SOUND IN CONTEXT: SOUNDSCAPE RESEARCH AND COMPOSITION AT SIMON FRASER UNIVERSITY

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ABSTRACT: Research activities at Simon Fraser University over the past 25 years that bridge environmental sonics and music are summarized, including soundscape studies, acoustic communication, soundscape composition, and the granulation of sampled sound.

Introduction.

The current technological situation in music has brought sampled sound increasingly into the compositional domain where it is both familiar and problematic. Western music theory, having followed composition in its path toward increasing abstraction and the primacy of pitch relationships, finds itself powerless to deal with the largely unpitched material of environmental sound. Timbre models have been proposed (Erickson, 1975; Wishart, 1982), but are generally relegated to the periphery of music theory. The lack of notation and the necessity to rely on aural judgement seem to present the most serious problems.

What is it about environmental sound that makes it difficult to introduce into the artistic domain? Why is it unsatisfying to substitute such sounds for either instrumented or conventionally synthesized material in a compositional process? At the most basic acoustic level, environmental sounds are much more complex in their spectral and temporal shape than most other musical material; synthesized sound in particular has been plagued by an artificial timbral quality that has most of the corporeality of environmental sound. The tools to shape and explore such sounds remain primitive and largely dominated by signal processing models. Moreover, environmental sound is not easily parameterized, and hence does not fit into any of the permutation/ordering schemes normally thought of as compositional techniques.

Perhaps the biggest obstacle that environmental sound erects to its musical usage is the fact that its meaning is inescapably contextual. Environmental sound acquires its meaning both in terms of its own properties and in terms of its relation to context. Therefore it cannot be arbitrary as is the semantic sign, because its own aural properties become inextricably associated with its meaning. Electroacoustic techniques specialize in taking sounds out of their original context and reproducing them arbitrarily in another - a "nervous" condition described as "schizophrenia" by Murray Schafer (1969) - and therefore it is not surprising that these sounds have been used as source material for many electroacoustic compositions for nearly a half century. The attractive acoustic richness of such sounds (in comparison to their primitively modelled electronic counterparts) has been claimed to be the motivating force for the French acoustic school since its inception, but when such sounds are used less as abstract sound objects and more for their contextual associations, the tendency, particularly among composers, has been to cry "acocital" or "programmatic." As a tempting parallel to Reiser's classic critique of the early concrete work - that the means to transform such sounds were inferior to their richness - we could speculate that most compositional work with environmental sounds has been inferior to the richness of their semantic context.

Finally, and perhaps the most subtly, environmental sound results in a different pattern of listening than one might expect within a musical situation (Shulman, 1992). Despite the ubiquitousness of music, environmental sound surrounds us constantly and the conventional modes of interpreting it are far more habitual and operate at a lower level of awareness than a focused attention for speech or music. Background music and public address systems maintain their ambiguous position precisely on this point, that the reproduced, disembodied sound is simultaneous-only speech or music and environmental sound. At the very least, environmental sound compositions challenge what constitutes a musical form of listening, if not the most appropriate venues (concert halls, radio, or public and private spaces) for their performance.

Given the range of problems which environmental sound presents to the composer, it is not surprising that its use until now has been characterized as falling more on a continuum between selected effects and abstracted discourse, with serious composers treading cautiously the more that any hint of the former might purport. Simon Emmerson has added a useful second dimension to this continuum by separating material and syntax, with each dimension ranging from abstract to abstracted, the latter being the most imitative of reality.
whether in terms of material or syntactic organisation. A contrasting approach can be found in the work at Simon Fraser University (SFU) that began with a study of environmental sound and all aspects of its behaviour and communicational roles apart from its potential musical value. In fact, the original aim was largely educational and archival, motivated by a concern for the deteriorating state of the world soundscape. Admittedly the aural sensibilities of the participants, mainly composers, played an important role, and of course, compositions inevitably sprang from this work. However, the basic aim was not to further exploit the environment as a source of musical material, but rather to exploit the knowledge base of musical design in order to re-design the soundscape and to reawaken people's perceptual appreciation of its importance.

The WSP and the Soundscape Composition

The basic concept of the World Soundscape Project and its establishment by R. Murray Schafer occurred at SFU during the late 1960s and early 1970s. It grew out of Schafer's initial attempts to draw attention to the sonic environment through two educational booklets, *The New Soundscape* and *The Book of Noise*, an extended essay *The Music of the Environment* and his book *The Tuning of the World* in which he describes examples of acoustic design, good and bad, drawing largely on examples from literature. The WSP grew from a detailed study of the immediate locale, published as *The Vancouver Soundscape*, and then in 1973, on a cross-Canada recording tour. In 1975, Schafer led a larger group on a European tour that studied the soundscape of five villages. Although the principal work of the WSP was to document and archive soundscapes, to describe and analyze them, and to promote increased public awareness through listening and critical thinking, a parallel stream of compositional activity also emerged that created what I have called the genre of the "soundscape composition" (Truax, 1984). Although in Emmerson's terminology the soundscape composition may be defined in terms of "默契 discourse" and "abstracted ontax", it is also characterized most definitively by the presence of recognizable environmental sounds and contexts, the purpose being to invoke the listener's associations, memories, and imagination related to the soundscape.

The mandate to involve the listener is an essential part of the composition, namely to complete its network of meanings, grew naturally out of the pedagogical intent of the Project to foster soundscape awareness. At first, the simple exercise of 'framing' environmental sound by taking it out of context, where often it is ignored, and directing the listener's attention to it in a publication or public presentation, meant that the compositional technique involved was minimal, involving only selection, transparent editing, and unobtrusive cross-fading. A subtle but important dimension of this practice occurred with the "Entry to the Harbour" sequence from *The Vancouver Soundscape* where, in order to simulate the experience of entering Vancouver harbour, the various waves, gulls, and buoys, it was important to build up the collection over the event in time, but also to mix together all of the separately recorded components, with appropriately engineered illusions of their approaching and receding. By being potentially familiar but strangely imaginary, the composition invoked various levels of listening activity, from identification to symbolic communication.

In 1974, the WSP members assembled a series of 40 one-hour radio programs for the CBC called *Soundscape of Canada*. These included, and for the first time essentially defined, the entire range of soundscape compositions, from naturalistic documentaries that were collectively authored through to abstracted compositions attributed to individual composers. The most unique documentary was the collectively authored "Summers Solstice" in which two minutes representing each of a midsummer day and night, as recorded beside a pond near a rural monastery outside Vancouver, were combined in a 50 minute composition. The piece inverts only minimal narrative in the form of a verbal identification of each hour. Edits are transparent with no mixing, so the effect is a compressed span of time that an individual would seldom if ever experience directly. The "composition" of this documentary, then, was largely realized by natural forces with the audio manipulation intended to evoke an appreciation of that ecology. Several pieces within the set were further by using transformations of the environmental sounds that were chosen. Here the full range of analog audio techniques came into play, with an inevitable increase in the level of abstraction. However, the intent was always to retain a deeper level of signification inherent within the abstract and to evoke the listener's semantic associations without obliterating the sound's recognizability.

All of Heldegard Westerkamp's compositional work utilizes environmental sound (Zapr, 1981), many being designed explicitly for radio, including those that were part of her "Soundwalking" program series on a local community station (Westerkamp, 1994), and more recently, for live performance by her with tape accompaniment, as in *Cool Dawn* (1983), a satire on Muzaik, and *India Sound Journal* (1995), a soundscape diary. One of her most ambitious projects was the Harbour Symphony commissioned by the Canada Pavilion during Expo 86, performed by tugs in Vancouver harbour around Canada Place. This, and all...
of the radiophonic and live performance works, present the possibility of breaking down the concert hall barrier, and hence the division of music and the soundscape, the concertgoer and the general public. Social, cultural and political issues can also be effectively brought into the compositional domain, as in His Master's Voice (1965), Street Music (1982) and Under the Flightpath (1981). However, the level of complexity in the soundscape compositions remains the highest with the solo tape works. These include the text-soundscape piece, A Walk Through the City (1981), and the recent works, Cricket Voice (1987) and Beneath the Forest Floor (1992), that greatly extend what might be called the hyperrealism of the composed soundscape in which voices, both natural and human, carry on an interplay. In all of these works, Wenderdge explores the wide ranging possibilities of the soundscape composition, inspired by the legacy of the WSP.

Composing through Environmental Sound

The predominant digital techniques for treating environmental sound compositionally today are samplers and signal processing. I regard both as encouraging composition 'with' sound rather than 'through' or 'within' sound. This distinction, which I owe to Walter Burch, captures the essence of the difference between conventional approaches, including the acousmatic tradition, and the soundscape composition. When one captures 'raw' sound on tape and subjects it to studio processing, whether for mundane sound effects or the abstract material of the acousmatic approach, the manufacturing process with its industrial overtones suggests that one is composing 'with' the sound and using it for its desired effect and affect, essentially turning it into a consumable product. The soundscape composition typically reverses the process because in a sense, the sound 'uses' the composer, and ultimately the listener, in that it evokes in such a wealth of difficult to verbalize images and associations, all of which guide the composition and its reception.

The technique I have found the most satisfying to facilitate moving inside a sound is real-time granulation of sampled sound (Truxx 1994b). A dramatic alteration called 'time stretching' is made possible with this technique in that it allows a sound to be prolonged by any factor with no resultant change in pitch. Since 1987 I have used this technique extensively to process sampled sound as compositional material (Truxx 1990, 1992b), at first being limited only to short 'phoeniciform' fragments, as in The Wings of Nikes (1987) and Tongues of Angels (1988). However, since 1990, longer sequences of environmental sound have been used in pieces such as Pacific (1990), Dominion (1991), Basilica (1992), Song of Songs (1992), and Sequences of Later Heavens (1993). In each of these works, the granulated material is time-stretched by various amounts and thereby produces a number of perceptual changes that seem to originate from within the sound.

Most obviously, the duration of the sound is usually much longer by anywhere from a doubling to a factor of several hundred times. This effect is used not merely to create drones, but to allow the inner timbral character of the sound to emerge and be observed, as if under a microscope. For instance, the crashing of waves in the "Ocean" movement of Pacific sound is remarkably like a choir of voices. The complex bell resonances in Basilica resemble organ clusters slowly dying away in a reverberant cathedral. However, the added duration also allows the sound to reverberate in the listener's memory, providing time for long-term memories and associations to surface. This effect was deliberately encouraged in Dominion, named like its predecessor, "Soundmarks of Canada," on an east to west sequence of unique Canadian sound signals, by keeping the attack portion relatively exact and stretching only the body of the sound, each signal retained its recognizability, but allowed listening associations to be savoured, along with the inherent musicality of its constituent harmonics.

Secondly, the volume or perceived magnitude of the sound is enhanced by time stretching. Both the superposition of 10-12 synchronous grain streams using the same material, and the prolonged duration, contribute to this effect. The resultant sound seems larger than life, and hence more potent when symbolic. In The Wings of Nikes the enhancement corresponds to the heroic figure of the Winged Victory of Samothrace in the basis of the accompanying graphic images. In terms of soundscape considerations, the magnification seems to relate less to the "brute force" amplification of the public address system than to the corporeality of acoustic sound. Musicians have become accustomed (though I suspect the public remains dubious) to the artificial, dimensionless timbres of synthesized sound, often disrupted in heavy reverb and chorus effect. A concern for the physical body in contemporary thinking about visual and performative art might correlate well to a re-evaluation of the physicality of acoustic sound. Granulation and physical modelling synthesis are the only types of digital processing I know of that produce that sense of physicality.

Thirdly, time stretching changes both the morphology (Smalley, 1986) and the associated imagery of the resultant sound and when done gradually, the listener may experience a process of transformation or
interpolation (Wishart, 1986). The most extensive use of this feature may be found in my Song of Songs, based on the verbal song of Solomon's text. Time-shifting is used to modify the rhythm of the spoken text subtly and make it more-singable, as well as to prolong the sounds into sustained timbral textures, frequently accompanied by multipitch shifting implemented with a harmonizing technique. Although these sustained sounds are vocal in character, their length and steadiness mean that they resemble environmental sounds. Moreover, the amount of stretching was modified during the recording of the birds, cicadas, crickets, monasteries bells, in response to the vocal ones already present, thereby creating an interaction of all the material and blurring the distinction between voice and environment. This sense of merging of sonic elements is consistent with the extended metaphor of the original text which compares the Beloved to the richness of the landscape. At a time when the Western imperative to dominate Nature has reached a critical juncture, this metaphor of love offers an alternative image of the individual’s role within the environment.

Conclusion

The soundscape composition, with the interdisciplinary conceptual background of soundscape studies and acoustic communication, and the technical means of granulation and time-stretching, as developed at SFU over the past 25 years, provides a well developed model for the musical use of environmental sound. The principles of the soundscape composition are: (a) listener recognizability 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 these aspects of reality; and ideally, (d) the work enhances our understanding of the world, and its influence carries over into everyday perceptual habits. The ideal balance that should be achieved in such work is matching the inner complexity of the sonic organization to the outer complexity of relationships in the real world, without one being subordinate to the other (Truax, 1994a). Thus, the real goal of the soundscape composition is the reintegration of the listener with the environment in a balanced ecological relationship.