Press, 1996), 89.

dog barking, a digitized scream, and extended techniques on both saxophone and violin. These sounds have the potential to provoke dialogue around the discourse of the railway while sharing little or no connection in reality. On its own, a train is a condensation symbol that brings to mind such concepts as mechanization, physical power, and transportation. However, when the dog barking, scream, and unconventional musical techniques—sounds that generally lack pleasurable associations—are presented alongside it, both the timbre and connotation of these other sounds reinforce the image of the train as a destructive force. Heard together, these sounds can encourage listeners to engage broader and more politicized topics associated with trains, which might include industrialization and progress.

Water in *In Lake'ch* also functions as a condensation symbol, but in opposition to that of the train. Gently flowing water conjures images of a peaceful environment, whether a pristine brook in a wilderness setting or a tranquil fountain in an urban alcove. However, when additional sounds with similar timbral properties are positioned next to the stream, associations such as healing, balance, and emotional or spiritual renewal are brought to mind. Such is the case from 0'00–1'52" in "Hidden catalyst" (Track 10), where water is accompanied by a variation of the opening flute motive, several low-pitched almglocken, and sustained synthesizer tones. The processed flute enters first with a sustained Ab3 that is then overblown to produce an Ab4. The almglocken and synthesizer follow immediately after the flute. Both instruments reinforce the tranquil properties of this musical space, the almglocken with its muffled, otherworldly tones and the synthesizer with its subdued attack and gentle reverberation.

In light of recent human-caused and natural disasters in North America, trains and water can stimulate thinking about controversial topics concerning humans and the environment. The train is no longer an iconic symbol of progress and water one of sustenance. Given the severity

of railroad disasters in North America, the sounds of trains may conjure images of derailments. Several train derailments, including the tragic *Lac-Mégantic* accident in Quebec, Canada, have raised public skepticism towards railway companies. As a result, contemporary media has portrayed the railroad industry increasingly as profit-oriented and dangerous.[290] Water has also caused major disasters in North America, either through prolonged shortage or a breach of its normal confines. Contemporary media coverage and public discussion of water range from drought in California to flooding in Colorado.[291]

Yet, there is a tension in works that present water as a life-giving force and natural disasters. For example, in light of recent drought-like conditions in the Lower Mainland of British Columbia, *Talking Rain* no longer stands as a celebration of a region known for its abundance of rain, but instead captures nostalgia for the "raincoast."[292] Westerkamp's composition might even create discomfort for survivors of flooding or individuals facing future sea level rise in coastal regions, including those living in the Lower Mainland.[293] Although water is also portrayed as a source of renewal in later movements of *In Lake'ch*, this interpretation is perhaps less at risk of conflicting with real-world conditions since the work does not focus on a

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[290] See, for example, Andru McCracken, "One Wreck after Another," *The Tyee* 10 March 2006, http://thetyee.ca/Views/2006/03/10/OneWreck/.

[291] See, for instance, Keith Wagstaff, "Drought-Shaming Apps Target California Water Wasters," http://www.nbcnews.com/storyline/california-drought/drought-shaming-apps-target-california-water-wasters-n167651 (accessed 16 July 2015); and Ginger Zee, Clayton Sandell, and Alexis Shaw, "Colorado Floods: Rescuers Seek Survivors and Signs of Hope," http://abcnews.go.com/US/colorado-floods-7000-evacuated/story?id= 20260859 (accessed 16 July 2015).

[292] For more on drought-like conditions in British Columbia in 2015, see, Wendy Stueck, "Concerns over drought fallout in B.C. heat up," *The Globe and Mail* 21 July 2015, http://www.theglobeandmail.com/news/british-columbia/concerns-over-drought-fallout-in-bc-heat-up/article25622332/.

[293] In general, there has been limited engagement with the destructive powers of water and water scarcity in contemporary art music. Two artists engaging these topics are John Luther Adams and Leah Barclay. See Adams' *Dark Waves* (2007) and *Become Ocean* (2013), two orchestral works that engage human-caused water crises (oil spills and anthropogenic climate change, respectively), and Barclay's The Dam(n) Project (2013), an interdisciplinary project that investigates water security in Australia and India.

specific place. Rudy is concerned with restoring the human spirit, instead of directing attention to the impact of human activity on an actual environment. This more indirect approach allows listeners to engage a broader range of topics and issues.

The Transformation of Self

Both *Talking Rain* and *In Lake'ch* aim to sensitize listeners to the external world and also to themselves by having them subscribe to the idea that humans have a discordant relationship with nature. With this understanding, listeners are encouraged to consider certain sounds as representative of a healthy sonic environment and others as signifying a polluted one. Westerkamp and Rudy begin the process of transforming listeners by removing sounds from the actual environment and manipulating them in the studio. Both composers apply different techniques to nature sounds than to those of human activity. Nature sounds are primarily modified to bring out their minute or "hidden" sonic details, whereas machine sounds are often processed such that their dominant characteristics are enhanced even more. For example, passages in both *Talking Rain* and *In Lake'ch* highlight pitched content in water through the use of filters and equalization. In contrast, mechanical sounds in *Talking Rain* and *In Lake'ch* are intensified through reverberation and amplification. Passages that present a specific machine in isolation are not common; more often they are layered. Such is the case with traffic in *Talking Rain* and railroads in *In Lake'ch*, both in the B section. Yet, similar to sections where a single machine is manipulated, layering multiple machines reinforces the association of mechanical sounds with power and disorder.

At the same time, audiences are likely to experience recorded environmental sounds differently. For example, some listeners may perceive water as nourishing, while others may

recognize it as threatening. Perhaps, then, supplemental materials (track titles and liner notes), audience demographic, and performance location inform how extramusical topics are engaged in *Talking Rain* and *In Lake'ch* more than the source materials themselves. However, the use of iconic sounds such as trains and water as condensation symbols can activate thinking about real-world issues not captured using either traditional soundscape or acousmatic techniques. As exemplified in *In Lake'ch*, the musical context in which trains and water are heard plays an important role in their interpretation; that is, the presentation of other sounds alongside trains and water helps to intensify their symbolic qualities.

In addition to the transformation of source materials through studio processing, the traversal of different environments also plays an important role in reconditioning listeners to nature and to self. Each work begins in a natural environment, transitions to a man-made setting, and concludes in an idyllic locale—an old growth forest and a cosmic core, respectively. The A section to both compositions consists primarily of nature sounds, although several man-made sounds are also present. *Talking Rain* opens in a rural space marked by birds, frogs, and most prominently water. On occasion, a car crosses the stereo field, disrupting nature and shifting the work to a different outdoor environment. *In Lake'ch* begins in a primordial space evoked by bubbling, gurgling, grinding, and splintering sounds. A processed flute and what sounds like water trickling through hands may seem to suggest human presence; however, in the context of a movement about a supercontinent (Pangaea), these sounds are perhaps more emblematic of a higher power. It is not until the B section of *In Lake'ch* that man-made sounds are pitted against those of the natural world, whereas Westerkamp establishes a dichotomy between nature and humans at the outset of *Talking Rain* through the juxtaposition of quiet water and animal sounds with the passing car.

The supposedly less desirable sounds of industrialized society dominate the B sections in both compositions. In *Talking Rain*, traffic disrupts the quieter sounds of rain. It masks delicate raindrops on organic surfaces by amplifying wet pavement. Moreover, the birds and frogs heard earlier in the work are no longer present, or perhaps they are now inaudible. The foghorn is also absent in the B section. Although it is a man-made sound, Westerkamp deems the foghorn worthy of protection given its status as a soundmark. The same can be said for the processed church bells in the final section of the piece. In *In Lake'ch*, railway sounds, barking dogs, a digitized scream, a sawtooth wave, and extended playing techniques on musical instruments capture the power and anxiety of an industrialized world. The disruptive sounds of human activity in each composition eventually give way to balance between humans and their surroundings.

The process of human transformation from disharmony to unity between nature and the self is realized in the final sections of each piece, which present two safe and tranquil spaces. *Talking Rain* evokes balance between humans and the natural world with its conclusion in a quiet forest marked by footsteps, birdsong, frogs chirping, gentle rain, and ethereal sustained tones (possibly an extract from the bells in the B section). *In Lake'ch* departs Earth altogether to arrive at a cosmic core evoked by pitched water and sustained partials from the overtone series—itself a natural process. These transcendent soundscapes gain their significance from the sonic environments that precede them, especially those that make up the middle section of each work. With the arrival at an idyllic space at the end of *Talking Rain* and *In Lake'ch*, audiences are left with a model soundscape—or at least one of inspiration—for change at the individual and societal levels.

Acousmatic Sounds and (Im)Balanced Soundscapes

One challenge of juxtaposing polluted and pristine environments in electroacoustic music—perhaps any musical work—is the risk of giving preference to non-human sounds. While raising awareness to balances and imbalances in the environment in *Talking Rain* and *In Lake'ch* may be well intentioned, the evocation of physical movement from a busy urban center to a peaceful forest or the transition from an industrial wasteland to a cosmic haven have the potential to perpetuate a romanticized conception of nature. Joanna Demers attributes the privilege given to nature in soundscape composition to "the belief that sound [as a medium] is unmediated and thus communicates more truthfully than other sense phenomena."[294] Demers' observation that soundscape composition prioritizes nature over man-made environments holds true for many but not all works in the genre. For instance, several compositions by Barry Truax focus on either a natural sound source (such as water in *Riverrun* [1986]) or a man-made one (as with church bells in *Basilica* [1992]), rather than contrasting natural and human environments. In addition, two of the three works that make up Westerkamp's album *Into India: A Composer's Journey* (2002) explore cultural gatherings and daily activities in densely populated areas of India. *Attending to Sacred Matters* (2002) is the exception in that it combines two nature recordings (one of water from a river in South Goa and another from The Ganges) with sustained bells, religious speakers, and sacred chant.

Demers, however, turns to an iconic soundscape composition—Westerkamp's *Kits Beach Soundwalk* (1989)—to support her claim that works in that genre prescribe interpretation. In *Kits Beach Soundwalk*, Westerkamp combines environmental sounds with spoken narration about the suppression of nature, women, and silence by other forces (i.e., the city, an armed man, and

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[294] Demers, *Listening through the Noise*, 123.

noise).[295] Although the work serves effectively as leverage for Demers' argument, it is a strategic choice. *Kits Beach Soundwalk* is exceptional in that it upholds several dualities and explores them through speech.[296] As mentioned, not all works contrast natural and human environments. Furthermore, later compositions by Westerkamp that do explore the "reality" of a real-world place use techniques other than speech to create commentary on social and environmental conditions. Such is the case with *Talking Rain*, which presents a personal account of a region in part through the use of acousmatic sound.

Demers' observation that "the ethnographical impulse in soundscape feeds a belief at odds with [. . .] the idea that sound can be used to imitate reality and impart truth in an unambiguous manner" reinforces an opposition between soundscape and acousmatic techniques.[297] The ideology of soundscape composition—that engagement with recorded sounds through music can help condition listeners to the environment—is counterintuitive to the autonomy of sound that defines other approaches to electroacoustic music, including historic musique concrète and more recent phonography (see López and Tsunoda above). Furthermore, the emphasis on context in soundscape works risks prescribing a natural setting, whether or not the composer's experience of nature aligns with that of listeners.

To criticize soundscape compositions on the basis that they use source materials to comment on social and environmental conditions ultimately calls into question the aesthetic standards of the genre. In other words, to weigh environmental sounds equally in electroacoustic music, as Demers seems to want composers and listeners to do, is to uphold soundscape

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[295] Ibid. Speech is also used in *A Walk through the City* (1981). The work explores an infamous neighborhood through the combination of field recordings and poetry composed and read by Norbert Ruebsaat.

[296] The same could be said for *Lighthouse Park Soundwalk*. See Chapter Two.

[297] Demers, *Listening through the Noise*, 122.

composition to the acousmatic tradition, which in theory soundscape composition does not support.[298] To subscribe to the idea that all sounds are of equal aesthetic and social value also depoliticizes soundscape techniques. Still, acousmatic approaches are one way to counterbalance pragmatism in soundscape composition while maintaining the moral imperative that defines the genre.

Acousmatic sound in Westerkamp's *Talking Rain* is not used in the Schaefferian sense (where the semantic properties of source material are suspended in order to focus on recorded sound as a pure phenomenon), but it is instead applied as a tool to illuminate less considered aspects of an actual environment. This engagement with acousmatic sound in context both directs attention to the preferences of listeners (i.e., which sounds are pleasing, which are disruptive, etc.) and calls attention to the "hidden" properties of environmental sounds, such as the pitched content and metered rhythm of water. *Kits Beach Soundwalk* presents an early example of this approach when Westerkamp applies a high-pass filter to the sound of barnacles. Yet, listeners remain aware of their original source (Kitsilano Beach in Vancouver) through speech—Westerkamp describes the sound as it undergoes studio processing.

In accordance with the aestheticization of environmental sounds in soundscape composition, acousmatic passages in *Talking Rain* are reserved primarily for the sounds of

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[298] Demers writes: "This faith in the universally meaningful properties of sound should be surprising, because one thing on which virtually anyone in electronic music can agree is that there is no one unmediated or natural experience of sound . . . Certainly, forest sounds are different from freeway sounds, but they are in no way truer or, to vocalize the unspoken implication in much acoustic ecology works and writings, better. Yet the ethnographic impulse in soundscape compositions suggests precisely that: sounds captured in natural environments are more beautiful and enlightening than those we normally hear." Demers, *Listening through the Noise*, 123. Demers is not the only scholar to critique soundscape composition on the grounds that works in the genre are pragmatic in approach (i.e., assumptions are made about the environment, its health, and human activity). Musicologist Sherry Lee and sound artist Francisco López have made similar claims. See Lee, "*Forêt profondes*"; and López, "Schizophonia vs l'object sonore."

nature.[299] Acousmatic techniques are applied to nature sounds in *Talking Rain* in part because of their connotation, but also because of their acoustic profile. For example, water is deemed rich in musical content on the basis of its complex timbral properties. Mechanical sounds, on the other hand, are considered homogenous due to their limited frequency distribution.[300] Thus, when Westerkamp filters and layers water the desired effect is one of awe and appreciation, rather than disruption and alienation. The appeal of naturally occurring sounds in *Talking Rain* is intensified further when listeners are transported from an immersive acousmatic passage to a real-world setting, such as the transition from the A to the B section. Here, a tapestry of different water sounds is gradually replaced by ambient noise and traffic. Through the use of acousmatic techniques, listeners are invited to consider the inner complexity of sounds of the natural world. When processed nature sounds are supplanted by urban activity, the sonic conditions of the city are reinforced as undesirable and the complexity of nature is promoted as valuable.

Environmental sounds in *In Lake'ch* are open to wider interpretation than those found in *Talking Rain*. Rudy uses source materials to engage topics beyond their immediate associations, whereas Westerkamp reasserts their everyday meaning. Yet, like *Talking Rain*, human transformation is a central theme in *In Lake'ch*. Rudy traces an evolution of human civilization from a reality of base materialism towards a higher plane of consciousness. He uses a wide range of source materials to propel listeners through these mental stages. Disparate sounds are at times grouped together, creating a sonic space where the semantic properties of source materials are twisted and in some cases redefined. The original context of recorded sounds gives way to

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[299] Acousmatic techniques are occasionally applied to soundmarks in soundscape works. In *Talking Rain*, sustained bell-like tones (possibly sourced from the Holy Rosary Cathedral bells) fade in and out starting at the transition to the A' section and continue to the end of the work (see 11'05"–17'31").

[300] For more on this topic see Truax, *Acoustic Communication*, 137–40.

imaginary environments in *In Lake'ch*, such as the synthetic space of processed water and sustained partials of the overtone series in which the work concludes. The transformation of sound, environment, and self in Rudy's composition leads not to a place of nature (as it does in Westerkamp's), but rather to a transcendent realm.

Talking Rain and *In Lake'ch* demonstrate some of the ways in which composers use both acousmatic and soundscape elements to recondition listeners to the environment. Both works explore the intrinsic properties of source materials while also maintaining an underlying environmentalist message. The separation of nature sounds and context in acousmatic approaches gives access to the deeper sonic layers of the natural world, while the ethical concerns of soundscape techniques draw attention to the discordant relationship between humans and nature. In order to progress from a culture of domination over nature to one of co-habitation, works such as *Talking Rain* and *In Lake'ch* put forth the idea that the wellbeing of humans is interdependent with that of the natural world.

Chapter 5 Sub-ice Sonifications and Spectrograms: Mapping a Natural Formation in Two Concert-Hall Works

The arctic and subarctic regions of North America have a rich, yet relatively recent history of representation in Western culture.[301] Perhaps the most iconic early work to focus on the Far North is the 1922 film *Nanook of the North*, a documentary that follows an Inuk man named Nanook and his family in the Canadian Arctic. In the visual arts, painters of European descent began to capture Inuit communities and arctic landscapes on canvas in the 1930s.[302] In classical music, Canadian composers began to employ Inuit music and to depict northern environments in the mid-1940s. These include John Weinzweig's *Edge of the World* (1946), an orchestral work that uses Inuit music as compositional material, and Harry Somers' *North Country: Four Movements for String Orchestra* (1948), which captures the four seasons in northern Ontario. However, the first sustained interest in the Far North in music was not until the early 1960s, with Canadian composers turning to either native culture or geophysical features of the Arctic.

Canadian composers interested in indigenous culture in the Arctic have primarily incorporated Inuit legends, drumming, and singing. Such works include Serge Garant's *Anerca* (1961), a piece for soprano and small ensemble that uses Inuit verse; Dianna McIntosh's *Kiviuq, an Inuit Legend* (1985), a composition for orchestra and narrator that draws on Inuit stories and

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[301] The Arctic is generally defined as the region north of the Arctic Circle (66°33'N). The Subarctic refers to regions located between 50°N and 70°N.

[302] Lawren Harris (1885–1970) and Alexander Young Jackson (1882–1974), two members of the group of Canadian landscape painters known as The Group of Seven, visited the Canadian Arctic together in 1930 aboard the *SS Beothic*. This was Jackson's third trip and Harris' first. The route took them as far north as Lancaster Sound and as far west as Bathurst Inlet before turning back due to ice pack. They made sketches of ice formations and indigenous communities during their trip and used them as models for such paintings as "Icebergs" (Harris, 1930) and "Encampment, Eastern Arctic" (Jackson, 1930). For Jackson's account of the voyage, see Alexander Young Jackson, *A Painter's Country: The Autobiography of A. Y. Jackson* (Toronto: Clarke, Irwin, and Company, 1958), 126–135.

drumming; and Barry Truax's *The Shaman Ascending* (2005), an electroacoustic work inspired by Inuit sculpture and throat singing. With focus on the natural environment, Canadian composers have generally captured the Far North in one of three ways. The first is as a place of harsh beauty and sacred purity. Works that present the North in this way include Barbara Pentland's solo piano piece *Suite Borealis* (1966) and Malcolm Forsyth's choral composition *Northern Journey* (1997). Other pieces portray the North as a source of national identity. Glenn Gould's radio documentary *The Idea of North* (1967) is emblematic of this approach. Gould combines recordings of five Canadians describing their physical and psychological experience of the Arctic in an effort to articulate the nationalistic meaning(s) of North.[303] The third way in which past works capture the North is as a place under the threat of changing environmental conditions. R. Murray Schafer's *North/White* (1979) is perhaps the earliest composition to focus on this topic as it pertains to the Canadian North. Schafer directs attention to the transformation of northern environments by industry and transportation through the juxtaposition of a quiet, restrained orchestra (representing the Northern landscape) and a blaring—if not offensive—snowmobile.[304]

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[303] For a critical discussion of national identity in *The Idea of North*, see Michey Vallee, "Glenn Gould's *The Idea of North*: The Cultural Politics of Benevolent Domination," *TOPIA: A Canadian Journal of Cultural Studies* 32 (2014): 21–41.

[304] For more on representations of the North in the arts, see Sherrill E. Grace, *Canada and the Idea of North* (Montreal and Kingston: McGill-Queen's University Press, 2001); Peter Davidson, *The Idea of North* (London: Reaktion Books, 2005); Sverrir Jakobsson, ed. *Images of the North: Histories, Identities, Ideas*, vol. 14 of *Studia Imagologica: Amsterdam Studies on Cultural Identity*, ed. Hugo Dyserinck and Joep Leerssen (Amsterdam and New York: Editions Rodopi, 2009); and Anka Ryall, Johan Schimanski, and Henning Howlid Wærp, eds., *Arctic Discourses* (Newcastle upon Tyne: Cambridge Scholars Publishing, 2010). Musical works dealing with Antarctica are limited to the environment, historic expeditions, and scientific research, given that the continent has no native population. For a comprehensive list of Antarctic-related music, see Valmar Kurol, "Antarctica Experienced Through Music," http://www.antarctic-circle.org/valmar.htm (accessed 27 April 2016). For discussion of contemporary composers engaging Antarctica, see Carolyn Philpott, "Sonic Explorations of the Southernmost Continent: Four Composers' Responses to Antarctica and Climate Change in the Twenty-First Century," *Organised Sound* 21, no. 1 (April 2016): 83–93.

Although the Far North has historically received interest from Canadian composers, musicians in the United States are increasingly engaging the Arctic in their works. Composers above and below the 49th parallel explore the Far North with a new understanding of the region.[305] Recent perceptions of the Arctic have been significantly informed by global climate change. With arctic ice melting at an unprecedented rate, the Far North is no longer seen as pristine and timeless. Instead, it is the front line of a changing planet. Some composers engage the Arctic in this context, either commenting on climate change through titles and supplementary texts or by integrating relevant information, such as scientific data, into their music.

Many contemporary composers utilize technology in their arctic-themed works. Approaches include the production of stand-alone field recordings (e.g., Peter Cusack, *Baikal Ice* [2003]), the combination of recorded environmental sounds with live instruments (e.g., Derek Charke, *Tundra Songs* [2007]), and spectrographic analysis of recorded materials (e.g., Carmen Braden, *Candle Ice* [2014]). Another technique used to engage the Arctic is rendering scientific data as sound, also known as sonification. Data can either be translated into synthesized sound in real-time (e.g., John Luther Adams, *The Place Where You Go to Listen* [2004–]) or it can be used to shape a musical score and/or recording that is played at a later time (e.g., Marty Quinn, *The Climate Symphony* [2000]).[306] Works that use sonification in an environmental context blur the

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[305] Composers also continue to engage indigenous culture in the Far North. For example, Derek Charke's *Tundra Songs* (2007) combines recorded environmental sounds with a string quartet and non-traditional Inuit throat singing. Charke's work was commissioned and premiered by the Kronos Quartet, featuring Inuk singer Tanya Tagaq. *Tundra Songs* exemplifies recent efforts for greater artistic collaboration between native and non-native peoples.

[306] See John Luther Adams, *The Place Where You Go to Listen: In Search of an Ecology of Music* (Middletown, CT: Wesleyan University Press, 2009); Tyler Kinnear, "Voicing Nature in John Luther Adams's *The Place Where You Go to Listen*," *Organised Sound* 17, no. 3 (2012): 230–39; and Marty Quinn, "Research Set to Music: The Climate Symphony and Other Sonifications of Ice Core, Radar, DNA, Seismic and Solar Wind Data," Proceedings of the 2001 International Conference on Auditory

boundary between art and science; that is, they aestheticize the physical world while presenting scientific findings.

This chapter considers how two composers, Matthew Burtner and Carmen Braden, combine recorded nature sounds and instrumental music based on environmental properties and processes. Particular attention will be paid to Burtner's *Iceprints* (2010), scored for one to three telematic pianos and recorded underwater ice and animal sounds, and Braden's *Candle Ice*, which calls for violin, cello, piano, and hydrophone recordings of candle ice.[307] Candle ice is a form of rotten ice (i.e., disintegrating ice) that develops as columns that are perpendicular to the original ice surface.[308] The two works under consideration comment on the transformation of a natural environment through the combination of ice recordings and instrumental music. *Iceprints* reveals the melting trend in arctic ice extent from 1970–2009, and *Candle Ice* traces the different stages of candle ice at subarctic lakes during the final days/weeks of the spring melt.[309]

Both Burtner and Braden have a personal relationship to the Far North. Burtner (b. 1971) was born in Naknek, Alaska, and grew up near Barrow, located above the Arctic Circle. Braden (b. 1985) was born in Whitehorse, Yukon, and raised and continues to live in Yellowknife,

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Display, Espoo, Finland, 29 July–1 August 2001, https://smartech.gatech.edu/bitstream/handle/1853/50634/ Quinn2001.pdf.

[307] There is currently no commercial recording of *Iceprints*. An excerpt of the electronic track used in *Iceprints* is available at http://matthewburtner.com/iceprints/. An excerpt of a live performance of *Candle Ice* is available on Carmen Braden, *Ravens*, Centrediscs/Centredisques, CMCCD 23217, 2017. That excerpt can also be streamed at https://www.musicworks.ca/profile/carmen-braden-raises-volume-subarctic.

[308] "Candle Ice," American Meteorological Society Glossary of Meteorology, http://glossary.ametsoc.org/wiki/Candle_ice (accessed 29 April 2016).

[309] Area and extent are different approaches to measurement. Area measures a given surface, whereas extent measures both a given surface and where that surface is not. In the case of ice, these different measures are particularly important where there is surface melt. Area measurement does not account for ice present underneath a water surface, whereas extent does. For more on the use of satellite and pre-satellite records to study change in ice extent study over time, see W. N. Meier, J. Stroeve, A. Barrett, and F. Fetterer, "A Simple Approach to Providing a More Consistent Arctic Sea Ice Extent Time Series from the 1950s to Present," *The Cryosphere* 6 (2012): 1359–68.

Northwest Territories. The former location is approximately 650 km (400 mi) south of the Arctic Circle and the latter is approximately 400 km (250 mi) south. Given their extensive experience of the Far North, Burtner and Braden have a connection to the Arctic that several of the composers discussed above do not. Forsyth, Gould, Pentland, Schafer, Somers, and Weinzweig never traveled above the Arctic Circle.[310] In the context of global climate change, both Burtner and Braden have experienced firsthand the environmental changes taking place north of the 60th parallel, including reduced precipitation, more frequent and powerful wildfires, and melting ice.

Arguably, the ice sounds and non-sounding information present in *Iceprints* and *Candle Ice* cannot be separated from the known effects of human activity on global ice patterns. The impact of humans on the environment is a theme that is engaged in several other composers discussed in this study. For example, Paul Rudy and Hildegard Westerkamp comment on the transformation of natural environments by humans by employing machine sounds associated with modernity and industrialization in their work, such as seaplanes, traffic, and trains. Burtner and Braden focus on changes to natural locations by environmental forces, rather than the role of human activity in driving those changes. In that way, the connection between human activity and ice in *Iceprints* and *Candle Ice* is implied, rather than stated.

Burtner refers to climate change in two places in the introduction to the score to *Iceprints*, but without elaboration on the environmental, political, or social implications of ice melt in the Far North.[311] Braden does not mention climate change in the program notes to *Candle Ice*. In an

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[310] John Luther Adams resided in Fairbanks, Alaska, from 1978–2014. On the influence of the Alaskan landscape on Adams' music, see Sabine Feisst, "Music as Place, Place as Music: The Sonic Geography of John Luther Adams," in *The Farthest Place: The Music of John Luther Adams*, ed. Bernd Herzogenrath, 23–47 (Lebanon, NH: Northeastern University Press, 2012).

[311] In the first passage, he writes: "The graphic shows frequeny [*sic*] and amplitude behaviors underneath the ice such as ice cracking and squeaking as a result of the natural deformation related to climate change." Burtner, *Iceprints*, 5. In the second, he explains: "The harmony for 'Iceprints' is based

article published shortly after the premiere of the work, Braden explains that she avoids engaging climate change in *Candle Ice* for the reason that she understands the seasonal melt of subarctic lake ice as a recurring phenomenon. She writes:

> In the global context, ice is becoming a threatened element. In a sub-Arctic context, however, ice melting is a normal, seasonal occurrence [. . .] Given this sense of normality, it is impossible for me to give the sound of melting ice on a sub-Arctic lake [as captured in *Candle Ice*] the same politicized meaning that has been imposed upon rapidly receding glaciers and ocean ice (Adams, *Becoming* [*sic*] *Ocean* 2014; Paterson, *Vatnajökull* 2007).[312]

As Braden observes, the connotations of the types of ice used in *Iceprints* and *Candle Ice* encourage listeners to engage the natural formation in environmentalist terms. Burtner turns to a type of ice that is now associated with climate change. Braden explores a type of ice that does not stir the same impulse for the reason that many have not heard of candle ice. Both composers provide the necessary supplemental information to connect their recorded sounds and instrumental music to a real-world environment, but they do not offer commentary on climate change. They leave that topic open for interpretation.

The "Ecoacoustics" of Ice: Matthew Burtner, *Iceprints*

Matthew Burtner composes in various genres in the Western art music tradition, including opera, concerto, and chamber music. He regularly incorporates indigenous culture—especially those of the Inuit people—and also the physical environment into his compositions. For example, Burtner draws on Inuit mythology and rituals in *Winter Raven (Ukiuq Tulugaq)*

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on a system developed for Burtner's 1997 composition 'Sikuigvik' ('the time of ice melting') for piano and ensemble. 'Iceprints' is thus an echo of 'Sikuigvik', a piece which shares its concern with climate change in the Arctic." Burtner, *Iceprints*, 6.

[312] Carmen Braden, "Cryophonics: Re-Performing the Ice Songs of the Canadian Sub-Arctic," *Soundscape: The Journal of Acoustic Ecology* 14, no. 1 (Winter/Spring 2014–2015): 15.

(2002), a large-scale multimedia opera. In terms of the physical world, Burtner employs recorded natural sounds, scientific data, and found objects in many of his works. Examples include recordings of lava in *A'aa* (2009), datasets of ice extent in *Iceprints*, and amplified snow in *Syntax of Snow* (2011). Burtner is also an inventor of technologies for human-computer-environment interaction, such as the Network-Operational Mobile Applied Digital System (NOMADS), a server-software project that enables audience members to communicate with others in attendance as well as shape aspects of a work in real-time (e.g., libretto, lighting, electronic sound, and video display), and the Metasaxophone, a modified tenor saxophone which functions as both an acoustic instrument and a computer controller.

Burtner describes his compositional approach as "ecoacoustic." He explains: "ecoacoustics is a type of environmentalism in sound [. . .] tak[ing] the form of musical procedures and materials that either directly or indirectly draw on environmental systems to structure music."[313] The concept can be understood as a holistic approach to technology, where non-sounding information derived from the natural world is embedded into music in an effort to better understand natural environments and to strengthen human relationships to them. Burtner is not the only composer to use the term. David Monacchi uses "eco-acoustic" to describe his work.[314] Monacchi's definition is broader than Burtner's, yet it too emphasizes the use of music

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[313] Matthew Burtner, "Ecoacoustic and Shamanic Technologies for Multimedia Composition and Performance," *Organised Sound* 10, no. 1 (2005): 10. Burtner's work in ecoacoustics extends to his non-profit environmental arts organization, EcoSono. Through the organization, he runs an annual workshop, the EcoSono Institute, where participants explore ecoacoustic techniques in live performance contexts. For more on EcoSono and the EcoSono Institute, see Matthew Burtner, "EcoSono: Adventures in Interactive Ecoacoustics in the World," *Organised Sound* 16, no. 3 (2011): 234–244.

[314] Although many contemporary composers and sound artists working with environmental processes and structures do not refer to their creative practices as "ecoacoustic," their works can arguably be associated with the concept. Consider, for example, John Luther Adams' *The Place Where You Go to Listen*, Leah Barclay's *Biosphere Soundscapes* (2012–), and Andrea Polli *Sonic Antarctica* (2009). Musicologist Jonathan Gilmurray has proposed ecoacoustics as a new field. He writes: "The adoption of

and technology as a way to illuminate the natural world and to promote preservation and conservation. According to Monacchi:

> The principal goals of the eco-acoustic method could be identified as: Research on the ecological order and equilibrium of specific sound environments, recording soundscapes which are unknown or threatened by extinction, recording in order to preserve the sound of relevant natural contexts isolating them from anthropogenic background noise, composing and performing with [. . .] [what Bernie Krause calls] 'eco-acoustical niches' (temporal, frequency and typological niches) through generative electroacoustic music, sensor-driven live interactions and real-time spectrogram visualizations.[315]

Both composers acknowledge both acoustic ecology and soundscape composition as influences on their own work as eco(-)acoustic composers. However, Monacchi emphasizes different aspects of acoustic ecology than Burtner. Several CDs by Monacchi and his multidisciplinary project *Fragments of Extinction* investigate the health of ecosystems (i.e., balances and imbalances in natural habitats). In contrast, natural phenomena are more often the focus in works

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suitable generic terminology is a prerequisite for any field of endeavour if it is to become part of a meaningful discourse. With the closest existing fields of acoustic ecology and soundscape composition no longer sufficient to describe this fast-growing and increasingly significant field of environmentally-concerned music and sound art, a new term is clearly needed; and 'ecoacoustics,' pioneered by David Monacchi and Matthew Burtner and now defined here, successfully fulfils this function . . ." Gilmurray, "Ecoacoustics: Ecology and Environmentalism in Contemporary Music and Sound Art" (unpublished manuscript), 9. Available at: https://www.academia.edu/2701185/ECOACOUSTICS_Ecology_and_Environmentalism_ in_ Contemporary_Music_and_Sound_Art (accessed 8 May 2016). In terms of science, the Ecoacoustic Congress defines it as: "a new interdisciplinary science that investigates natural and anthropogenic sounds and their relationship with the environment over a wide range of study scales, both spatial and temporal, including populations and communities." Remote Environmental Assessment Laboratory, "Ecoacoustics Congress 2016," http://real.msu.edu/ec-2016 (accessed 8 May 2016). This definition of ecoacoustics is synonymous with the most recent application of the concept of soundscape ecology. In the 2011 special issue of *Landscape Ecology*, soundscape ecology is described as: "an understanding of how sound, from various sources—biological, geophysical and anthropogenic—can be used to understand coupled natural-human dynamics across different spatial and temporal scales." B. C. Pijanowski et al., "What is Soundscape Ecology? An Introduction and Overview of an Emerging New Science." *Landscape Ecology* 26, no. 9 (2011): 1213. The term "soundscape ecology" was first used by Barry Truax in his 1978 *Handbook for Acoustic Ecology*. Pijanowski et. al distinguish their use of the term from Truax's original usage on the grounds that they take a strictly scientific approach to research, instead of an interdisciplinary one.

[315] David Monacchi, "Recording and Representation in Eco-Acoustic Composition," in *Soundscape in the Arts*, ed. Jøran Rudi (Oslo: NOTAM, 2011), 235.

by Burtner.

Their interests in different aspects of the natural world may well explain the types of musical forces that they use in their compositions. Monacchi employs field recordings in many of his pieces (either stand-alone or with live instruments). Burtner also uses field recordings, but they are presented alongside sonified environmental data, live instruments, computer ensembles, and/or video. *Iceprints* is one example where environmental sound and data are used ecoacoustically; that is, both sound and non-sound signals are used to shape a composition and—perhaps more importantly—to highlight properties of an environmental system as a means to raise awareness and inspire change.

Burtner is not the first composer to generate compositional material from data sets and spectrographic analysis. The use of sound technology to translate non-sounding information into music can be traced back to the mid-1960s and early 1970s, when composers including Charles Dodge, Alvin Lucier, and Pauline Oliveros created works that explored astro-, bio-, and geophysical phenomena.[316] In terms of spectrographic analysis, spectral composers generated compositional material from the analysis of spectra played by musical instruments as early as the 1970s. For example, in Gérard Grisey's orchestral piece *Partiels* (1970) instruments are assigned different partials derived from a spectrogram of an E2 on a bass trombone. Burtner's use of data sets and spectrograms in *Iceprints* departs from these earlier applications in that his source materials are strongly tied to an environmental topic (i.e., climate change).

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[316] See, for example, Lucier's *Music for Solo Performer* (1965), Oliveros' *Indefinite Integral of Psi Star Psi D Tau Equals One* (1969), and Dodge's *Earth's Magnetic Field* (1970). For a discussion of astro-, bio-, and geophysical energies in the arts, see Douglas Kahn, *Earth Sound Earth Signal: Energies and Earth Magnitude in the Arts* (Berkeley: University of California Press, 2013). For more on spectral music, see Joshua Fineberg, ed., *Contemporary Music Review* 19, no. 2 (2000a), special issue "Spectral Music: History and Techniques"; and Fineberg, ed., *Contemporary Music Review* 19, no. 3 (2000b), special issue "Spectral Music: Aesthetics and Music."

Iceprints is a twenty-three minute work scored for one to three telematic pianos and a three-channel electronic track of underwater ice and animal sounds.[317] Telematics deal with the transmission of information over a large distance. In the case of *Iceprints*, up to three performances take place simultaneously at different locations. The audio from each performance is transmitted to the concert halls in real time using the computer program JackTrip.[318] *Iceprints* is performed in a conventional concert-hall setting, where the pianist is on stage and the audience faces him or her. In addition, three speakers are positioned in a triangular set up. Channel one is in the front center, and channels two and three are located behind the audience on the far left and far right (see Figure 5.1). All three channels present a different hydrophone recording. When three pianists perform *Iceprints*, channels two and three also project audio from the live performances in distant locations. When one pianist realizes the work, the hydrophone recordings are played through speakers positioned on the left and right side of the stage.

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[317] *Iceprints* is one of four compositions that currently make up Burtner's "print" series. The others are *Snowprints* (2001), *Windprints* (2005), and *Cloudprints* (2008–12). *Snowprints* is scored for flute, cello, piano, electroacoustics, and video; *Windprints* for 1–3 flutes and mixed ensemble; and *Cloudprints* for instrumental ensemble and computer ensemble. In *Snowprints*, various audio and video recordings of snow (e.g., human and non-human animal footsteps and wind) are mapped onto the score. In contrast, there are no environmental sounds in *Windprints* and *Cloudprints*. *Windprints* is scored for live instruments, where the parameters of the score are determined using real-time data sourced from wind measurement tools located in the Arctic. In *Cloudprints*, both instrumental and computer parts are derived from still-images of cloud formations. For more on these works, see Matthew Burtner, "Syntax of Snow: Musical Ecoacoustics of a Changing Arctic," in *North by 2020: Perspectives on Alaska's Changing Social-Ecological Systems*, ed. Amy Lauren Lovecraft and Hajo Eicken, 651–54 (Fairbanks: University of Alaska Press, 2011).

[318] Juan-Pablo Caceres and Chris Chafe, "JackTrip Documentation," https://ccrma.stanford.edu/groups/soundwire/software/jacktrip/ (accessed 20 May 2016).

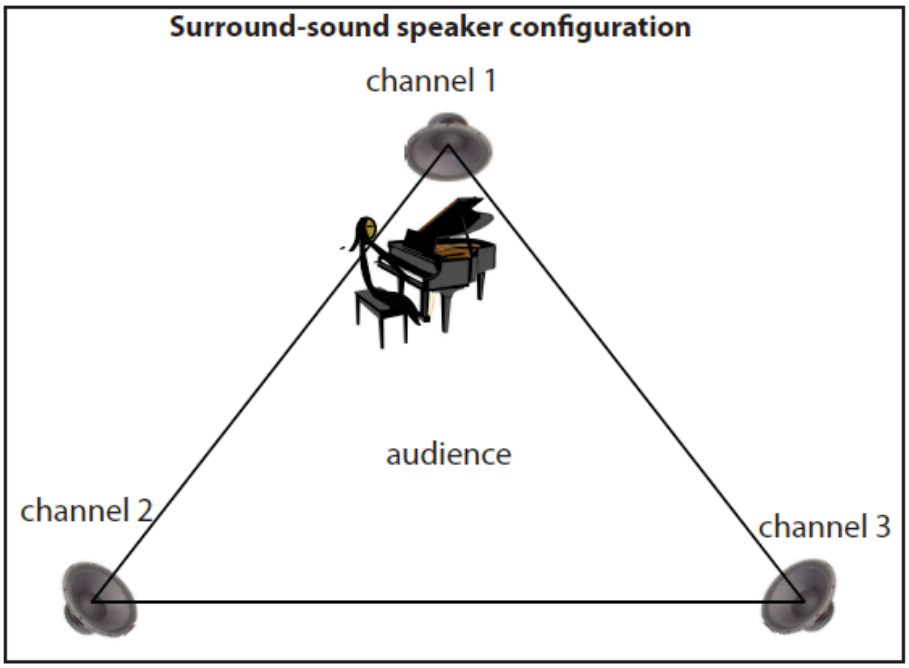

Figure 5.1 Performance Layout for *Iceprints*. Source: http://matthewburtner.com/iceprints/ © 2009 Matthew Burtner. Used by permission.

Burtner draws on both sounds and environmental processes in the Arctic, combining multiple spatial domains and temporal trajectories. The three hydrophone recordings played during the performance were made simultaneously at a distance of approximately one kilometer in a triangular configuration. He applies an evolving filter to the underwater sounds. The filter was designed based on Burtner's harmonic analysis of his 1997 piano concerto, *Sikuigvik (Time of Ice Melting)*. Rhythm, dynamics, and pitch in the piano are determined by Burtner's spectrographic analysis of one of the three processed recordings. Register in the piano and the range of frequencies audible in the three-channel audio track are controlled using a graph of 40 years of ice-extent data. Before discussing the relationships between the piano part and both the ice-extent data and spectrogram, it is important to first consider the temporal and spatial connections between the hydrophone recordings and the telematic component of *Iceprints* and the way in which Burtner's engagement with multiple spatial and temporal scales in the work

comments on climate change.

As mentioned, the recordings were made simultaneously at approximately one kilometer apart in a triangular configuration. Since sound travels approximately four times faster in saltwater than in air, the rate at which ice and animal sounds pass from one channel to another during a performance is heightened.[319] Delay is also a property of live telematic performance. The rate at which audio signals are transmitted among the three locations differs from performance to performance. In terms of space, the physical position of the speakers replicates the spatial array of the hydrophones.

Burtner asserts that the distance created by network technology in *Iceprints* mirrors the anxiety between contemporary society and the natural world. He explains:

> The telematics reveal how we are intimately connected but also separate from these dramatic changes of our planet. The audience perceives the remote pianos through the delays, glitches and compression artifacts of network sound. These sounds of separation, introduced by the medium, evoke distance. We are continuously pulled to the other locations and simultaneously to the Arctic sub-ice world of cracking and thumping ice, whale and seal calls. "Iceprints" uses telematics to evoke a complex paradox: individuals are distant and separate from some real effects of our actions and from things that affect us; we cannot escape our physical or temporal context and yet we are constantly affecting and affected by things that are not present spatially or temporally. "Iceprints" collapses and folds time and space to illustrate this concept.[320]

As Burtner suggests, "errors" in long-distance audio transmission symbolize the tension between human action and global climate change. The connection of three remote performances via audio

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[319] In air, sound travels at approximately 343 meters per second (m/s) at 20 °C; in freshwater, at approximately 1,481 m/s; and in saltwater, at approximately 1,500 m/s. The speed of sound is determined by several variables, including air/hydrostatic pressure, temperature, and in the case of saltwater conditions salinity. See C. D. Maunsell, "The Speed of Sound in Water," *Journal of the Canadian Acoustical Association* 4, no. 3 (1976): 2–4.

[320] Matthew Burtner, "Iceprints," http://matthewburtner.com/iceprints/ (accessed 20 May 2016). For other perspectives on telematics in the arts, see Roy Ascott, "Is There Love in the Telematic Embrace?" *Art Journal* 49, no. 3 (1990): 241–47. Pauline Oliveros et al., "Telematic Music: Six Perspectives," *Leonardo Music Journal* 19 (2009): 95–96.

streaming may seem constructive, yet compression artifacts (i.e., sound distortion caused by the compression of data) and delay are audible during a performance of *Iceprints*. As well, the three pianists are confronted with the challenge of collaboration via telecommunications. Each musician is given headphones so that he or she can listen to the other two performers. However, an attempt at performing *Iceprints* in unison is arguably a futile effort given the probability of audio delay.

The score to *Iceprints* also comments on the transformation of the arctic environment. Burtner captures multi-year change in the total amount of arctic sea ice by using a graph of 40 years of ice-extent data to determine register (see Figure 5.2). He created the graph with both pre-satellite and satellite records of ice extent for the region (measurements before and after 1979). The X-axis maps ice extent to the first six octaves of the piano. The seventh and eighth octaves are reserved for coloration when interpreting events in the spectrogram. In short, more ice, the higher register; less ice, the lower register. The Y-axis represents time, where each page of the score corresponds to one calendar year. The green line (the jagged line between the yellow points that outline the top and bottom of the data set) shows annual change. The thick black line between the two outer lines represents average change, accounting for maximum and minimum ice extent. As shown, there is a strong melting trend from 1970 to 2009.

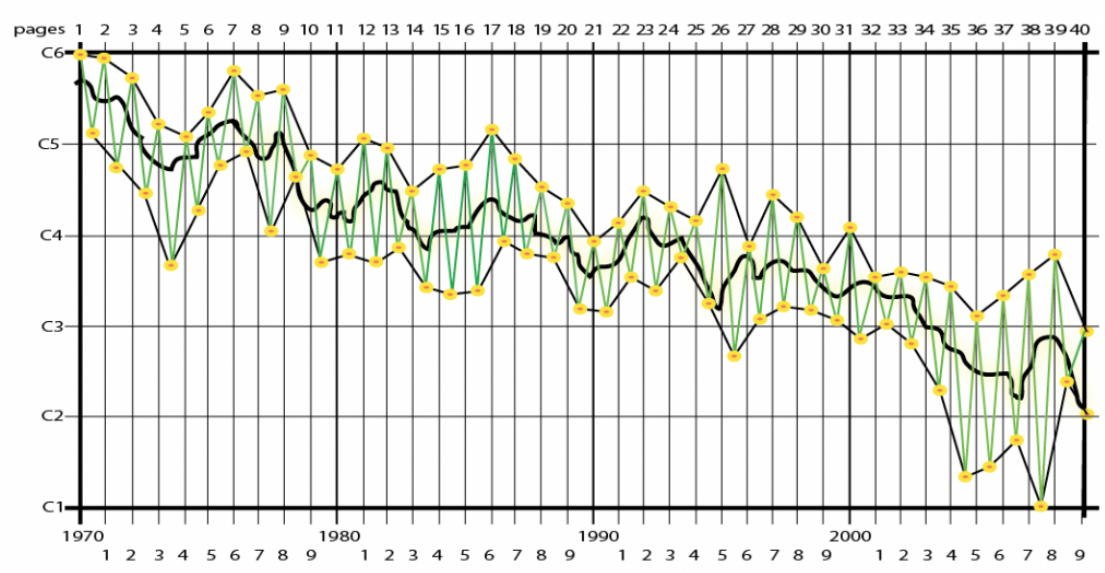
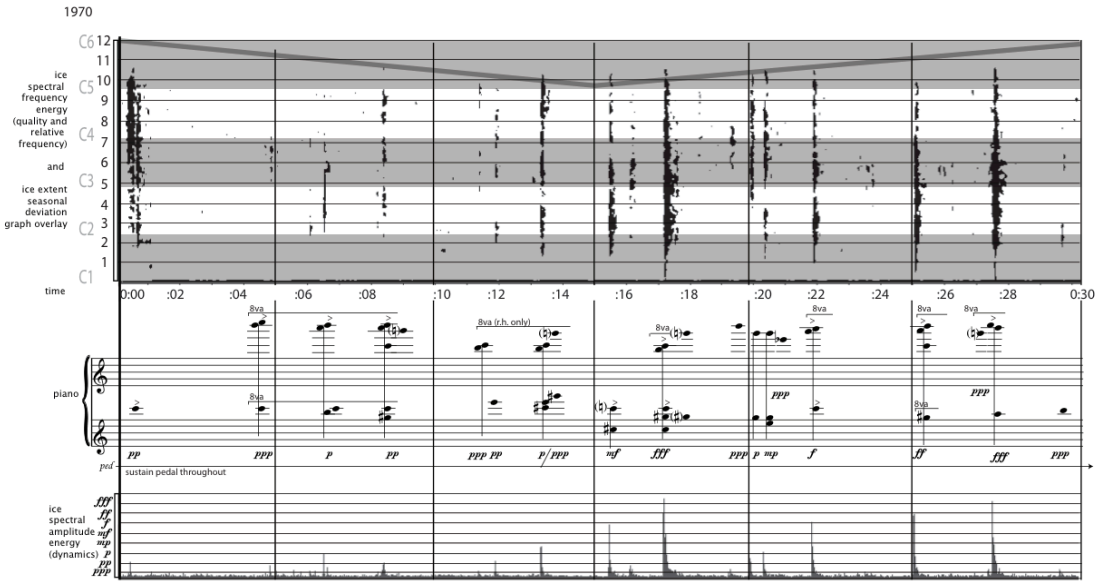
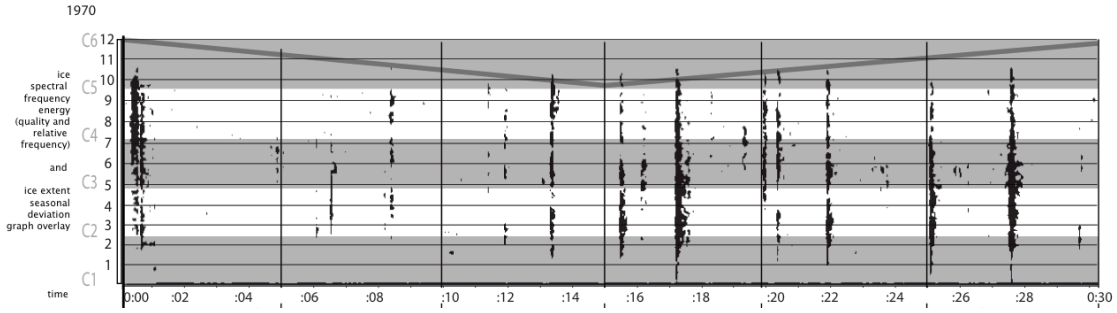


Figure 5.2 Ice-extent Data Sets Mapped to Piano Register. © 2009 Matthew Burtner. Used by permission.

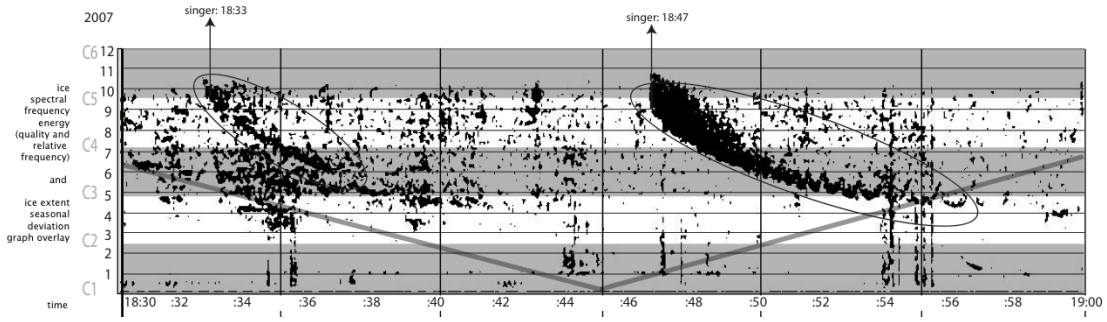
Each page of the score traces one annual ice cycle over the course of 30 seconds (see Example 5.1). The seasonal melting of arctic ice is captured in the first 15 seconds and the seasonal freezing in the 15 seconds that follow. The slope of the V-shaped line (representing one annual ice cycle) determines both the rate and the amount of movement across registers in the piano left hand. Years where there is less change in ice extent result in a limited range in the piano line, whereas years with a large fluctuation yield a wide range. For example, for 1970, a year with limited change in ice extent, the left hand spans approximately one octave (see Example 5.2). In contrast, for 2007, a volatile year, it covers approximately three octaves (see Example 5.3). Listeners can also trace the change in register across years. A comparison of 1970 to 2007 shows a permanent "loss" of three octaves on the basis that 1970 starts in the sixth register and 2007 in the third. The piano left hand gradually descends from the sixth register to the second register over the course of the work, capturing a loss of approximately 12 percent of arctic sea ice since 1970.



Example 5.1 Burtner, *Iceprints*, 0’00”–0’30”. Ice-extent change for 1970 is marked by V-shaped line, and the spectrogram from a hydrophone recording excerpt is shown as dark vertical bands. © 2009 Matthew Burtner. Used by permission.



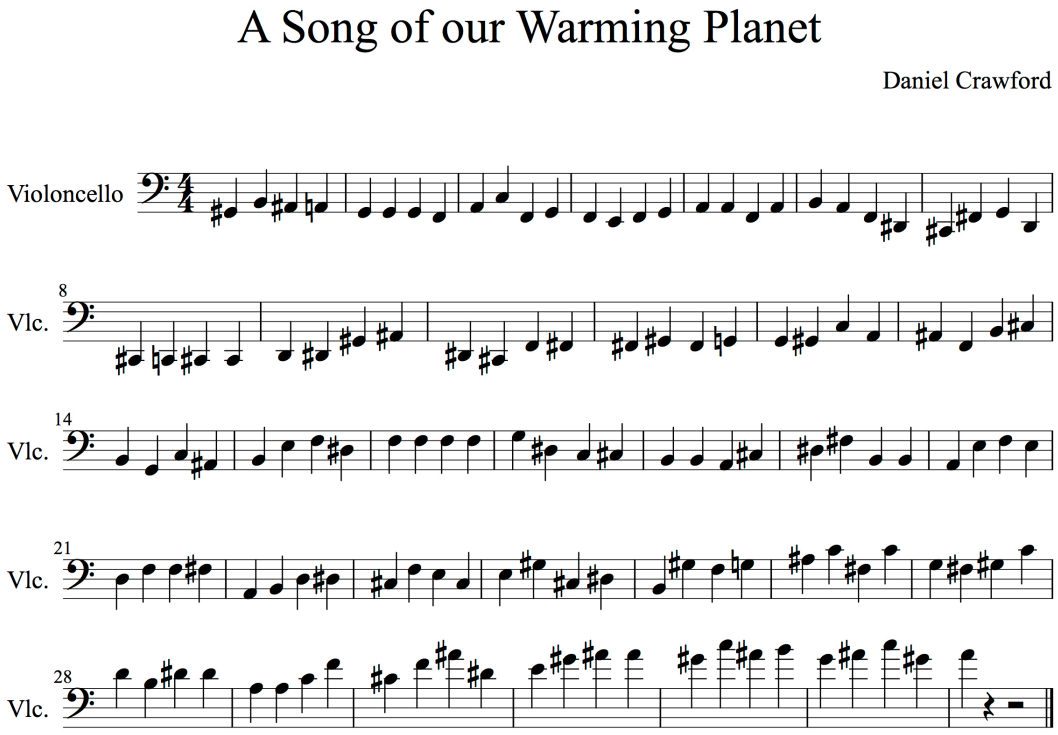
Example 5.2 Ice Extent for 1970. The total change in ice extent (represented by the V-shaped line) translates to approximately one octave (C5). Register is listed on the right-hand side of the score as C1, C2, C3, etc. The numbers 1–12 divide the frequency range on the spectrogram. © 2009 Matthew Burtner. Used by permission.



Example 5.3 Ice Extent for 2007. The total change in ice extent (represented by the V-shaped line) translates to approximately three octaves (C1–C3). Note: the markings for singer are for the performance of *Iceprints* during a staging of Burtner's telematic opera *Auksalaq* (2012). © 2009 Matthew Burtner. Used by permission.

Iceprints is not the only composition that maps an environmental parameter onto register. Other works include Daniel Crawford's 2013 solo cello work, *A Song of Our Warming Planet*, and Andrea Polli's 2004 online installation *Heat and the Heartbeat of the City*. These two works focus on rising temperatures, and thus the register at the end of each composition is significantly higher than at the outset. In *A Song of Our Warming Planet*, the pitch of each note corresponds to the average annual global temperature, from 1880–2012 (see Example 5.4). At 34 measures in duration, lower notes represent cooler temperatures and higher notes represent warmer temperatures. The cello spans nearly its entire range, with the lowest possible note (C1, measure eight) corresponding to the coldest year on record (1909), and the highest note in the piece (C5, mm. 32 and 33) to the warmest years (2005 and 2010). The interval between the first and final notes in the work (G#2, representing the year 1880, and A4, corresponding to 2012) reflect a global temperature difference of approximately 1.4° F (0.8° C).[321]

[321] Todd Reubold, "A Song of Our Warming Planet," *Ensia* 28 (June 2013), http://ensia.com/videos/a-song-of-our-warming-planet/.



Example 5.4 Daniel Crawford, *A Song of Our Warming Planet*. The interval of a halftone represents approximately 0.03°C. © 2013 Daniel Crawford. Used by permission.

Andrea Polli also sonifies temperature in *Heat and the Heartbeat of the City*, but she uses both recorded data and predictive analysis. The work is divided into four seven-minute movements, each of which presents maximum daily temperatures in Central Park, New York, for the summers of one of the following decades: 1990s, 2020s, 2050s, and 2080s. Polli uses three synthetic noise bands to represent temperature. These can be described as a thin, wind-like sound, radio static combined with an electrical hum, and a low pulsating drone. Change in the type of sounds present corresponds to change in temperature, with multiple loud noise bands emphasizing consecutive days over 90° F and fewer quiet ones to days below 90°.[322] Polli also

[322] Andrea Polli, "Ice + Air + Water + Dust: Sonifications of Global Environmental Phenomena," in *Art of Immersive Soundscapes*, ed. Pauline Minevich and Ellen Waterman, (Regina, Saskatchewan: University of Regina Press, 2013), 64.

represents the data visually. Each movement consists of a screenshot of a spectrogram (presumably the audio recording for the corresponding decade) layered over an aerial image of Central Park (see Figures 5.3 and 5.4). In addition, a column on the left side of the screen rises and falls and a red background darkens and fades, both in relation to maximum daily temperatures (compare Figures 5.3 and 5.4). Thus, sounds gradually increase in amplitude and texture, and the screen becomes saturated with the color red as the work unfolds. Cooler temperatures (i.e., those below 90°) offer repose from the aural and visual discomfort of days above 90°. By the 2080s, numerous days are above 100° and the sounds and colors of *Heat and the Heartbeat of the City* peak in intensity.

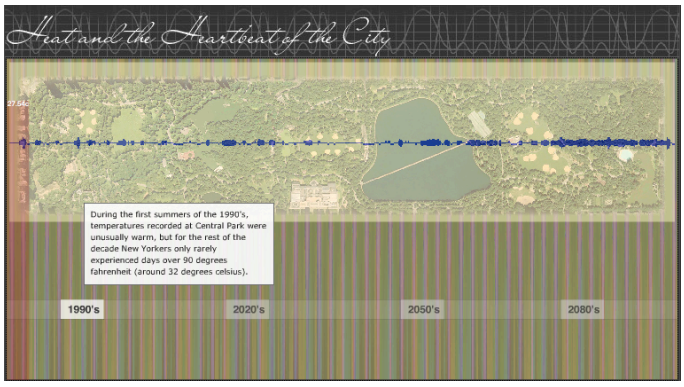


Figure 5.3 Screenshot of "1990s" from *Heat and the Heartbeat of the City*. Source: http://archive.turbulence.org/Works/heat/index2.html.

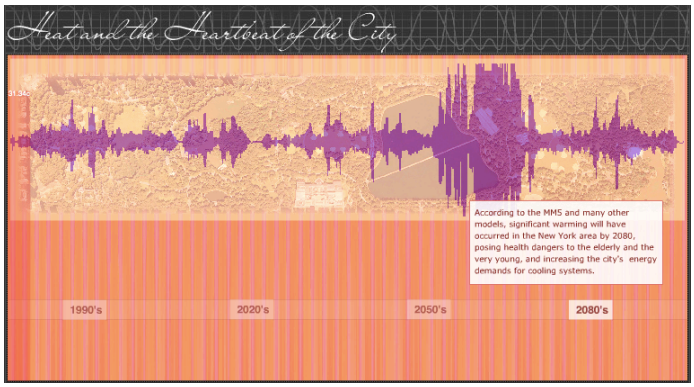


Figure 5.4 Screenshot of "2080s" from *Heat and the Heartbeat of the City*. Source: http://archive.turbulence.org/Works/heat/index2.html.

Polli's work emphasizes prediction, whereas *A Song of Our Warming Planet* and *Iceprints* do not. Although 24 years of data are present (1990–2004), *Heat and the Heartbeat of the City* focuses on projected temperatures (2005–2090). Polli's work also skips decades, heightening the degree of change over time. In contrast, *A Song of Our Warming Planet* and *Iceprints* sonify non-sounding information that leads from the past to the present (1880–2012 for Crawford and 1970–2009 for Burtner). Data is rescaled differently in each work. Polli presents 100 years over the course of twenty-eight minutes; Crawford represents 133 years in approximately two and a half minutes; and Burtner captures 40 years over the course of approximately twenty-three minutes.[323]

Iceprints is informed by two sources not found in the other two works. These are the use of a spectrogram to determine parameters of the score and the presentation of processed sub-ice sounds during the performance. *A Song of Our Warming Planet* and *Heat and the Heartbeat of the City* do not feature natural sounds. Crawford's work is written for solo cello and Polli's is for synthesized noise. Through his use of spectrographic analysis and three hydrophone recordings, Burtner explores permanent ice loss revealed through 40 years of data sets as well as the temporal and spatial dimensions of actual ice sounds (i.e., those captured on the recordings and translated into music through spectrographic analysis). These different media are combined in the score, linking together long-term ice trends and an encounter in real-time.

The extent of ice loss is magnified when 40 years is rescaled to approximately twenty-three minutes in *Iceprints*. Listeners can begin to appreciate a slow process normally beyond comprehension. Two additional time dimensions overlap with 40 years of change in the

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[323] The duration of *A Song of Our Warming Planet* is based on the average of two live recordings. See https://vimeo.com/69122809 and https://www.youtube.com/watch?v=Z7UCUoWmv9I (accessed 8 May 2016). Since Crawford does not provide tempo or phrasing in the score, a performance of the work could hypothetically be significantly shorter or longer in duration.

composition. These are annual time (the seasonal ice cycle) and moment time (the sounds of sea ice and animals). Annual time is rescaled to 30 seconds in the piece. In order to follow long-term change in the work, listeners must keep track of both annual time and register (the measure of total ice extent). Actual sounds in *Iceprints* can also be heard in the context of 40 years of permanent ice loss. The sound of ice cracking and grinding is not only a signal of seasonal change but also of long-term melting. Will ice deformation and arctic sea animals be audible in 40 years? Will future hydrophone recordings capture waves and marine life that inhabits warmer waters exclusively?

A Lament for Arctic Ice

The lament tradition is one perspective from which to consider the theme of loss in *Iceprints*, in particular laments in the Baroque Period. In Baroque opera, a lament is generally sung in preparation for, or immediately following the death of a person. A technique commonly used in laments in Baroque opera is the ground bass (aka the *lamento* bass).[324] The basic feature of the ground bass is a repeating chromatic line, often covering the interval of a fourth. The chromaticism heightens a character's expression of pain and sorrow.

Repetition of the descending fourth line has historically served as both an expressive device and a way to create formal unity through a work. These two aspects, expression and structure, are exemplified in Purcell's "When I am laid in earth" from *Dido and Aeneas*

[324] For more on the lament in music of the Renaissance and Baroque periods, see Tim Carter, ed., *Early Music* 27, no. 3 (1999), special issue "Laments"; and Ellen Rosand, "The Descending Tetrachord: An Emblem of Lament," *The Musical Quarterly* 65, no. 3 (July, 1979): 346–59.

(1689).[325] The aria takes place after Aeneas' departure from Carthage. Dido is in shock after learning of her abandonment, and during the aria she grieves her loss. At the outset of the lament, Purcell introduces a descending chromatic fourth line in the bass, followed by a cadential figure (see Figure 5.5). The line repeats eleven times over the course of the aria. The brooding quality of the ground bass captures Dido's emotional state as she contemplates suicide. With the *lamento* bass underpinning the aria, Purcell enhances sadness through the use of word painting, the resolution of dissonances by leap (rather than by step), suspensions, and sudden changes in dynamics.

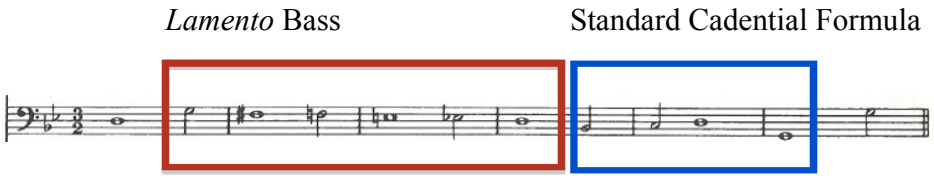

Figure 5.5 Lament Section from Aria "When I am laid in earth."

Although Burtner is not deliberately drawing on the lament tradition in *Iceprints*, a broader association can be made between the descending bass pattern in his composition and the idea of lament.[326] Peter Williams' book *The Chromatic Fourth* provides insight in this regard.[327] Williams observes that the *lamento* bass has specific connotations within the 400-year history of the chromatic fourth in Western classical music: it refers to both a specific genre (opera) and a certain mode of expression (the repeated bass).[328] In that line of thought, in opera the descending

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[325] See Ellen T. Harris, *Henry Purcell's Dido and Aeneas* (Oxford: Clarendon Press, 1987); and Henry Purcell, *Dido and Aeneas, An Opera,* ed. Curtis Price, Norton Critical Scores (New York: W. W. Norton, 1986).

[326] There is no mention of the idea of lament in the introduction to the score, the composer's website, or in articles by the composer that comment on *Iceprints.*

[327] Peter Williams, *The Chromatic Fourth During Four Centuries of Music* (Oxford: Clarendon Press, 1997). The third chapter is dedicated to the use of the chromatic fourth in seventeenth-century music for voices, with particular attention to opera. See pages 50–76.

[328] Williams, *The Chromatic Fourth During Four Centuries of Music*, 4.

bass pattern reinforces the emotions of pain and sorrow that are articulated in the libretto. This transference of meaning from language to a specific musical line is exemplified in the Purcell example above. Although *Iceprints* is not an opera lament, the introductory notes to the instrumental piece provide the information needed to connect the descending bass pattern with loss. Furthermore, the sorrow captured in the repeating bass pattern in Burtner's work is attributed to the deterioration of an environmental process, instead of the death of a human subject.

Iceprints does not exactly follow the Baroque model of the *lamento* bass, but three aspects of Burtner's piece are characteristic of the idiom. These are a descending line, ceaseless repetition, and the use of musical effects that heighten expressivity.[329] The V-shaped line used to control register in *Iceprints* creates a recurring line in which the first half of one page of the score descends and the second half ascends. The line is presented 38 times over the course of *Iceprints*. It varies with each statement, instead of repeating note-for-note like the ground bass in the Baroque tradition.

The piano left hand sidesteps the conventional *lamento* bass by presenting intervals that exceed a fourth. Consider, for example, the first page of the score (see Example 5.5). At the outset of the work the line descends a major seventh, from C6 to C#5, and then ascends a minor seventh from C#5 to B5. Another way in which Burtner goes beyond the Baroque model of the *lamento* bass is by stating an ascending line in the second half of each page. The duration of the ascent is equal to that of the descent. The ascending figure does not provide any sort of

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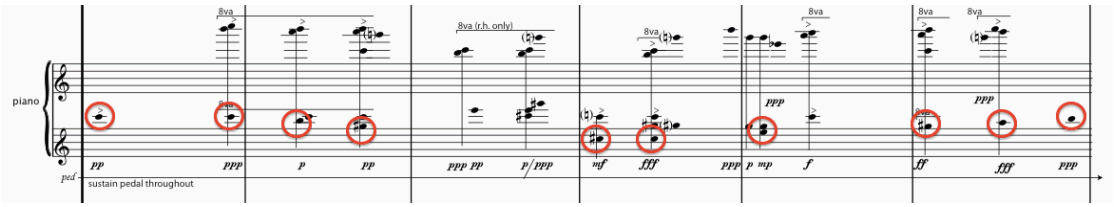
[329] Burtner is one of several twentieth/twenty-first-century composers to draw on historical lament techniques. Others include Béla Bartók, Benjamin Britten, Harrison Birtwistle, György Ligeti, and Kaija Saariaho. Discussion of works by these composers can be found in Arnold Whittall, *Exploring Twentieth-Century Music: Tradition and Innovation* (Cambridge, UK: Cambridge University Press, 2003); and David Metzer, *Musical Modernism at the Turn of the Twenty-First Century* (Cambridge, UK: Cambridge University Press, 2009).

resolution like the cadential formula in the Purcell example above. Through the failure of the ascending line to reach to the starting pitch of the section, the piano captures a mournfulness that is increasingly weighted with each statement.

A larger descent can be traced across the starting pitches of the individual sections. This sense of gradual loss can be seen in the bass lines for the years 1971–74. These passages preserve the contour of the line representing 1970, but each subsequent section begins on a lower pitch (see Diagram 5.1). The lower starting pitch is created by the ascent of the line on the previous page not reaching the opening pitch of that section. For example, the bass line for 1970 begins on C6 and ends on B5—a "loss" of a minor second. As a result, 1971 starts on B5, a minor second below the opening pitch to 1970. There are exceptions where the opening pitch to a section is higher than the one on the previous page, but still the majority of them are lower.[330]



Example 5.5 Lament-like Bass Line, Burtner, *Iceprints*, 0'00"–0'30". © 2009 Matthew Burtner. Used by permission.

[330] For instance, for 1975 the left hand starts a major third above the initial pitch of the previous year (i.e., F5 for 1995 and C#5 for 1974). This is an exception to the larger trend in the data sets that is a gradual descent over the course of 40 years.

1970: C♮6–C♮6–B5–G#5–**C#5**–C#5–E5–G#5–A5–B5
Min 2nd
1971: B5–B5–G#5–G#5–**F5**–C#5–A5–C#5–E5
Aug 4th
1972: F5–C#5–A4–F4–**A4**–C#5–C#5–C#5
Min 2nd
1973: E5–C#5–A4–A4–F4–F4–**A3**–C#4–G#4–B4–C#5
Min 3rd
1974: C#5–B4–**F4**–C#5–C#5–C#5–A4–C#5

Diagram 5.1 Bass Lines for the Music Representing 1970–74 in *Iceprints.* The pitches in bold correspond to the trough of each V-shaped line. The intervals refer to the pitch space between the first note of a given year and that of the year that follows.

Musical effects used to heighten expression are another important aspect of the lament in the Western classical tradition. These effects can push the lament to new emotional as well as musical territory, as shown in Purcell's *Dido and Aeneas*. Writing about the use of lament by modernist composers, David Metzer observes: "The [lament] genre encourages types of sonic behavior indulged in by modernist styles, particularly wild transformations of sound and the transgression of established boundaries."[331] *Iceprints* is restrained when it comes to sonic displays of loss. Instead of crossing over to non-traditional playing styles, a mourning technique found in modernist music, Burtner enhances the lament-like bass with several conventional musical effects. These include scalar passages, dissonant chords, sudden changes in dynamics, and tremolo.

Tremolo is used during arguably the most dramatic passages in *Iceprints*. These sections present powerful, sustained ice events in both the spectrogram and the electronic track (see Example 5.6). Yet, Burtner instructs the pianist to play tremolos in a calm manner:

[331] Metzer, *Musical Modernism at the Turn of the Twenty-First Century*, 147.

> The tremolo is slow and highly uneven. It lasts until it is stopped by a vertical line. Other events [i.e., notes to the right of the box, but before the vertical line] may occur within the figure as one-time events. Vary the order and duration of the notes. The effect should give a slow, lazy and non-dramatic feeling.[332]

The use of tremolo to capture a "lazy and non-dramatic feeling" in connection with prolonged, even violent arctic ice deformations is an apparent contradiction. In the context of climate change, grinding and pressing sea ice has connotations of a deteriorating natural environment. However, the pianist(s) presents a gentle, shimmering effect next to these powerful ice events. In addition, several passages feature tremolos based on consonant sonorities. Such is the case at 17'04" with the F major seventh chord in the piano right hand and at 17'08" and again at 17'28" with the ascending G minor scalar fragment also in the right hand. Tranquil, and on occasion consonant tremolos give a serene quality to sustained ice events. The failure to capture the magnitude of large-scale ice deformations may be deliberate, although Burtner does not assert that intention. One interpretation of the contradiction is that it comments on the stereotype that the Arctic is a pure and peaceful place. More specifically, the tremolo represents the (mis)conception of the Arctic as inviting and tranquil, and the sounds and spectrographic imprints of sustained ice events capture the region as powerful and destructive.

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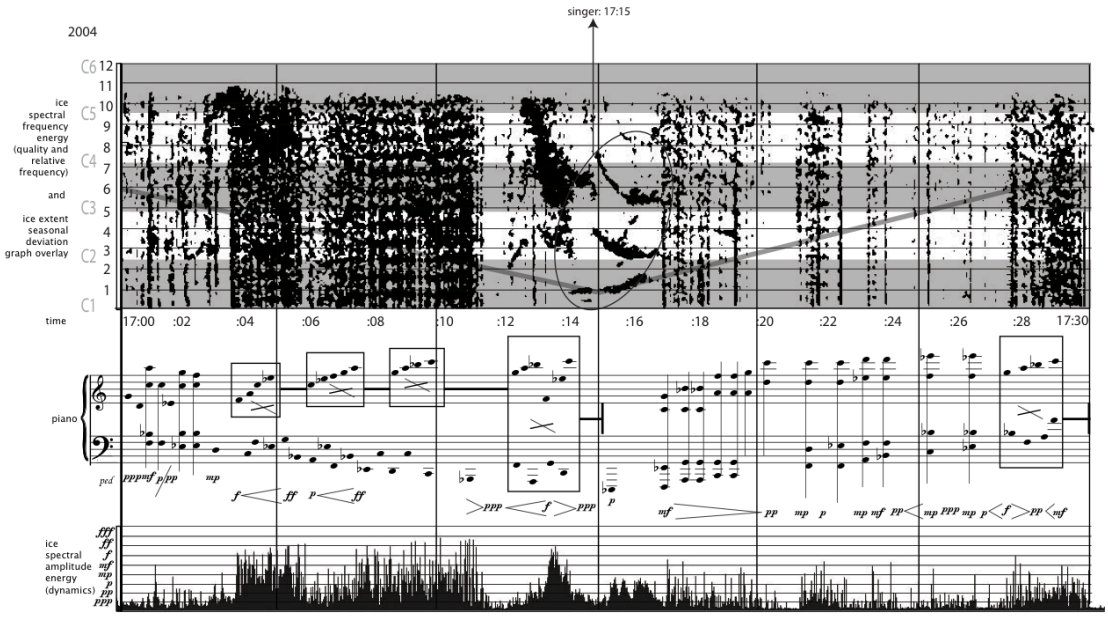
[332] Matthew Burtner, *Iceprints* (2009), 7.



Example 5.6 Example of Tremolo, Burtner, *Iceprints*, 17'00–17'30". Each tremolo is marked by a rectangular box. © 2009 Matthew Burtner. Used by permission.

There is also a larger environmental process captured in *Iceprints*: permanent ice loss. Burtner traces this melting trend through a gradual change from dissonant to consonant sonorities over the course of the composition, in addition to the slow descent in register described above. Consonance is brought about by the work's progression within the harmonic series based on F2. The series is not stated in its entirety until the year 2009. *Iceprints* starts at the upper end of the series and descends slowly to the lower end. Packed, microtonal intervals are at the top of the spectrum and open, consonant ones are at the bottom.

At the year 2007, the piano departs from previous sections in several ways. Perhaps most notable is the break from the contour of the V-shaped line for the first time. From 18'47"–18'56" the piano line and the V-shaped figure are in contrary motion; in previous sections the piano followed the V-shaped line (see Example 5.7). Other changes include the use of pitch content based exclusively on the harmonic series, restricted dynamics, and note placements that do not align with events in the spectrogram. In contrast, earlier passages present pitch content from

outside the series, wide-ranging dynamics, and note placement in alignment with events in the spectrogram. Why these changes in the section representing the year 2007? That year is a historic one in terms of global climate change. The ice extent at the end of the melt season (September) in 2007 was the first year to set an all-time record low since satellite recording began in 1979.[333]

The record-low level of ice extent in 2007 is visualized in the score. That section presents the V-shaped line with the lowest trough. The line touches the bottom of the spectrogram at 18'45". As if in anticipation for the grounding of the V-shaped line, the piano left hand falls an octave lower to F1 and then C1 at 18'44". A fragmented version of the harmonic series is introduced immediately after the octave displacement. The pitches F2, C4, A4, Bb5, and B♮5 are absent. The series fills in during the years 2008 and 2009. F2, C4, A4, and Bb5 are introduced in 2008 and B♮5 is added in 2009 (see Examples 5.8 and 5.9). Burtner omits E5 and F#5 (harmonic numbers 10 and 11) altogether, possibly to create smaller intervals sooner before descending back to the fundamental. There is also a permanent change in dynamics starting in 2007. Before that year, the pianist(s) plays dynamics ranging from *pianississimo* to *fortississimo*. However, from 2007 to the end of *Iceprints* he or she does not rise above *piano* except for the F2 struck at *mezzo forte* in 2008 and again in 2009. The change to quieter dynamics creates a sense of peace around the melodic line based on the series.

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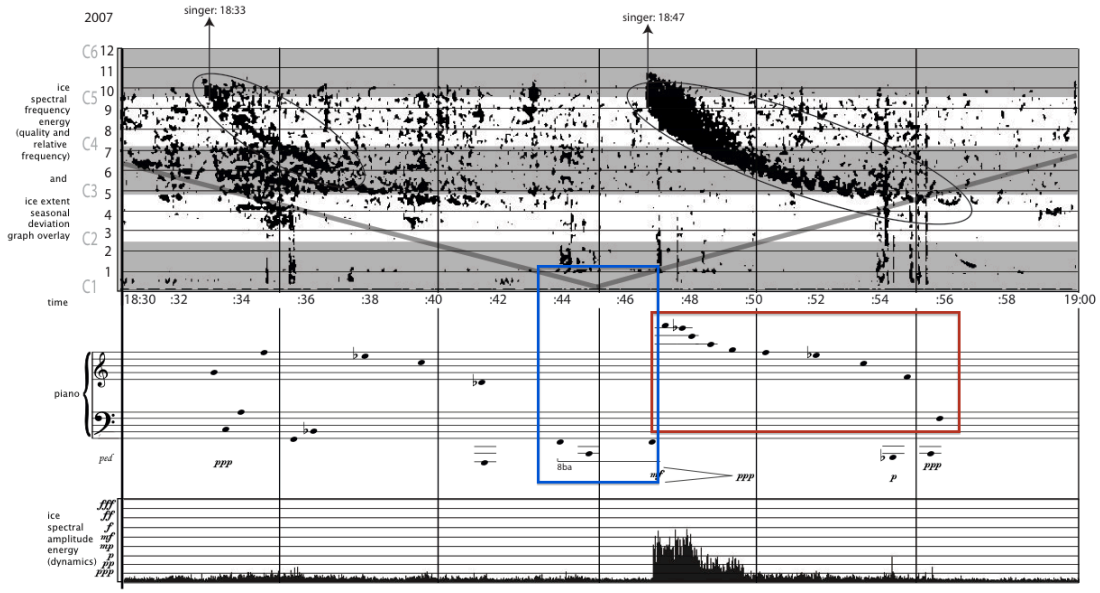
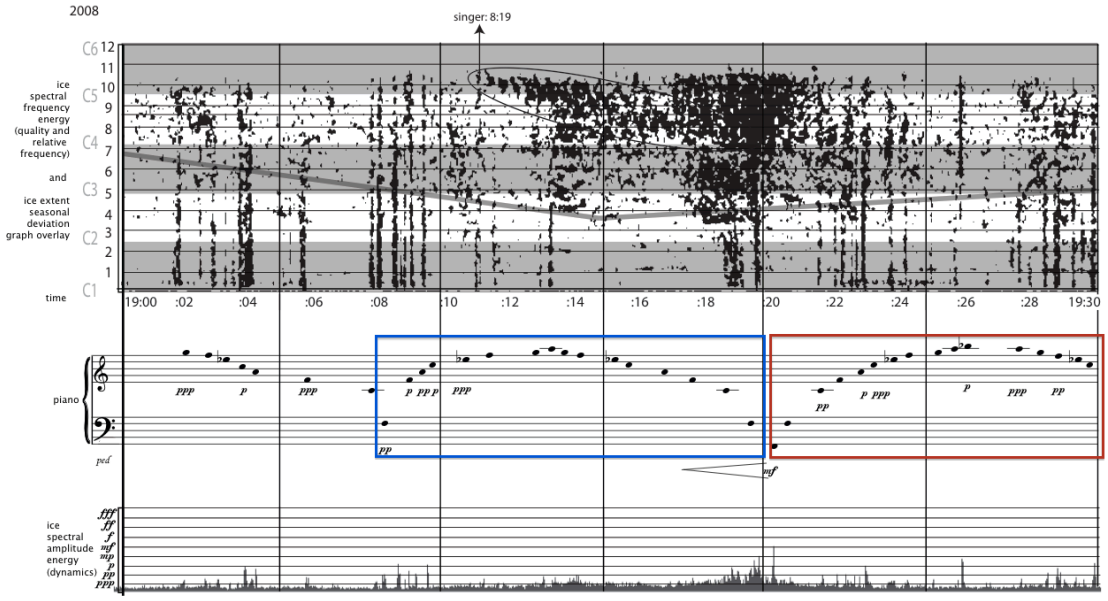
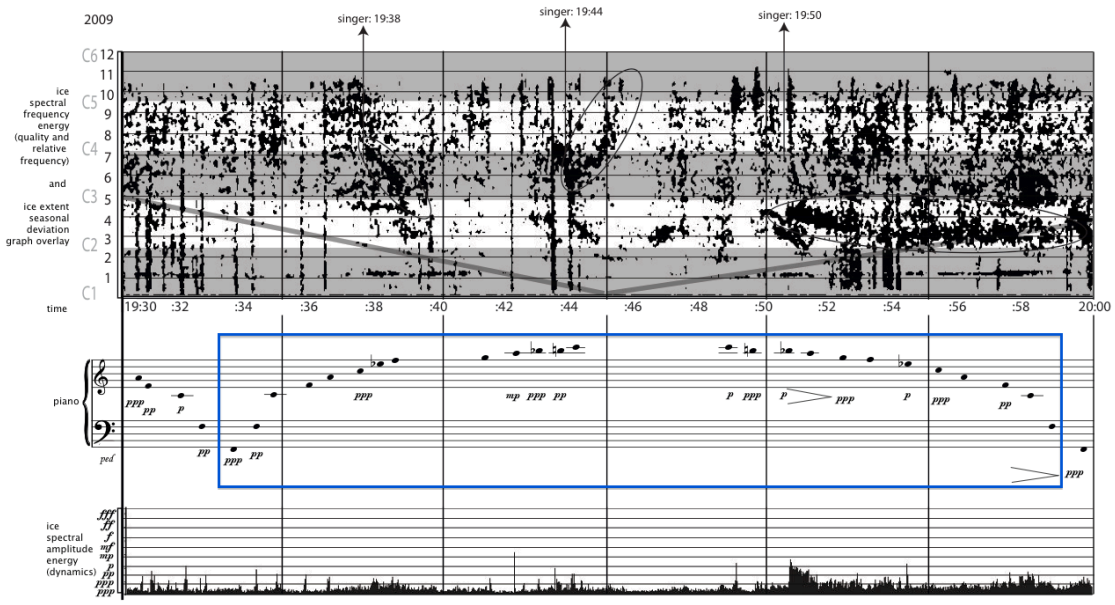
[333] "Arctic Sea Ice Shatters All Previous Record Lows," National Snow and Ice Data Center, 1 October 2007, https://nsidc.org/news/newsroom/2007_seaiceminimum/20071001_ pressrelease.html. A new record for the lowest seasonal minimum ice extent was set in 2012.



Example 5.7 V-shaped Line with Lowest Trough, Burtner, *Iceprints*, 18’30”–19’00”. The trough of the V-shaped line and “8ba” in the piano left hand are marked by the blue rectangle. The descending partial harmonic series is marked by the red rectangle. © 2009 Matthew Burtner. Used by permission.



Example 5.8 Harmonic Series Used for 2008, Burtner, *Iceprints*, 19’00”–19’30”. The blue rectangle marks the first statement of the series; the red rectangle marks the second statement. Note: the second statement carries over to 19’33” on the next page. © 2009 Matthew Burtner. Used by permission.

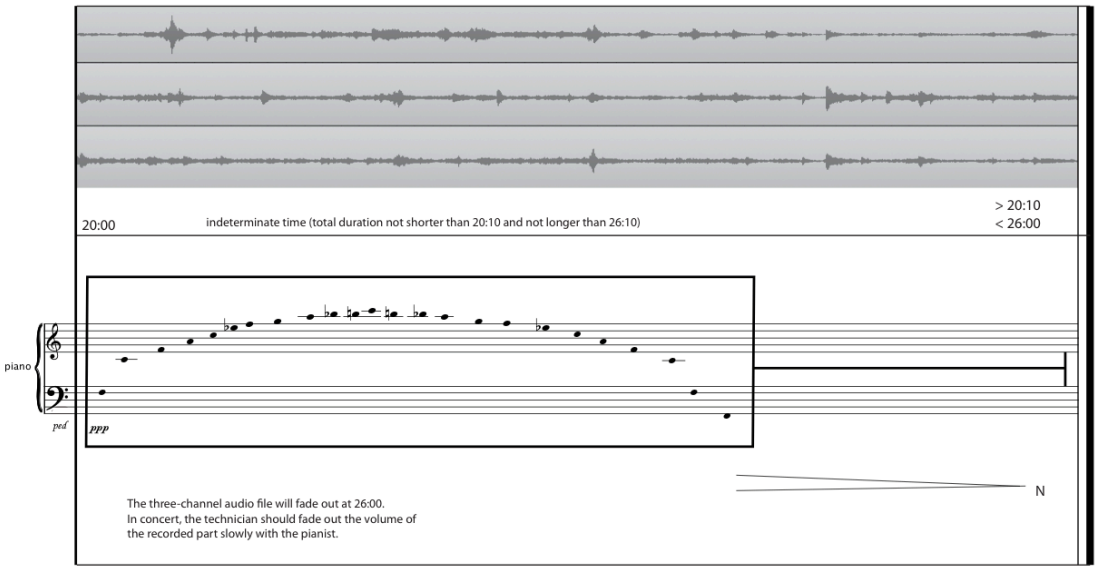


Example 5.9 Harmonic Series Used for 2009, Burtner, *Iceprints*, 19'30"–20'00". © 2009 Matthew Burtner. Used by permission.

The pleasing, quiet sonorities in *Iceprints* do not create a feeling of comfort around the idea of permanent ice loss. Instead, they represent an unhealthy region marked by ice scarcity. After 2009, the thin, *pianississimo* line on the harmonic series portrays minimal arctic sea ice. The narrow intervals at the upper end of the series evoke the last remnants of ice and the wide consonant intervals near the fundamental represent the open water between those ice fragments. Dissonant sonorities portray a vibrant Arctic, whereas consonant ones—although pleasing to the ear—suggest environmental degradation of the region.

The gradual motion from the upper end of the harmonic series to the fundamental is similar to the change in piano register over the course of the work. Both the series and the register reinforce a larger theme of descent in the work. However, the pianist nears the physical limits of the keyboard when the V-shaped line directs him or her to play in the first register in 2007. If the first half of the V-shaped figure were to descend below the first register, the left hand would be silent during those passages. To accommodate for this, Burtner flips the melodic

line that represents the annual ice cycle starting with the year 2008 (see Example 5.8). The V-shaped line appears in the score through 2009, but the piano now ascends and then descends. This flip is jarring since the music prior to 2008 began with a descent. The new pattern in 2008 begins in small waves, first as three-measure swells. Then, in 2009, the waves expand to six measures. After 2009, the swells are not measured (see Example 5.10). The piano repeats the harmonic series indefinitely; that is, until the processed underwater sounds fade out at 26'00". The wave-like lines mark a formal divide between an Arctic with and without permanent ice.



Example 5.10 Harmonic Series After 2009, Burtner, *Iceprints*, 20'00"–20'10"/26'00". © 2009 Matthew Burtner. Used by permission.

This environmental change is evoked not only by the flip of the piano line but also by modifications to the visual appearance of the score. The V-shaped figure, annual time, and moment time are absent on the last page (see Example 5.10). The final page of the score is the only section that does not provide a year in the upper left-hand corner. The spectrogram of the hydrophone recording used up to this point is replaced by spectrograms of all three recordings used in the work, although sub-ice sounds are still heard. Each spectrogram shows a single band

of sound representing amplitude. Frequency distribution and time scale are not shown. The work ends in a more open time frame. There are no longer thirty-second blocks that suggest year. Without the specification of time scale in the score for this passage, it is unknown whether these spectrograms capture the entire recordings or excerpts. More importantly, the omission of the V-shaped line and the original spectrogram breaks the connection between the piano and ice. With no sense of annual or moment time, the music hovers in an unmeasured space of rising and falling spectra.

The harmonic series is a more basic and arguably more natural source of compositional material than the data sets and spectrographic analysis used earlier in *Iceprints*. Yet, the series is introduced at a moment when the environment is transformed by human activity in the piece, where there is no longer permanent ice in the Arctic. The closing passage is pleasing in the conventional sense, with the piano outlining the harmonic series over a gentle murmur in the electronic track. There are no clusters of notes, dissonant chords, or tremolos at the end of the composition. The harmonic series captures loss in the work, but that loss is quite beautiful. The transition from an abundance of ice to a scarcity of it is represented by the progression from rich, dissonant textures to a thin consonant line.

Iceprints and the Changing Image of the North

Iceprints departs in several ways from existing compositions that represent arctic and subarctic environments. Two relatively straightforward distinctions are the spatial and temporal dimensions explored. Several works focus on specific locations during a particular time of year. These include Malcolm Forsyth's *Northern Journey*, Barbara Pentland's *Suite Borealis*, and Harry Somers' *North Country*. In contrast, Burtner comments on an entire region and rescales 40

years of ice extent data to approximately twenty-three minutes of music. Through the use of 40 years of data sets, each representing thousands of kilometers of permanent ice, *Iceprints* helps listeners to comprehend some of the spatial and temporal aspects of the Arctic that are beyond human perception.

Burtner's work also differs from other North-themed compositions in terms of the musical techniques used to comment on natural environments. Forsyth and Pentland, to name two composers, employ musical effects to depict specific landscapes. These include wide, sustained intervals to capture the vastness of the terrain, dense chords to portray towering peaks and ice formations, and unconventional playing techniques such as glissando and sul ponticello to capture atmospheric conditions. Some composers bring in actual sound sources from the North, either as live instruments or recorded materials. For example, R. Murray Schafer positions a snowmobile on stage in his orchestral work *North/White* (1979). Einojuhani Rautavaara combines live orchestral music with field recordings of Arctic birds in his *Cantus Arcticus* (1972).

Schafer's *North/White* is one of the earliest compositions to comment on the transformation of northern regions by humans. He writes in the introduction to the score:

> The instruments of destruction are pipelines and airstrips, highways and snowmobiles. But more than the environment is being destroyed by these actions [. . .] Canadians are about to be deprived of the "idea of the North", which is at the core of the Canadian identity. The North is a place of austerity, of spaciousness and loneliness, the North is pure; the North is temptationless [. . .] The idea of North is a Canadian myth. Without a myth a nation dies.[334]

Schafer's critique of industry and economic progress smacks of the rhetoric used by environmental advocates. Consequentially, he polarizes nature and society. Schafer presents an idealized image of the North where desirable environments, essential to the nourishment of

[334] R. Murray Schafer, *North/White* (Toronto: Universal Edition, 1980), 1.

national identity, are those that are unscathed by resource extraction and infrastructure development. In order to comment on environmental change in the North, Schafer uses several nontraditional musical techniques. These include chromatic and quartertone note clusters and vocables in the orchestra, the expansion of acoustic space through the placement of two trumpets off-stage, and the use of unconventional instruments such as Masonite sheets, metal pipes, and a snowmobile.

The dense, sustained chords in the strings, winds, and brass evoke a vast environment of snow and ice. The trumpets heighten the experience of spatial depth with their position off stage. The metal pipes and sheets and the snowmobile are pitted against the winds, string, and brass as the sounds of industry. *Iceprints* also uses dense chords to represent a vibrant North. However, Burtner embraces technology, albeit a different kind than engaged by Schafer. *Iceprints* demonstrates one way in which sonification, spectrographic analysis, hydrophone recordings, and telematics can be used constructively to engage an environmental topic such as disappearing ice.

Burtner is one of several contemporary artists that use sound technologies to engage polar regions in their work. Others include Katie Paterson, Andrea Polli, and Douglas Quinn.[335] The employment of sonification, spectrographic analysis, and field recordings in polar-themed works also reflects a change in the way in which the Far North—and also the Far South—is understood. In short, polar regions have become a frontline of climate change. Multimedia artists Jane D. Marsching and Andrea Polli articulate this conceptual shift:

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[335] See, for example, Paterson's *Vatnajökull* (2007), a multimedia piece that presents a neon sign in a gallery space with a phone number that gallery visitors can call to reach a hydrophone recording of the Vatna Glacier in Iceland; Polli's *Sonic Antarctica* (2009), a radiophonic work that combines sonifications of weather data, scientist interviews on the topic of climate change, and field recordings from Antarctica; and Quinn's *Vostok Ice Memories* (2012), a concert hall work for saxophone and live electronics where parameters of the score are shaped by data from the Vostok ice core sample.

> The Poles have become both the proving ground and the advanced warning system for scientific research related to global climate change. In the middle of this climate change media super-saturation, age-old narratives of exploration, myth and literary imagination have yielded to the data of satellites and ocean currents.[336]

With this change, composers such as Burtner are starting to blur the boundary between art and science. *Iceprints* aestheticizes the Arctic, like existing works, but with the added layer of technical details about ice extent patterns. Burtner uses data sets, hydrophone recordings, and telematics in order to help make complex temporal and spatial dimensions of a specific region more comprehensible to his audiences. The use of three hydrophones enables listeners to experience sounds beneath a water/ice surface from three different locations approximately one kilometer apart. Along similar lines, the audio from three simultaneous performances is transmitted to the other venues.

The Arctic is more accessible than ever before with the Northwest Passage now fully navigable in late summer. The physical transformation of the Far North has drawn the attention of scientists, as Marsching and Polli note, but also tourism and transportation industries. New tour packages and commercial trade routes are planned for the region.[337] Yet, the Arctic is a place that most will never set foot. The public's view of the Far North is primarily provided through news outlets and films, among other sources. Images of stranded polar bears and retreating glaciers and graphs of rising $C0_2$ levels and declining ice extent provoke a sense of

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[336] Jane D. Marsching and Andrea Polli, "Introduction," in *Far Field: Digital Culture, Climate Change, and the Poles*, ed. Jane D. Marsching and Andrea Polli (Chicago: Intellect Ltd., 2012), 11.

[337] Ker Than, "Arctic Meltdown Opens Fabled Northwest Passage," *Live Science*, http://www.livescience.com/1884-arctic-meltdown-opens-fabled-northwest-passage.html (accessed 25 April 2016); Nathan Vanderklippe, "China reveals plans to ship cargo across Canada's Northwest Passage," *The Globe and Mail* 20 April 2016, http://www.theglobeandmail.com/news/world/china-reveals-plans-to-ship-cargo-across-canadas-northwest-passage/article29691054/; Bob Weber, "Northerners prepare for largest cruise ship in Northwest Passage," *The Globe and Mail* 10 April 2016, http://www.theglobeandmail.com/news/national/northerners-prepare-for-largest-cruise-ship-in-northwest-passage/article29581410/.

loss, and for some fear. However, these visual representations are arguably limited in their capacity to provide insight into the complex environmental processes taking place in the Arctic. Burtner's composition helps listeners better comprehend large-scale environmental change in the Arctic through rendering ice-extent data sets as music. *Iceprints* goes inside these measurements. Through his aestheticization of technical information, Burtner stirs both impulse to act and critical thought.

The "Re-Performance" of Ice: Carmen Braden, *Candle Ice*

Not all composers working with ice connect their music to climate change. Carmen Braden is one artist who explores the sonic and structural properties of the natural formation without presenting an overt environmentalist message.[338] In *Candle Ice* (2014), for violin, cello, piano, and electronic track, Braden engages the final melting phase of subarctic lakes in the spring. *Lake Skin* (2013), for double chorus and soprano, focuses on ice formations in the winter, and *The Ice Seasons* (2015), for double chorus, soprano, string sextet, and electronic track, traverses the annual cycle of lake ice. In these and other concert-hall pieces, Braden exhibits careful attention to both place and season. She does not subscribe to a generic idea of Arctic, but instead directs attention to the distinct subarctic soundscapes near her home in Yellowknife, Northwest Territories.[339]

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[338] Others include Natasha Barrett, Peter Cusack, and Chris Watson. For example, Barrett's chamber work *Crack* (2007) uses data derived from a recording of an ice cube cracking—among other sources—as a structural device; Cusack's field recording album *Baikal Ice* (2003) documents both nature and man-made sounds in the spring around Lake Baikal, Russia; and Watson's electroacoustic composition *Okeanos* (2015) combines hydrophone recordings from around the globe, including the Arctic.

[339] For more on Braden's upbringing and her music, see Samia Madwar, "Carmen Braden Raises the Volume on the Subarctic," *Musicworks* 126 (Fall 2016), https://www.musicworks.ca/profile/carmen-braden-raises-volume-subarctic.

Candle Ice reveals some of the ways in which both recorded sounds and non-sounding information are used to connect listeners to a less familiar type of ice. Braden's composition traces candle ice from its initial formation from rotten ice (i.e., disintegrating ice) to its phase change to water. This process is evoked through the combination of recordings of different stages of ice melt and instrumental music based on ice sounds and patterns. The transformation of an ice pan to candle ice to water can take place over a few days or several weeks (see Figures 5.6 and 5.7). Braden rescales this multi-day/week process to approximately ten-and-a-half minutes in her work. Similar to Burtner, she brings out aspects of a seasonal ice deformation process by rescaling it to fit the duration of a concert-hall work. However, Braden focuses on ice melt during a specific period of a particular season, instead of measuring change across four decades like in Burtner's *Iceprints*. Before describing *Candle Ice* in detail, it is important to first consider Braden's relationship to ice.

Figure 5.6 Candle Ice and Ice Pan, Prosperous Lake, Northwest Territories, June 2006. Image by Carmen Braden. Used by permission of the artist.

Figure 5.7 Candle Ice Shard, Prosperous Lake, Northwest Territories, June 2006. Image by Carmen Braden. Used by permission of the artist.

Braden understands ice as a recurring, seasonal phenomenon in the Subarctic. She observes the spring thaw and fall freeze as processes that take place consistently each year. For this reason, Braden does not comment on anthropogenic climate change in *Candle Ice*. In addition to her interest in the environmental conditions that create and shape ice, Braden recognizes the natural formation as a living entity with spiritual qualities:

> I believe that the ice formed in the North's long winters is a quasi-biotic phenomenon, one that embodies a spiritual and ontological bridge between living and elemental forces. I believe the ice has a voice, and the sounds it produces in its natural state are an on-going, ecological form of music. My approach to the use of these sounds is a borrowing or *re-performance* of this music.[340]

As a "quasi-biotic phenomenon," ice is given agency in Braden's music. For example, in *Candle Ice* recorded ice sounds are treated as a performer. In certain sections, the ice "performs" alone.

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[340] Carmen Braden, *Candle Ice* (Yellowknife, NT: Black Ice Sound, 2014), 2, italics in original.

In other passages, it "plays" alongside live musicians, thus creating the illusion of interaction. Braden acknowledges ice as a musical resource when she refers to her works as a "borrowing or re-performance." The concept of appropriation is generally applied to human culture, but Braden extends issues of borrowing to nature.[341] In the case of *Candle Ice*, the violist, cellist, and pianist are made aware that their music is based on the sonic and physical properties of candle ice through detailed notes in the score explaining the source of compositional materials.

Braden's musical engagement with ice is informed by both her observations and recordings of frozen lakes around her home in Yellowknife, Northwest Territories. The recordings heard in *Candle Ice* were made at Great Slave Lake around the same time as Braden composed the piece.[342] The association of recorded sounds with an environmental context connects *Candle Ice* to the tradition of electroacoustic soundscape composition. Braden uses studio processing to heighten the experience of sound sources, instead of scrutinizing the sonic properties of source materials, as found in *musique concrète*. She applies band-pass filters and equalization to her source materials, studio-processing techniques also found in Paul Rudy's *In Lake'ch* and Hildegard Westerkamp's *Talking Rain*. Although studio processing is applied to recorded sounds in Braden's work, source materials are not manipulated to the point that they become unrecognizable.

As mentioned in Chapter Four, one of the primary aims of soundscape composition is to sensitize listeners to the sonic environment. Soundscape composers often turn to iconic sounds in order to create an environmental and social context and also to stir an emotional response in audiences. Iconic sounds include rain, trains, horns, and bells. On occasion, an unconventional

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[341] See Chapter Three for a discussion of cultural borrowing in Schafer's *The Princess of the Stars*.

[342] Carmen Braden, Skype interview by author, 3 June 2016.

sound plays a central role in a soundscape work, such as that created by barnacles. *Candle Ice* directs attention to a less familiar sound of the Subarctic. It is unlikely that many performers and audience members know what candle ice is. Referring to the area around Yellowknife, Northwest Territories, Braden asserts:

> There's a lot of subtlety that happens up here in the humanscape, the landscape, and the soundscape. These events might not make as loud a sound or produce as iconic an image, or they may happen for a short span of time. This in-between phase, when you can't go on the ice or in the water because there is candle ice, doesn't receive as much attention.[343]

Braden's focus on a less familiar nature sound brings to mind the sound of barnacles at the outset of Hildegard Westerkamp's electroacoustic work *Kits Beach Soundwalk* (1989). Westerkamp infuses the distinct clicking sound with otherworldly qualities through the use of bandpass filters and equalization. Braden also applies these two techniques to her recordings, but with the additional layers of three live instruments. Furthermore, Braden uses descriptive text to create a story around candle ice. In contrast, Westerkamp uses her voice to detail what she sees and hears at Kitsilano Beach. Both recorded sounds and live instruments play an important role in raising awareness to candle ice in Braden's work. Together, they connect listeners to the natural formation in terms of both its sonic properties and its meaningfulness as a soundmark of spring in the Subarctic.

A Program Narrative for Candle Ice

Candle Ice is divided into six sections, each of which focuses on a different stage of candle ice as observed by Braden at Great Slave Lake. She creates a program around the different stages of the natural formation through the use of descriptive text at rehearsal letters in the score (see Diagram 5.2). The work begins with the second stage of candle ice, rather than the

[343] Carmen Braden, Skype interview by author, 3 June 2016.

first. One possible explanation for Braden starting the work with the second stage is that shards floating in open water are arguably richer in sonic properties than shards falling from a deforming ice pan. The B section goes back to the first stage, where ice shards fall from a pan as environmental forces weaken it. After the B section, Braden captures the movement of candle ice by water and wind (C section), then its deterioration (D and E sections), and finally its phase change to water (F section).

Rehearsal Letter	Time	Text
A (m. 1)	0'00"	"candle ice begins to float freely"
B (m. 29)	2'50"	"a closer look – shards falling from the main ice pan"
C (m. 58)	5'09"	"the wind and waves begin to move the ice"
(m. 66)	5'40"	"the ice pan shifting together – a wash of sound"
D (m. 100)	7'16"	"a close look at the chaos of the ice pan – violence and jagged edges – the ice's death!"
E (m. 138)	8'18"	"in agony – the death throes of the ice!"
F (mm. 157–172)	8'58"–10'30"	"the quiet melt into lakewater"

Diagram 5.2 Formal Overview of *Candle Ice*. Text from Braden's score; time markings based on a live recording of the work performed by the Gryphon Trio at the 2016 University of Toronto New Music Festival.

The text helps to give context to the performers, as they may not be aware of candle ice prior to the work. Audience members are given the program notes printed on the first page of the score, but not the descriptive text that is provided to the performers. The program notes present a general description of candle ice and how Braden integrates the natural formation into her work. Still, she wants her audiences to know that there is a "story" to the composition:

> For the premiere [at the Ottawa International Chamber Music Festival (6 August 2014)], I was there and spoke briefly before the performance. It's quite important to me to contextualize the music because it's so directly connected to a physical place or a physical phenomenon (in a particular place). I feel it is respectful to the original source to do this (ie. the ice). Also, my experience talking to [some] audience members [. . .] is that they like knowing the story, or the source behind the piece. It makes them access my concepts of the piece faster.[344]

[344] Carmen Braden, e-mail correspondence with author, 4 July 2016.

For Braden, it is sufficient that listeners have a general understanding of the original source of the recorded materials and how she draws on candle ice in her piece. It is unlikely that audience members will recognize all of the ice sounds, especially those who are unfamiliar with the physical and sonic properties of candle ice.

The ways in which performers and audience members experience the formation is also shaped by Braden's focus on candle ice in a wilderness setting. Although the final melting stage of subarctic lakes generally has connotations of springtime and renewal, spring ice can also be destructive to man-made structures. An ice pan set in motion can damage docks and waterfront buildings.[345] Individual shards of candle ice are sharp enough to pierce skin. Braden captures the physical power of candle ice in the D and E sections, but she does not extend its destructive capacity to man-made structures. Candle ice is witnessed from a safe distance and therefore is not perceived as a threat. From this position, careful observation among performers and audience members can lead to a better understanding of the natural formation.

The recorded materials used in *Candle Ice* correspond to the descriptive text. For example, the unprocessed glass-like wash in the electronic track at the outset of the composition is that of candle ice floating freely (refer hereafter to Diagram 5.3). Another example is the isolated clinking introduced in the track just before the B section, the sound of individual shards striking together. The electronic track fades out approximately two thirds through the C section at m. 86 in preparation for the violin, cello, and piano capturing "the ice's death." The electronic track is silent during the D section and part of the E section. The danse-macabre-esque D section is defined by angular rhythms, ceaseless meter changes, and piercing accents in the violin, cello,

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[345] See Jennifer Geens, "Ice surges into Deline, N.W.T., in dramatic Great Bear Lake breakup," *CBC News* 4 June 2016, http://www.cbc.ca/news/canada/north/deline-ice-surges-shore-breakup-1.3616155.

and piano. The E section evokes the penultimate stage of candle ice where it is pushed en masse by the wind, a painful event according to Braden. This section presents similar rhythms and meter changes as those heard in the D section, but with the addition of rising glissandi in the violin and cello. The closing section of *Candle Ice* marks both the final stage of candle ice and a reprise of the first half of the A section. The electronic track returns six measures before the F section with an excerpt from the recording heard at the outset of the piece. Braden also presents the melodic motive and harmonic trills in mm. 3–13. The unprocessed wash in the electronic track crossfades to lapping water approximately halfway through the F section, representing the phase change of candle ice to water.

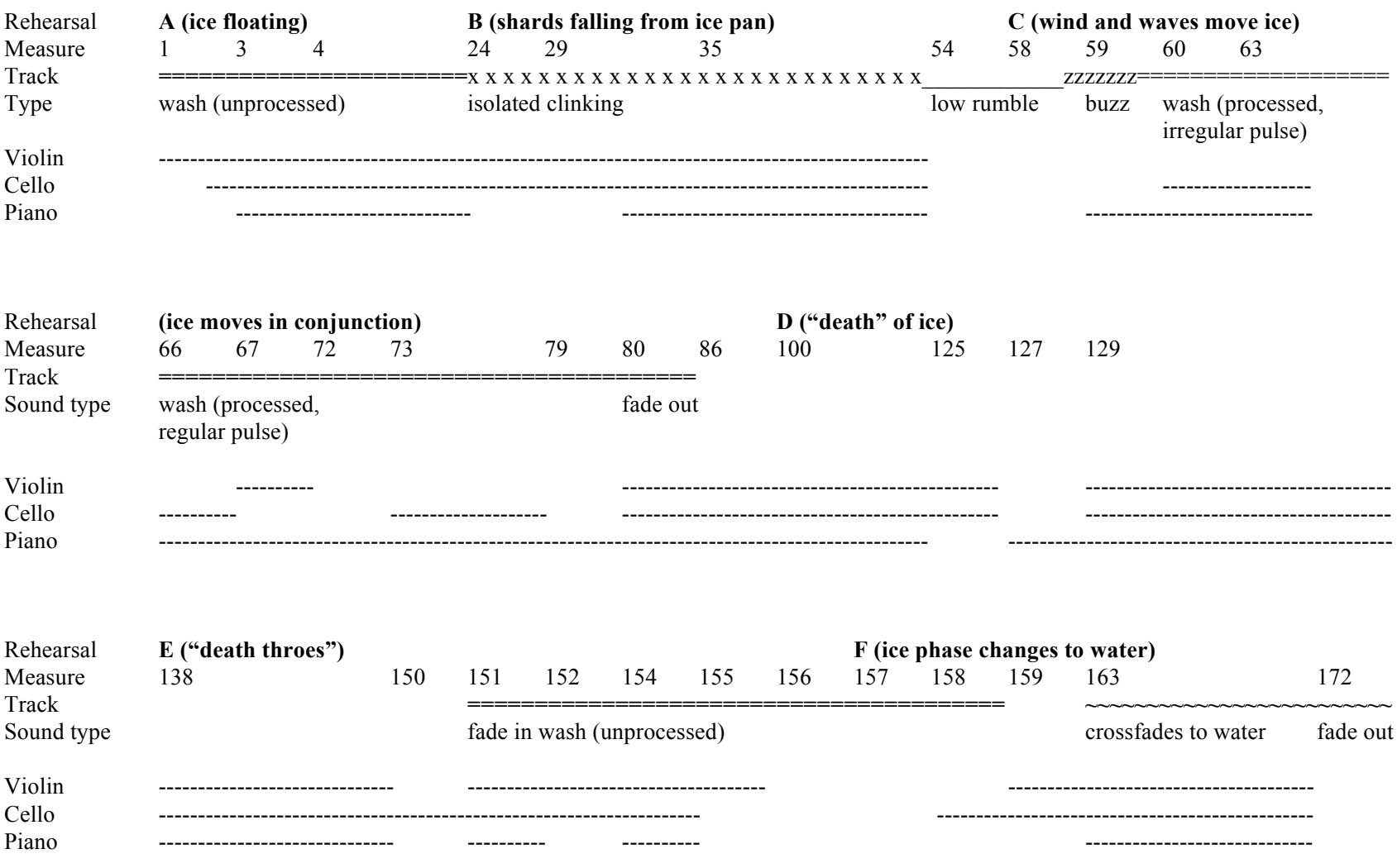
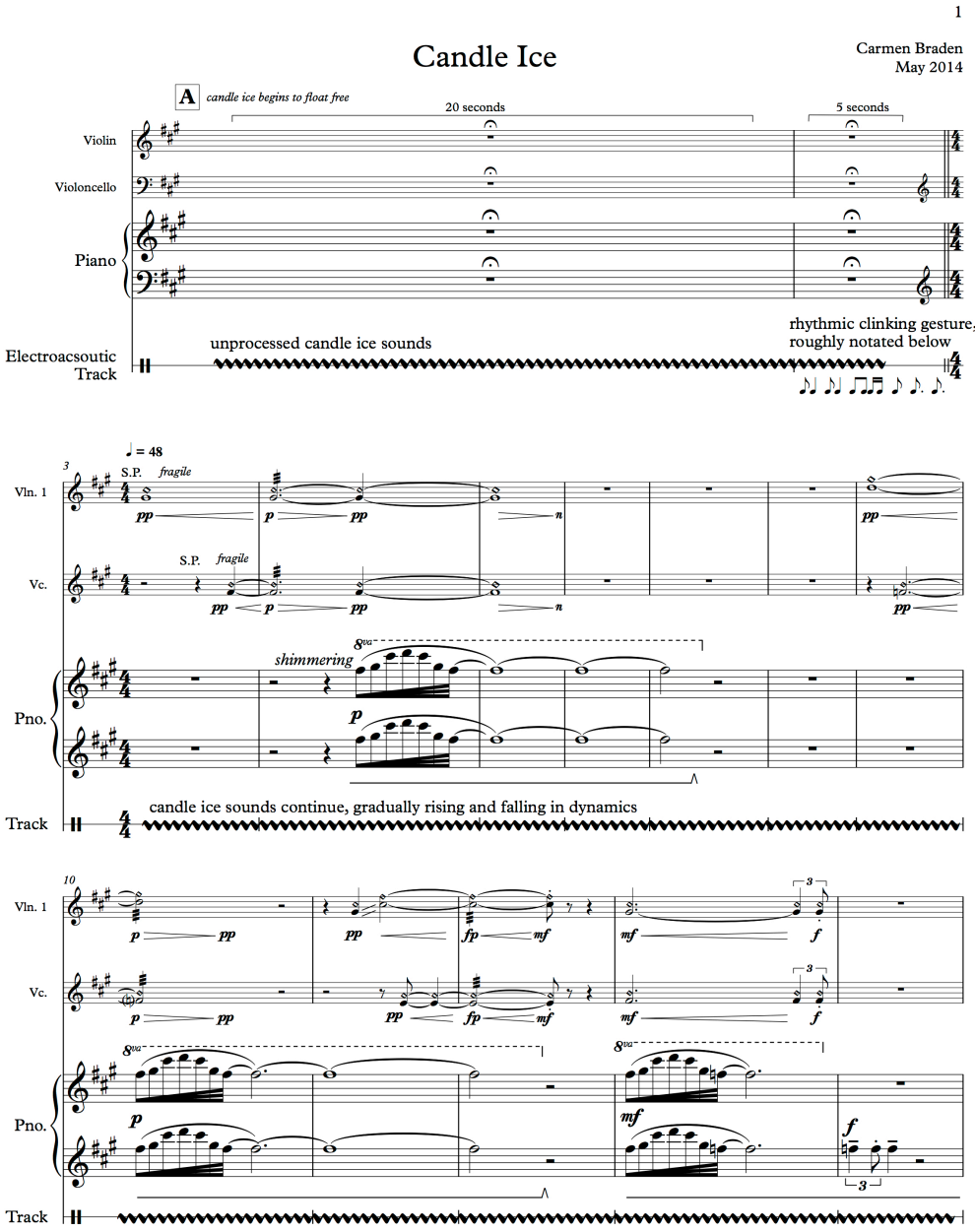


Diagram 5.3 Correlation of Recorded Ice Sounds and Live Instruments in *Candle Ice*.

Music for Candle Ice

In addition to the evocation of the final melting stage at Great Slave Lake, *Candle Ice* presents compositional materials based on actual ice sounds. Candle ice has sonic properties that are conducive to music, especially timbre and rhythm. Individual shards produce both a metallic-like shimmer and distinct rhythmic patterns when in contact with other pieces of ice. Candle ice also has quasi-pitched qualities, unlike the broadband sounds of ice cracking, grinding, and splitting. The majority of melodic and harmonic materials in *Candle Ice* are based on a four-note pitch collection: F#–G#–C#–D. The collection was generated from Braden's spectrographic analysis of the hydrophone recording heard at the outset of the work.

The collection is introduced in the A section as sustained notes and also as a melodic motive. In m. 3, the violin sustains the artificial harmonic G#6 and the cello F#6 (see Example 5.11). The D and C# are introduced as sustained tones in the violin in m. 9 and 11, respectively. The collection is first played as a melodic motive in the piano at m. 4. With feathered beaming, the piano accelerates the arch-shaped motive as it ascends from F#5 to D6 and then descends back to F#5. This flickering figuration stands out against the thin sustained notes in the strings and the glass-like clinking of candle ice in the electronic track. The piano fades into the wash of candle ice at the end of each statement of the motive when it sustains either an F# or F♮.



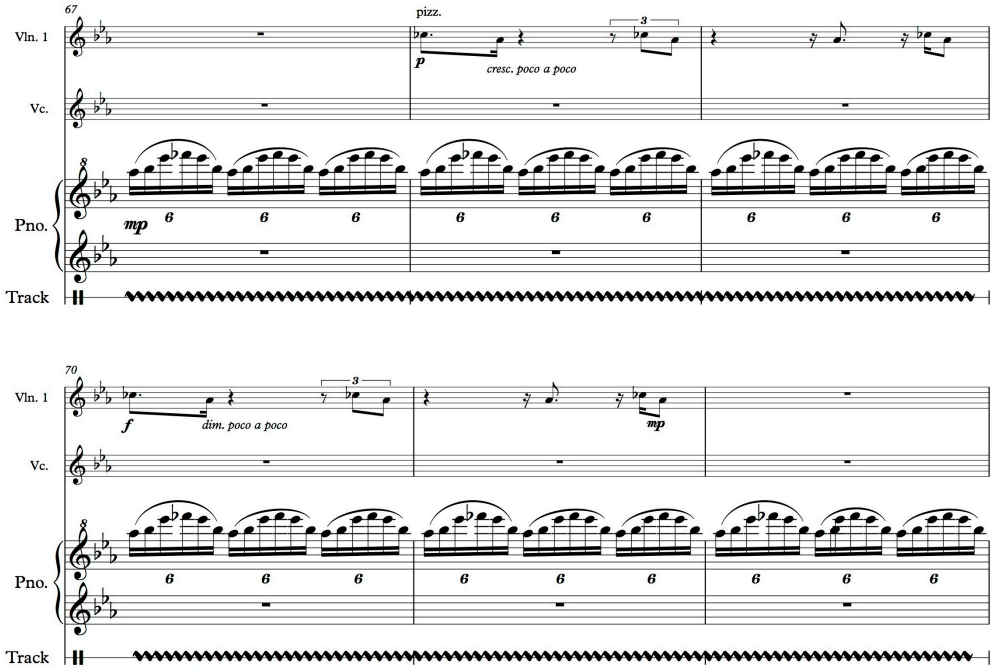
Example 5.11 “Candle Ice” Pitch Collection in Strings and Piano, Braden, *Candle Ice*, mm. 1–14. © 2014 Black Ice Sound, Yellowknife, NT. Used by permission.

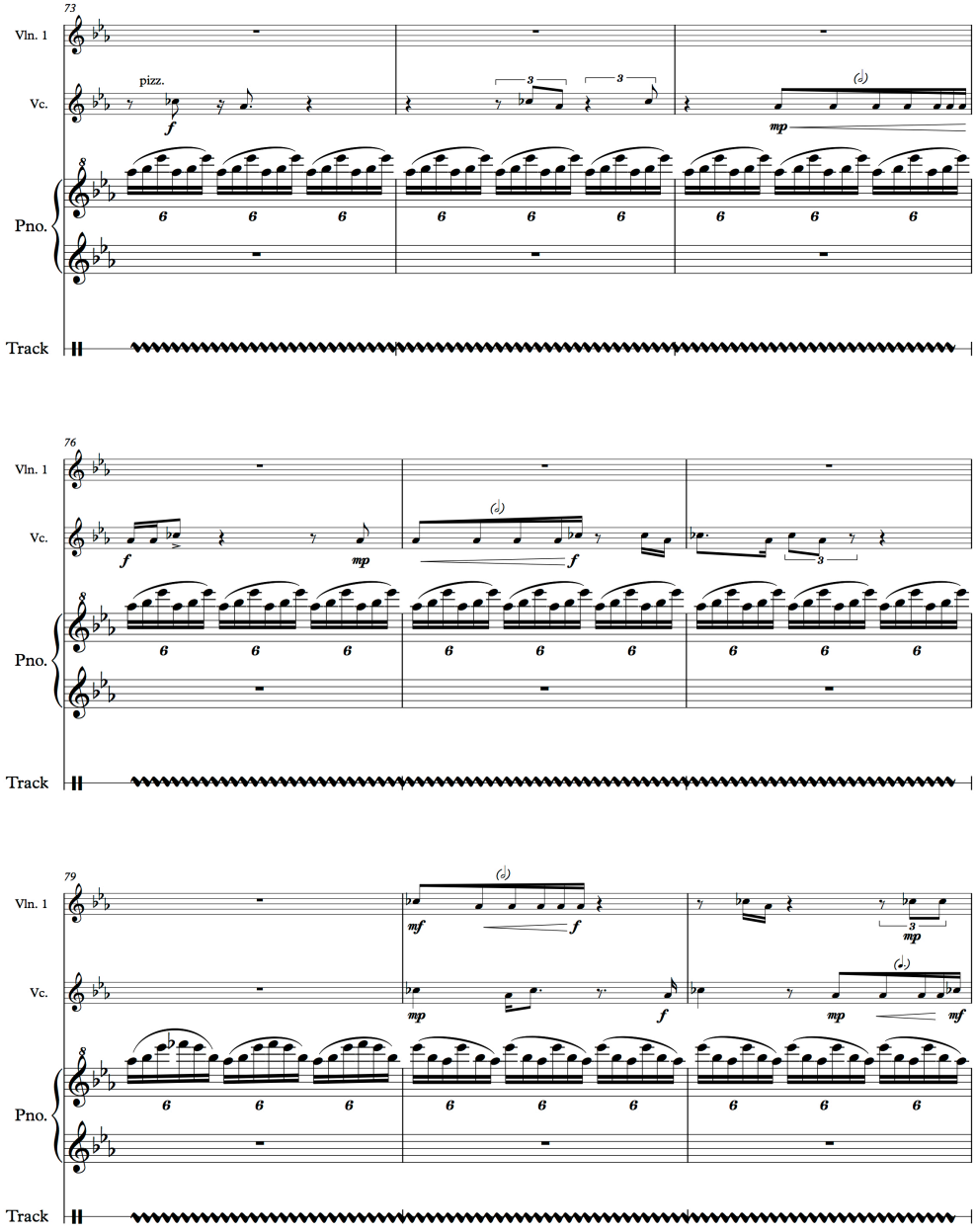
Braden suggests the presence of a key through the use of key signatures, but she avoids clearly establishing one. The key signature for F# minor/A Major is used in the A, B, D, E, and F sections. In the C section, the four pitches are transposed up a diminished third (Ab–Bb–Eb–Fb) and a C minor/Eb Major key signature is used. Braden may have used key signatures so as to avoid having to use accidentals. There are passages throughout *Candle Ice* that present pitches outside of the collection. Examples include the ascending G♮–A♮–A# line in the cello in mm. 34–35 and the D–E–F♮ line in the piano left hand and G#–F#–F♮ line in the right hand in mm. 36–37. F♮ is present in several places in the score where there is a change in rhythm and texture. For example, immediately following the F♮ in both hands of the piano in m. 13 a distinct rhythmic pattern on the same pitch is introduced in the left hand.

Braden also transcribes a rhythmic motive from the ice recording at the outset of the composition. She notates the rhythm on the right-hand side of the first page (see Example 5.11). There are hints of the rhythmic motive in the A and C sections; however, it is not until the D section that the motive is stated in its original form. The rhythms that allude to the motive in earlier sections create disruptions. For example, in the A section it is already difficult to follow the 4/4 meter specified in the time signature because of the sustained tones in the strings, the unpredictable clinking rhythms in the electronic track, and the unevenly spaced entrances of the melodic motive. In m. 17, the triplet rhythm in the piano left hand (on F#) heightens the metrical instability and anticipates the entrance of isolated clinking in the electronic track starting around m. 24.

Another example of the imitation of candle ice rhythms is in the C section when brief pizzicato groupings in the violin and cello are set against steady sextuplets in the piano right hand and a wash of processed candle ice sounds in the electronic track (see Example 5.12). At m.

68, the violin injects pizzicato rhythmic bursts into the piano and ice lines. Soon after at m. 73, the cello responds to the violin with a combination of triplet rhythms and feathered beaming. Then at m. 80, both the violin and cello are set against the piano. The clash of different rhythms does not merely disrupt the metric pulse, but it mimics the overlapping rhythmic streams of candle ice through the use of live instruments. Most of the violin and cello rhythms do not fit into the sextuplets. As such, listeners can envision the irregular clinking of individual shards that rise above the pulsing wash of an ice pan shifting en masse on a lake.





Example 5.12 Imitation of Clinking Ice Shards in Violin, Braden, *Candle Ice*, mm. 67–81. © 2014 Black Ice Sound, Yellowknife, NT. Used by permission.

The rhythmic motive based on the opening recording pervades the D and E sections, the two sections where recorded ice sounds are not present. At the start of the D section, the violin and piano play the rhythm in full (see Example 5.13). Although the motive is derived from a sample of candle ice, the transcription alone does not capture the rhythmic complexity and variety of the natural formation. Braden alludes to candle ice rhythms by modifying the original motive in different ways. One approach is through the placement of accents on off beats. Examples include the accent on the second and fifth beat in the violin and piano right hand in m. 100 and on the final chord in the piano in m. 106.[346] Another way in which candle ice is evoked is through the fragmentation of the rhythmic motive. This technique is exemplified by the manipulation of the rhythm in m. 101. That rhythm is broken into four smaller segments, which are then combined, reordered, and repeated over the course of the D and E section (see Diagram 5.4). For example, in the D section "Fragment A" is repeated in mm. 116, 119, and 120, "Fragment B" in mm. 104–105 and mm. 132–135, "Fragment C" in mm. 112–113, and "Fragment D" in mm. 106–109. The repetition of these fragments creates new patterns within the larger rhythmic stream. These rhythmic shards also allude to the main theme of the D and E sections: death. Ice clinking together is a form of deformation; the striking and rubbing of shards further breaks the ice into smaller pieces.

[346] Offbeat accents are not exclusive to the D and E sections. See, for example, the piano left hand in mm. 17–21 and the cello in mm. 73, 76. Another type of syncopation used in *Candle Ice* is the alternation of simple and compound rhythmic groupings. See, for instance, the cello in m. 68, 70, and 74.

Example 5.13 "Candle Ice" Rhythm at Start of D Section, Braden, *Candle Ice*, mm. 100–103. © 2014 Black Ice Sound, Yellowknife, NT. Used by permission.

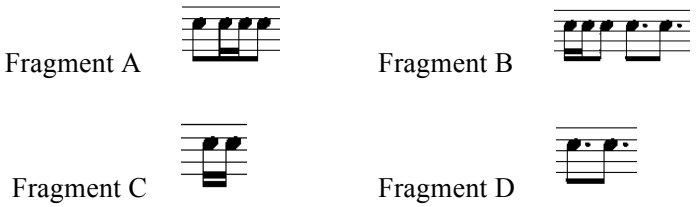
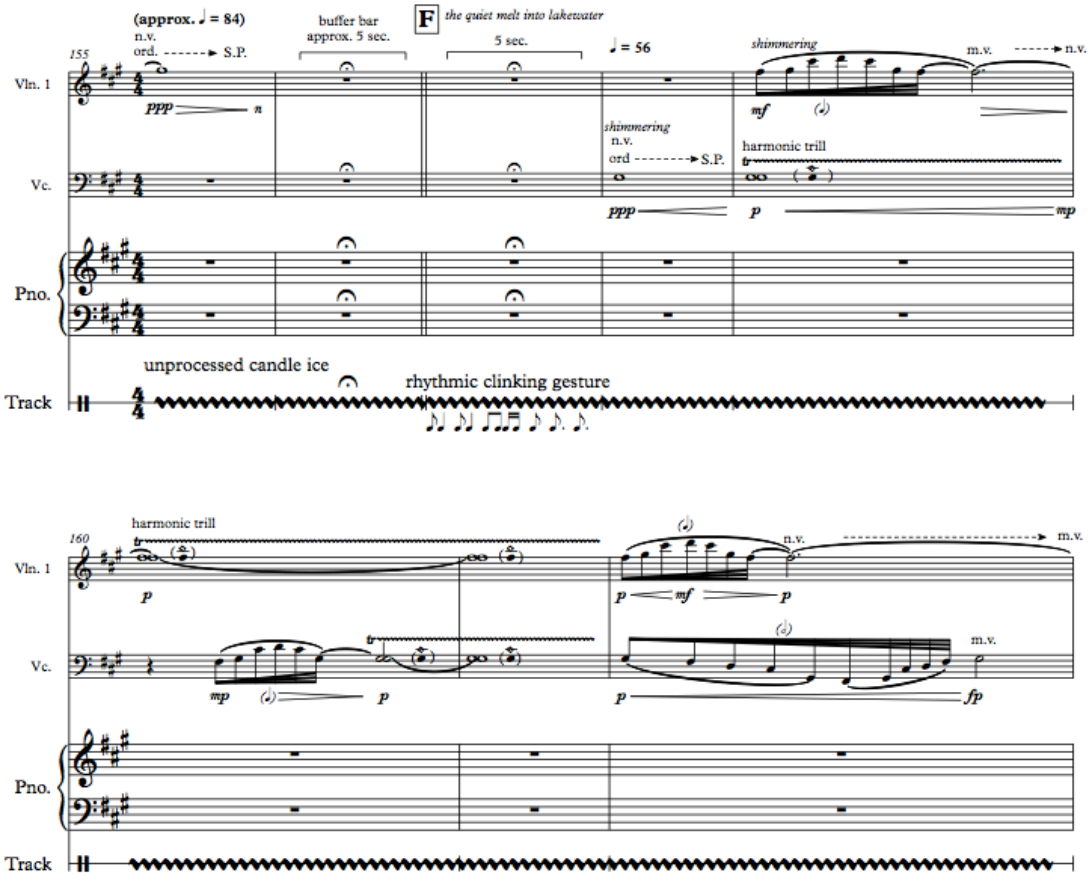


Diagram 5.4 Fragments Derived from "Candle Ice" Rhythm in m. 101, Braden, *Candle Ice*.

The closing portion of *Candle Ice* marks a reprise of the opening of the work. The unprocessed wash heard at the outset of the piece enters at m. 151, six measures before the start of the F section. The violin, cello, and piano fade out soon after, leaving only the sounds of unprocessed candle ice. The "solo" in the electronic track in the F section lasts approximately ten seconds, in contrast to twenty-five seconds at the start of the composition. At m. 159, the violin enters and restates the melodic motive introduced at m. 4 in the piano, and the cello plays the harmonic trill heard at the opening in the violin (compare Examples 5.11 and 5.14). The final statement of the motive is reserved for the piano. The pianist repeats the melodic motive exactly as stated in m. 13 (first at m. 166 and again at m. 170).



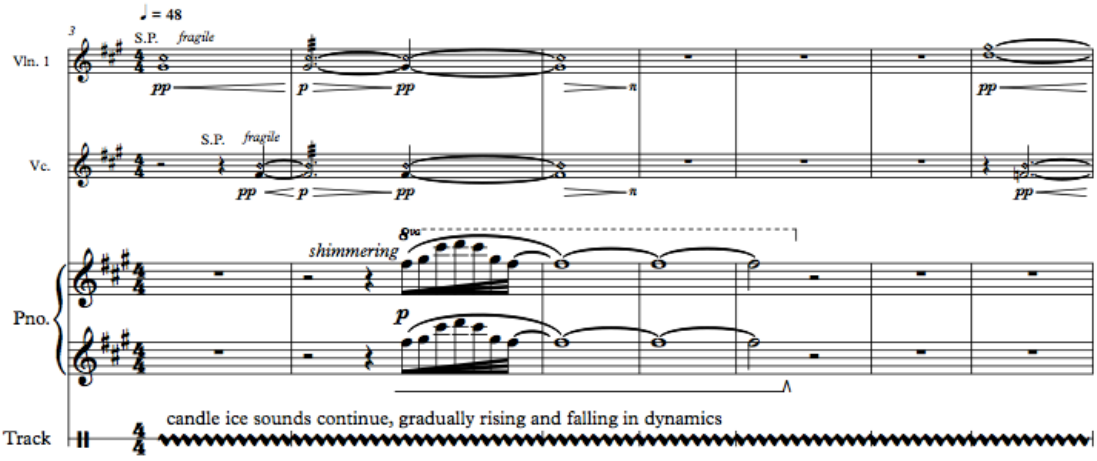
Example 5.14 Reprise of Opening Section, Braden, *Candle Ice*, mm. 155–162. © 2014 Black Ice Sound, Yellowknife, NT. Used by permission.

Both the four-note pitch collection and the transcribed ice rhythm serve as unifying devices in *Candle Ice*. In certain sections, they function as motivic material. Such is the case with the melodic line in the piano in the A and F sections and the rhythms in the violin, cello, and piano in the D and E sections. Additionally, the pitch collection provides the majority of harmonic and melodic content in the work. Although the pitch collection and rhythm are heard across sections, *Candle Ice* captures changes in a natural environment over time. Braden's work ends with the evocation of a lake free of candle ice. However, it is not an open space representing permanent ice loss. A link is created between the origins of the formation and its

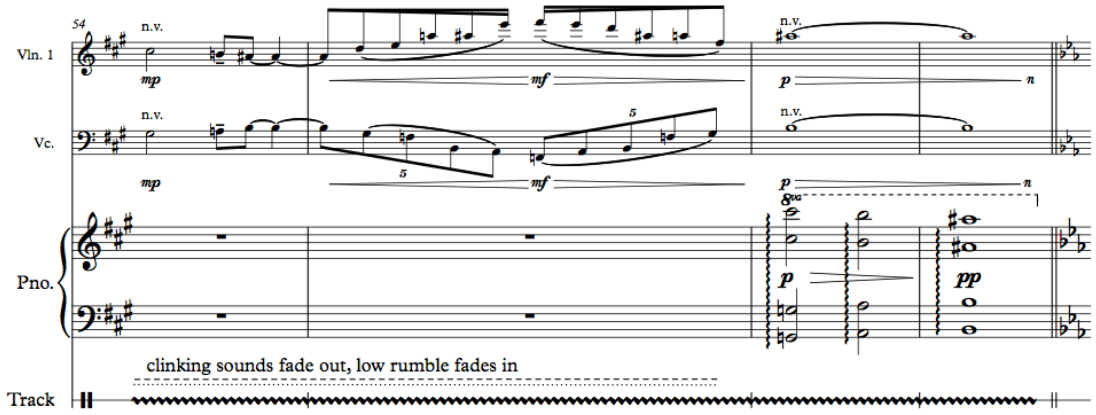
free-floating form through Braden's layering of recorded water sounds with the melodic motive and harmonic trills from the A section. In this way, the sound of water is heard as a celebration of seasonal change. It marks the culmination of a process that takes place annually.

Feathered Beaming and Candle Ice Rhythms

In addition to her use of a rhythmic motive transcribed from the opening hydrophone recording, Braden employs feathered beaming to imitate the unpredictable rhythms produced by candle ice. Feathered beaming creates a pictorial image of the natural phenomenon by making a rhythmic line gradually accelerate or decelerate. The notation appears in the score as the convergence or divergence of secondary beams. Feathered beaming is first used as an accelerando in m. 4 in the piano (see Example 5.15). The first use of feathered beaming as a ritardando is at m. 55 in the violin (see Example 5.16). In several passages, Braden provides a single note in parenthesis above the rhythmic line to indicate duration. However, in most places feathered beaming is approximate to the placement of bar lines and note onsets in other instruments.

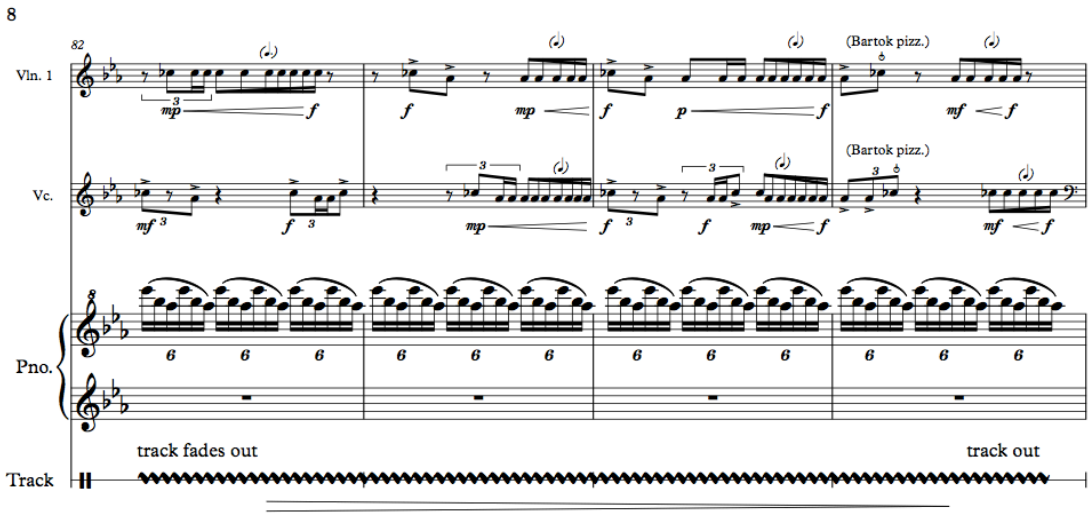


Example 5.15 Feathered Beaming with Acceleration, Braden, *Candle Ice*, mm. 3–7. © 2014 Black Ice Sound, Yellowknife, NT. Used by permission.



Example 5.16 Feathered Beaming with Acceleration Followed by Deceleration, Braden, *Candle Ice*, mm. 54–57. © 2014 Black Ice Sound, Yellowknife, NT. Used by permission.

In certain passages, feathered beaming is applied to one instrument at the same time as another plays a metered rhythm. For example, at m. 55 the violin ascends and then descends with feathered beaming while the cello descends and then ascends with quintuplet-grouped eighth notes. In other places, Braden applies the notation to two or more instruments. Such is the case at mm. 83–85. Here, the violin and cello, marked with feathered beaming, are set against the piano, which plays sixteenth notes grouped as sextuplets (see Example 5.17). Musical lines change at different speeds when feathered beaming is applied to two or more instruments. In these passages, individual lines do not synchronize until the arrival of the final note of a rhythmic grouping. Braden does not apply feathered beaming to the violin, cello, and piano simultaneously. This is explained perhaps by her desire to preserve a given meter. In the case of mm. 83–85, the violin, cello, and piano emulate the rhythmic irregularity of candle ice while also maintaining a 3/4 meter.



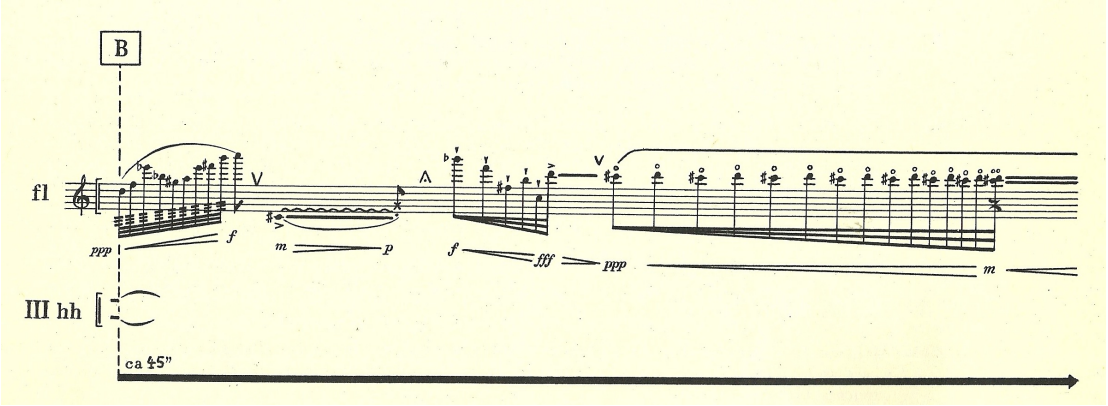
Example 5.17 Application of Feathered Beaming to Cello and Piano, Braden, *Candle Ice*, m. 26. © 2014 Black Ice Sound, Yellowknife, NT. Used by permission.

Feathered beaming is part of a broader development in twentieth-century music to loosen the restraints of standard notation.[347] Other composers that use feathered beaming in their works include Kazimierz Serocki, Jan van Vlijmen, Karel Husa, George Crumb, and Betsy Jolas.[348] In Serocki's *Segmenti* (1962), for winds, strings, and percussion, the notation is applied to passages for solo instruments as well as those for two or more instruments (see Examples 5.18 and 5.19). Similar to the effects created in *Candle Ice*, emphasis is placed on the gradual acceleration or deceleration of a single line when feathered beaming is applied to a passage for a solo instrument. In contrast, attention is drawn to the rhythmic and timbral interplay of two or more lines when one instrument is notated with feathered beaming and another is notated differently. Braden also uses feathered beaming in both solo and multi-instrumental passages in *Candle Ice*.

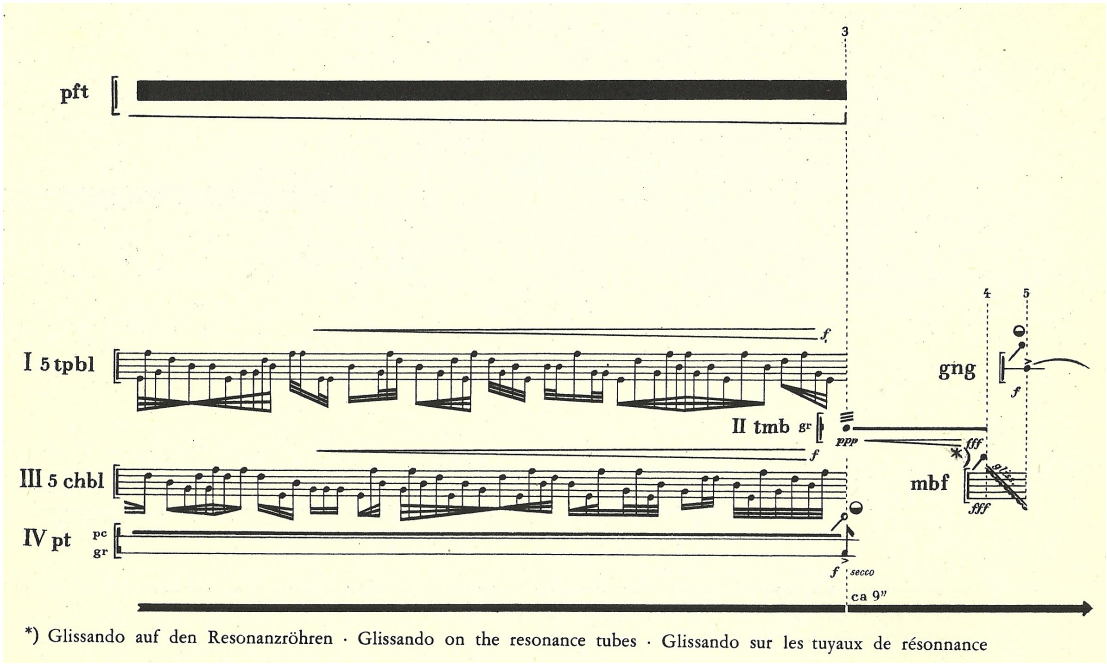
[347] Other ways to give rhythmic flexibility to a line that is metered include the use of half dots, note groupings with the duration shown in seconds, irregular tremolos, and "metric modulation" (a technique coined by Elliot Carter).

[348] See van Vlijmen's *Mythos* (1963), Husa's *Music for Prague 1968* (1969), Crumb's *Ancient Voices for Children* (1970), Stolas' *Stances* (1978).

Like other composers, she moves away from an exact notation to an approximate one. Braden, though, uses the technique to evoke an environmental sound.



Example 5.18 Use of Feathered Beaming in a Solo Musical Line, Serocki, *Segmenti*, Rehearsal B. © 1962 Edition Moeck. All rights reserved. Used by permission.



Example 5.19 Use of Feathered Beaming in Two Musical Lines in Combination with Other Instruments, Serocki, *Segmenti*, Rehearsal E. © 1962 Edition Moeck. All rights reserved. Used by permission.

In *Candle Ice*, the rhythms produced by the musicians occasionally interlock with the clinking of individual ice shards in the electronic track. One example is in mm. 38–45 when the sound of shards striking together is heard alongside repeated notes played *spicatto* in the violin and cello. Such passages bring to mind Dallas Simpson's interaction with Canada geese in *The Adoration of Willow*, "Stoke Bardolph." Both works create moments of exchange between the performer(s) and nature sounds. However, "Stoke Bardolph" takes place in a natural setting, while Braden brings natural sounds into the concert hall. This difference has an effect on the ways in which performers interact with natural sounds. Simpson's encounter with geese in "Stoke Bardolph" is by happenstance and his interaction with the birds through rhythm is impromptu. The alignment of Simpson's patting with the geese calls is shaped by his ability to predict when the geese will produce a sound. In contrast, performers play from a score in *Candle Ice*. Thus, instances of human-ice interaction in Braden's piece are constructed.

In the spirit of soundscape composition, Braden combines hydrophone recordings with instrumental music in order to raise awareness of a real-world source. There are few soundscape works that feature both recorded environmental sounds and live instrumental music; most consist exclusively of recorded sounds.[349] Braden contributes to this less common practice by mapping parameters of candle ice onto a musical score. However, like many soundscape pieces, *Candle Ice* focuses on natural sound. There are no human sounds in the recorded track, and the live instruments and studio processing (two forms of human presence) help to illuminate the sonic properties of candle ice. With attention to nature, Braden ultimately animates candle ice. For her,

[349] Barry Truax and Hildegard Westerkamp are two soundscape composers that have combined recorded sounds with live instruments. For example, Barry Truax's *From the Unseen World* (2012) features bell-like sonorities and live piano. Hildegard Westerkamp's *Fantasie for Horns II* (1979) combines train, factory, boat, and foghorns and live French horn.

it is a living, breathing entity with its own voice.[350] *Candle Ice* is an attempt to better understand—and perhaps even communicate with—that voice.

From Ice to Music: Mapping a Natural Formation

Iceprints and *Candle Ice* turn to a defining natural feature of the North, one that is now under threat. Both Burtner and Braden present hydrophone recordings of ice in their compositions and also use ice processes to shape elements of their works, specifically timbre, pitch, rhythm, dynamics, and form. Although the two composers use ice recordings and non-sounding information in their music, they do so for different reasons. Burtner comments on permanent ice loss in the Arctic through the sonification of 40 years of ice extent measurements. Braden does not connect her piece to climate change. She instead explores the sonic and physical properties of candle ice at Great Slave Lake, Northwest Territories.

Although the two composers focus on different types of ice, they share three interests: the rescaling of time, rhythmic interplay among musicians, and the allusion to past Western classical music styles. Both *Iceprints* and *Candle Ice* deal with ice melt over a set time period. Burtner rescales 40 years of ice extent measurements to approximately twenty-five minutes, and Braden the multi-day/week lifecycle of candle ice to ten-and-a-half minutes. In *Iceprints*, listeners can hear the V-shaped phrases of the annual ice-extent pattern, but this is also part of the larger 40-year descent. In *Candle Ice*, each section represents one of six stages of ice melt.

Additionally, Burtner and Braden create rhythmic complexity by having instruments play at different speeds. The rhythmic interplay of multiple instruments in *Iceprints* is a by-product of telematics. Glitches, delay, and signal fluctuation are frequent to telecommunication across large

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[350] Braden, "Cryophonics," 14.

distances. The pianists may attempt to perform together, given that they play from the same score and wear headphones to listen to each other, but it is unlikely that their music will be in unison. For Burtner, the lack of correspondence among musicians signifies the disconnection of listeners from the Arctic. In contrast, Braden creates complex rhythms through the use of feathered beaming, irregular note groupings, and fragmentation. For her, the performance of two or three unsynchronized lines simultaneously is a way to capture the rhythmic intricacy of ice shards clinking together.

Both composers also draw on past musical styles; however, neither Burtner nor Braden explicitly associate their work with earlier periods. *Iceprints* presents a piano line that is similar to the technique of the *lamento* bass. Burtner's composition does not follow the ground bass exactly (i.e., it does not repeat the same line and does not end with a standard cadential formula). However, the first half of the V-shaped line emulates the descent of the repeating bass line, and it does so with ceaseless repetition—38 times over the course of the composition. Repetition is characteristic of the lament tradition; it is one way to express grief or sorrow. *Iceprints* uses repetition to that effect. The starting pitch for each subsequent section is slightly lower (with a few exceptions). This downward trend reveals a larger descent across the piece. With that descent, feelings of loss associated with disappearing ice sheets are intensified.

Candle Ice connects to the tradition of program music through the use of supplemental materials. Composers such as Hector Berlioz, Franz Liszt, Felix Mendelssohn, and Richard Strauss used a descriptive text—either in the score, in a separate document, or in both—to attribute a story to an instrumental work. In the context of programmatic works about polar regions, Ralph Vaughan Williams provides quotes from a wide range of literary sources at the

start of each movement to his Seventh Symphony, "Sinfonia Antarctica" (1952).[351] Braden presents written commentary at the start of each section in the score in order to contextualize the different stages of candle ice for performers. She also distributes program notes, and when possible speaks directly to her audiences. The program notes offer a general description of the natural formation and explain the source of compositional materials, but they do not outline each stage of candle ice.

The reference to past styles helps Burtner and Braden to comment on real-world topics in their works. In *Iceprints*, the lament expresses the emotional weight of climate change. Mournfulness builds with each iteration of a V-shaped bass line that is slightly lower than the previous one; that is, until the descending-ascending line gives way to the harmonic series in the music representing the second half of 2007. In addition, expressive devices such as tremolo and sudden changes in dynamics capture the brooding quality of the lament. In *Candle Ice*, Braden comments on the different stages of candle ice through descriptive texts. Without these supplemental materials, it would be difficult for performers to comprehend the natural formation. Along similar lines, the program notes given to audience members encourage them to connect both the recorded nature sounds and live instrumental music to the final melting stage at Great Slave Lake.

Iceprints falls near the end point of the continuum, whereas *Candle Ice* is closer to the midpoint. The spatial and temporal dimensions of the two works explain their spacing on the continuum. Burtner engages an entire region through satellite data, a three-kilometer radius using hydrophones, and three distant performance locations through telematics. He also layers annual

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[351] For a rich discussion of the program narrative in Vaughn Williams' composition, see Daniel M. Grimley, "Music, Ice, and the 'Geometry of Fear': The Landscapes of Vaughan Williams' 'Sinfonia Antarctica,'" *The Musical Quarterly* 91, nos. 1–2 (Spring–Summer, 2008): 136.

time and moment time on the score. The combination of multiple spatial and temporal trajectories makes it difficult to perceive natural sounds and processes. However, *Iceprints* is not at the endpoint for the reasons that it presents recorded nature sounds and maintains an environmental context. The sounds of ice deformation and marine animals draw listeners to an underwater environment. In contrast, *Candle Ice* focuses on a specific place (Great Slave Lake) during a shorter span of time (several days/weeks, compared to 40 years). *Candle Ice* does not get closer to the endpoint of the continuum for the reason that Braden uses a program narrative to connect listeners to a real-world location. She maps a story onto her music, guiding performers along the way through descriptive text. In addition, Braden focuses on a specific sound source, whereas Burtner captures a variety of sub ice and marine animal sounds in his work. Ice sounds are arguably more easily recognizable in *Candle Ice* than in *Iceprints*. This is explained by the fact that Braden applies studio processing to some but not all passages of her composition. As such, candle ice is heard in its unmediated form. In contrast, Burtner applies a digital filter to the electronic track for the duration of his piece.

As two works that fall between the midpoint of the continuum and the far end, *Iceprints* and *Candle Ice* exhibit a tension between recorded sounds and non-sounding information. One point of tension is created by the combination of audio recordings that capture real-time events and non-sounding information associated with longer environmental processes.[352] As a result, listeners are pulled in two different directions in both works: the moment time captured on the recordings and the larger temporal dimensions of change in ice extent and candle ice. Although works such as Janet Cardiff's *Wanås Walk* and Hildegard Westerkamp's *Talking Rain* explore multiple time domains, those pieces present real-time encounters. Cardiff traverses past, present,

[352] Neither Burtner nor Braden modify the speed of recorded sounds in their works. The rate of an audio signal can be modified through the studio processing technique known as time stretching.

and future realities, and Westerkamp engages a series of heightened sonic environments where sound events occur in real time. In contrast, *Iceprints* and *Candle Ice* present moment time and longer (i.e., week/multi-year) processes simultaneously. The discrepancies in time among compositional resources play a role in the abstraction of nature in the two works. The discordance between recorded sounds and non-sounding information creates a space of interaction in the two pieces.

To experience *Iceprints* and *Candle Ice* in the second decade of the twenty-first century is to hear arctic and subarctic ice sounds at a time when northern regions are no longer thought of as pristine and timeless. Individuals are more aware of the North through different media outlets, yet most remain physically and psychologically removed from the environmental changes taking place there. The current rate of transformation in the North raises several important and troubling questions. How much time remains before there is no permanent ice in the Arctic? What are the projected impacts of an ice-free Arctic on the biosphere? What are the implications of a faster seasonal thaw of subarctic lakes? What if the freeze and melt cycles of those lakes are offset? Who (if anyone) is responsible for the transformation of northern environments? Works such as *Iceprints* and *Candle Ice* invite reflection on these and other questions concerning climate change. Burtner and Braden urge listeners to not only reflect on the physical and sonic properties of arctic sea ice and candle ice, but also to think about their own connection—or disconnection—to the Far North.

Chapter 6 Conclusion

The artists of the works examined in the thesis engage the natural world in a variety of ways. Approaches include enacting a walk in a forest reserve, positioning musicians around a rural lake, composing in a studio with a library of recorded environmental sounds, and combining sub-ice recordings with live instrumental music shaped by scientific data. Although their approaches vary, all of the artists considered here construct a relationship between the perceiver and the perceived. That is to say that each artist positions his or her listeners and/or performers in relation to nature. One challenge of experiencing nature in subject-object terms is the propensity to construct an opposition between humans and the natural world. In order to avoid dualistic thinking as it pertains to the environment, what is needed is a way to suspend our tendency to label and classify what we experience.

The idea of process offers a non-dualistic approach that problematizes the opposition between humans and nature in two ways. First, a process unfolds over time and therefore cannot be reduced to an object that accumulates value based on its properties. Second, the characteristics and parameters of a process are outlined, but not predefined. This approach enables prediction and basic understanding, but it also creates variability, uncertainty, and complexity. Viewed as a process, nature remains in a state of becoming; it is changing, evolving, and adapting. To think of nature as a process is one way to avoid reducing nature to a set of known and defined objects. Hence, nature as a process cannot be fully known. It also invites us to consider how we might wish to engage the natural world differently. In other words, encountering nature as a process encourages interpreting the natural world in new ways.

Environmental historian John Farnsworth's understanding of nature as a process is useful when considering the role of art in helping us to rethink the natural world in conceptual terms.[353] Farnsworth claims that through aesthetics we can begin to identify with nature as a process. He proposes:

> A possible solution to dualistic ways of constructing nature is to move toward redefining nature as being primarily an aesthetic construct [. . . .] I can think of nothing more important, as we go about the process of resituating nature, than to avoid its reification. Nature is not a thing.[354]

Farnsworth critiques an object-based ontology of nature that reduces the natural world to either an idealized thing (e.g., a wilderness reserve) or a commodity (e.g., oil). He argues that a process-based ontology of nature helps cultivate appreciation for the natural world and also encourages us to recognize that nature is always in flux.[355] Based on a process-based ontology, then, the value of nature lies in both its ongoing transformation and our ability—and willingness—to adapt to the changing environmental conditions of Earth.

Philosopher Warwick Mules gives perspective to Farnsworth's position in *With Nature: Nature Philosophy as Poetics through Schelling, Heidegger, Benjamin and Nancy*.[356] Mules' concern is similar to that of Farnsworth—and also Timothy Morton—in that he refutes conceptions of nature as an object in relation to a human subject.[357] Mules arrives at a process-

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[353] See the Introduction for an overview of Farnsworth's position on the concept of nature.

[354] John S. Farnsworth, "Resituating Nature: New Horizons for a Pesky Noun," *Minding Nature* 9, no. 1 (January 2016): 45.

[355] Farnsworth, "Resituating Nature," 46.

[356] Warwick Mules, *With Nature: Nature Philosophy as Poetics through Schelling, Heidegger, Benjamin and Nancy* (Bristol, UK: Intellect, 2014).

[357] Mules critiques Morton on the grounds that Morton views nature as a social construct. In Mules' words: "This negative approach to nature [. . .] reaffirms the anthropocentric view of nature—that nature is nothing but a projection of human meaning and value—and remains powerless to change the human relation to nature as such." He continues: "Instead, my aim is to seek an *ecological* account of the human-nature relation that places the relation itself *en abyme*, at the very edge of critique. Here, nature can be encountered in an already negated state as the beginning of another possibility." Mules, *With Nature*, 5. See Chapter One for an overview of Morton's critique of the concept of nature.

based ontology of nature by questioning the hierarchical relationships that have been constructed between humans and the natural world. According to Mules, humans cannot experience nature directly, but rather only through representation. Consequently, representation focuses attention on human responses to the natural world and not on nature itself.[358] In that light, Mules claims that we should establish a new relationship to nature that promotes greater awareness of poiesis in the natural world. He defines the term: "*Poiesis* refers to emergent transitivity: the activity of shifting and shaping evident in the way the things of nature come forth and show themselves."[359] Poiesis, as Mules views it, enables us to understand nature in ways beyond what we know it to be as an object. In other words, nature resists being reduced to that which is known when it is encountered through its own becoming.[360] Through poiesis, nature not only unfolds independent of human thought and action, but we as humans are called to embrace the uncertainty of that process in our encounters with the physical world.[361]

Music is conducive to presenting nature as a process. It is a time-based art and requires the mediation of source materials through the use of musical instruments, voice, recording and playback devices, and digital workstations. The idea of process is captured in different ways in works across the "music-nature" continuum. Some artists capture the process of physical movement through a natural setting. Others explore environmental processes. In the three art-based walks near the "nature as perceived" endpoint, the participant-listener traverses a path, either in an actual environment or by imagining movement through a space while listening to a recording. R. Murray Schafer's outdoor theatre work *The Princess of the Stars* is also close to

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[358] Ibid., 4.

[359] Ibid., 6, italics in original. See Chapter Two for discussion of poiesis in the context of art-based walks.

[360] Ibid., 17.

[361] Ibid., 21–22.

"nature as perceived." In a performance of that composition, audience members experience music set to the transition from night to day and the corresponding changes in temperature, air pressure, and environmental sounds. Located midway on the continuum, Hildegard Westerkamp's *Talking Rain* and Paul Rudy's *In Lake'ch* depict physical movement through a series of imaginary environments. *Talking Rain* begins in a rural setting, transitions to an urban space, and returns to the initial environment (this time with footsteps instead of motor vehicles). *In Lake'ch* opens with an evocation of the splitting of the ancient supercontinent Pangaea, moves to an industrialized wasteland, and concludes in a spiritual place beyond Earth.

Environmental processes are captured in the two works closer to the "nature abstracted" end of the continuum. Matthew Burtner's *Iceprints* and Carmen Braden's *Candle Ice* explore dynamic ice events that unfold over weeks, months, or even decades. The two composers compress the time scales of these events. Burtner presents 40 years of change in ice extent in approximately twenty-three minutes; Braden captures the multi-day/week lifecycle of candle ice in ten-and-a-half minutes. The shorter time scale in both works reveals these longer environmental processes and makes them perceptible. The long durations of the original events are illuminated, as are moments within those events, such as sudden changes in ice extent measurements and in the type of sound produced by candle ice.

Although each work examined in the thesis captures a process over time, nature in many ways still maintains its object status. For example, in Schafer's *Princess* transcribed birdsongs are employed as stylized motives. The original birdsongs are classified both musically (the motives are organized into groups of six frames on a graphic score) and scientifically (species names are listed in the glossary to the score). Both Westerkamp and Rudy explore the acoustic properties of recorded sounds, and in doing so treat them as objects, as is the case in acousmatic

works. However, sounds are not cut off from their original contexts in *Talking Rain* and *In Lake'ch*. The composers instead utilize the sonic characteristics of real-world sounds to comment on the social and environmental conditions of the source materials. The recorded sounds employed in the two works are not just acoustic objects but rather are used to sensitize audiences to the physical world.

Schafer and Westerkamp are two composers who develop dualities in their compositions, and do so deliberately. In Schafer's *Princess*, the sounds produced by the musicians are pleasing, especially when imitating stylized birdsongs, whereas those of the Three-Horned Enemy are regarded as disruptive (as reflected in the harsh sounds projected through the megaphone). In Westerkamp's *Lighthouse Park Soundwalk*, a distinction is made between pristine wilderness (the old growth forest) and the negative impact of human activity on the natural world (in the form of noise pollution attributed to seaplane traffic from Vancouver Harbour). Both Schafer and Westerkamp draw a line between what they deem natural and unnatural by setting the sounds of nature and those of modernized human activity in opposition.

There is merit to Schafer's and Westerkamp's preference for what they understand to be nature in its "original" form, especially in the context of environmental thought in the 1970s. The idea of an "original" nature is a moral imperative (to borrow from environmental historian William Cronon) driven by the desire to create a world where humans are in greater harmony with their surroundings.[362] However, amid contemporary environmental crises there is a need to identify new tools that can help us understand better our role in shaping Earth, instead of merely serving as inspiration to return to an idealized nature. To begin to make changes in how we live on the planet, we need to find new ways to interact and identify with the physical world.

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[362] See Introduction on Cronon's idea of "nature as moral imperative."

One promising line of artistic inquiry is to give greater attention to the anxiety between human perception and the physical environment. To study nature in music is to consider how humans relate to and interpret the natural world. There is no way to escape human mediation, as the works considered in the thesis demonstrate. Nature is experienced through human activity. Yet, as Mules observes, we cannot fully know nature—we can only know nature through representation. There is unease in the idea that we remain apart from nature, yet nature is not independent of us. Philosopher Kate Soper finds potential in that unease:

> Rather than becoming more awe-struck by nature, we need perhaps to become more stricken by the ways in which our dependency upon its resources involves us irremediably in certain forms of detachment from it. To get 'closer' to nature is, in a sense, to experience more anxiety about all those ways in which we cannot finally identify with it nor it with us. But in that very process, of course, we would also be transforming our sense of human identity itself.[363]

This process is conveyed to in Burtner's *Iceprints*, a work that falls close to the "nature abstracted" endpoint. Burtner comments on the difficulty of comprehending environmental catastrophe through the integration of multiple temporal and spatial trajectories into his composition. *Iceprints* features sub-ice recordings, scientific data, three live pianos, and telematics (i.e., where information, in this case live audio of the three pianists, is streamed in real-time to each location). There are failures strewn throughout the piece in the form of glitches in the transmission of audio between the locations. The process of long-term ice melt is interwoven with other processes, including the moment-time of three hydrophone recordings and the telematic diffusion of three live performance. Together, these layers reveal both the complex processes of ice formation and deformation in the Arctic and our connection and disconnection to those processes as humans.

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[363] Kate Soper, *What is Nature?*, 278.

There is discomfort in being in multiple places at once during a performance of *Iceprints*. Audiences are in an actual concert hall and are also connected to two distant performance spaces and an undisclosed location in the Arctic (via audio recordings). But it is through that discomfort that audience members are given insight into the complex processes taking place in a region that many will never visit. Perhaps more importantly, audience members are invited to reflect on whether their perceptions of ice melt patterns is different from the melting trend that data sets reveal is taking place in the Arctic. In line with Mules' observation of poiesis in nature, Burtner's work demonstrates one way in which nature can "begin" through music. Nature is experienced not exclusively as an object that is in relation to us or as a separate entity in *Iceprints*, but it is instead a combination of both. Poiesis informs this particular experience of nature by giving non-human forces control in Burtner's work, as with the ice extent data that controls piano register and the signal strength of the audio feed that shapes the transmission of the three simultaneous performances to the other locations.

The idea of process plays a central role in thinking about nature as a concept, for it helps us to avoid the kind of thinking that leads to exploiting nature (as a commodity) or alienating ourselves from it (through our distinction from it as a species). In order to engage nature as a process, we must assume a position of uncertainty and discovery. That position will continue to change and shift as the physical world around us changes. Nature is still largely unknown, or even falsely known. There can be comfort in that uncertainty, for it opens up new ways of being in the world. Contemporary sonic artists are exploring some of these new ways of being through their works. Through utilizing the sounds, spaces, and non-sounding signals of nature, the sonic arts demonstrate a growing interest in creating new sound worlds and using those sound worlds to further our understanding of and relationship to nature.

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