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Soundscape Studies: An Introduction to the World Soundscape Project

by Barry Truax

Barry Truax holds a Bachelor of Science degree (1969) from Queen's University, Kingston, and a Master of Music degree (1971) from the University of British Columbia in composition and theory. During 1971-73 he studied at the Institute of Sonology in Utrecht, Netherlands under a Canada Council arts bursary for composition. There he worked with Gottfried Michael Koenig and Otto E. Laske, created the POD computer programs for synthesis and composition, and collaborated with Laske on the OBSERVER programs for musical intelligence research. At present, he teaches in the Department of Communication Studies at Simon Fraser University, and works with R. Murray Schafer and the World Soundscape Project. His compositions for live performers and electronic and computer tapes have been performed in Canada and Europe.

I. The Soundscape Concept:

The soundscape, which we define as the relationship of man and sonic environments of every kind, seems never to have benefitted from the critical insight and methodology of all the various disciplines which deal with isolated aspects of it, such as acoustics, psychology, sociology, music, architecture and urban planning. Yet this ever-evolving and subtle relationship reflects all aspects of man's social, cultural and philosophic development, in the sense that any change in man or his environment is reflected in the soundscape. They are inextricably related, just as sound itself is influenced by every nuance of the character of its source, its medium of propagation and the nature of any receiver.

Our lack of awareness of the world soundscape and its historical development is typified at the individual level in our own time by the experience of the average citizen who blocks out most of the sound he encounters, assuming noise to be an inevitable by-product of technological progress, and denying any responsibility for his own contribution to the soundscape composition. The natural hearing faculty allows this kind of protective blockade only temporarily and thus the ultimate result of this attitude of the individual is deafness on his part, and sonic chaos in the environment. The greater the need for awareness, the less able we seem disposed to exercise it.

The discovery of man's potential role in composing the various soundscapes he experiences is a means of re-establishing a balance now quickly disappearing through thoughtlessness and ignorance, but it involves the creation of a new art which we call acoustic design, and whose task is the (re)composition of the world soundscape.

The contemporary situation is such that the work of the performer to refine a sensitive ear for music, that of the engineer or orchestra conductor to raise the quality of production or reproduction of acoustic information to a level of unparalleled excellence, or that of the composer to create new and powerfully exciting soundscapes for the imagination, will all be entirely futile if there is no one in the future who can hear any of it. The performer who practises a skilled sonic craft in the concert hall, or the teacher who encourages the development of students' musical sensibility in the classroom, and then shuts his ears as soon as he walks out into the street, hearing no reason to use his skill to evaluate the workmanship of that domain, reinforces the splendid isolation of music as art, separate from and above the rest of life and society.

The same attitude regards music as a series of historical artifacts to be taken apart through analysis, thereby disguising the lack of knowledge of music as a mental process. If this process is poorly understood in music, it is not surprising then that the concept of soundscape, which expresses the totality of man's cognitive awareness of his acoustic environments, has been equally neglected. The procedures by which the intelligible sound structures of music are created do not differ from those which balance and maintain an intelligible acoustic environment.

In this century, composers have opened the doors of the concert hall to expand the sonic repertoire to include sounds found in the environment, or synthesized in the electronic and computer studios; now, they and others should be concerned about the prevention of sound as well as its production. However, if we are also to act positively to create stimulating soundscapes in which one can live, designed as carefully as those by a composer, then we must devote ourselves to research into the processes which attempt to create coherence in

our mental representations of the world we perceive. That is, one cannot redesign a soundscape without knowing how it is understood by the people who create it.

The music theorist uses pre-conceived tools of analysis to dissect a supposedly musical artifact in which he expects to find the component called music, instead of trying to understand the mental and psychological processes involved in its creation, production or understanding. Insight into the structure of these related activities is missed by concentrating on the work as artifact, without relation to its nature as the created soundscape of the mind. The acoustical engineer perpetrates the same mistake at the environmental level by regarding the acoustic environment as a fixed artifact, a given physical configuration, to be dissected along the equally pre-conceived lines of acoustic parameters, instead of treating it as a soundscape intelligible only in terms of the mental processes by which those people creating it have understood and designed it. A soundscape cannot be divorced from those responsible for it, since it is not merely a physical reality but a mental one as well. When people in disciplines relevant to the acoustic environment make this kind of fundamental mistake, then it is not surprising that the average citizen feels this environment is out of his control, or that his own actions are not a part of it.

Environmental research that remains at a level of treating the object of study as a physical specimen to be dissected will contribute little to our insight into the way in which the soundscape is created (i.e., understood) by the individual and society. If the equivalent musical insight had been already developed, our task would be made easy since that knowledge would provide the basis for understanding the nature of the soundscape by the tools and concepts it would have developed. But a state of near ignorance prevails in both regions of the domain of sound comprehension, and the only advantage of being caught in that predicament is that we will probably find a continual cross-fertilization between music and soundscape theory as knowledge in each develops.

II. Soundscape Analysis:

As implied by our understanding of the concept of the soundscape, any analysis of it will be based not only on physical parameters, but rather on what may be called perceptual and cognitive primitives and procedures or concepts derived from them. Examples of such primitives would be foreground, background, contour, silence, density, acoustic space, rhythm (or acoustic time perception) and volume (in its sense of the psychological totality of a sound's perceivable content, which varies with intensity, reverberation, and timbre, among others). This is not to imply that these terms form a complete set, or are entirely irreducible, but rather that such concepts already form both a perceptual and cognitive base from which other analytical terms may be derived.

It is often observed that even in the linguistic behaviour of people discussing their understanding of a given soundscape experience, these basic terms and not physical parameters outline the framework within which their ideas are cast. Disintegrating a total sound impression into its component physical parameters appears to be a skill that must be learned; and while it is probably one that is necessary for acoustic design, a soundscape cannot be understood merely by a catalog of such parameters (even if that were possible) but only through the representations formed mentally that function as a basis for memory, comparison, grouping, variation and intelligibility.

Some of the basic concepts formed in relation to these primitives we have given the terms keynote, signal, soundmark and sonic symbol. These representative terms illustrate already complex but distinct mental strategies for understanding that seem to be common between individuals and widely separated cultures as well. It should be noted that any example of these forms needs to be studied in its development within a given culture and as well in the variations it undergoes between cultures.

A keynote sound, for instance, is a fundamental and prevailing one in any soundscape to which all others are related, just as a figure is seen in relation to a ground. Keynote sounds are normally in the background perception, and because of that are seldom made explicit or drawn into attention. As a result, reconstructing such sounds from previous societies is difficult and highly conjectural, since by their very nature they were not

Barry Truax at the Institute for Sonology, Utrecht, 1973.

Photo Credit: Theo Coolsma

singled out, even when they conditioned the way in which all foreground sounds were perceived. The materials and energy forms basic to a culture usually determine its keynote sounds. Signals, on the other hand, are decidedly foreground sounds, often encoding certain information or simple messages. Some may be thought of as drawing people together or regulating and unifying life, that is, as centripetal forces; others may disrupt or seek to dispel, and as such are centrifugal in character.

Soundmarks, by analogy to landmarks, are highly unique sounds specific to a certain locale and often affectionately regarded by the public. Many are of historical importance and worthy of preservation as establishing a continuity between generations. Sonic symbols comprise a more general category, of which the former three may be examples, but have the further implication of cross-cultural significance. They may be thought of as an acoustic equivalent of Jung's visual symbols, but unfortunately have not been investigated to the same extent. A society's visual and written artifacts may have survived — its sonic culture could not, until the development of the phonograph and tape recorder.

Sonic symbols are implicit in most sound objects or acoustic rituals, but are seldom made explicit. Their metamorphoses through history have hardly been investigated, though composers habitually make intuitive use of them in many forms. Beginning with natural and human sources, the history of these symbols illustrates the effects of every social and technological development occurring in a society, until the transformations weave a rich web of related variations that condition the design of every new artifact and the understanding of many older ones.

Sound as metaphor throughout the literatures of the world gives another means of insight into the way sounds have been perceived and related, and often reveal the implicit order seen between man and his social and physical environment. If metaphor can be thought of as illustrating a positive association, then an examination of sound phobias and taboos (related to the phenomenon of noise abatement measures) reveals the negative side of such associations. Many aspects of the soundscape in its most general sense come into focus around these prohibitions. Such diverse attitudes as the theological, social and political are exposed, that is, when one comes to realize that the motivation for these taboos is not a fear of the sound as physical vibration, but rather the need to reinforce certain mental attitudes. For instance, the loudest sounds in a community are usually indicative of the prevailing seats of power, and yet it is often the lesser volume of the rowdy human voice that is banned.

Soundscape studies may be carried on anywhere, with any group of people. One begins by listening, by rediscovering the depth and subtlety of the aural faculty, by sensitizing the awareness to sound and silence. You may have to use blindfolds and much patience to coax long-neglected perceptual ability out from behind accustomed barriers. Just as the eye needs time to adjust to low light levels, so the ear and mind both need time and space to unfold and become receptive. One may be still or moving, alone or in a group, spaced at just such a distance that one must listen carefully for the footsteps of one's companions.

Soundwalking and listening involves not simply a passive monitoring, but an active mental and physical participation as well in the ongoing composition forever being created. Awareness begins with one's own sounds and works outwards, and sometimes inwards again. When you can hear your own footsteps, the environment is still scaled on human dimensions, you still make an impression on it, communication is possible, sounds are heard clearly in their own place and time, the environment has a favorable signal to noise ratio, that is, it remains high fidelity in character. Too often in both urban and rural areas we are cut off from our own sounds, alienated from our basic source of reference to the environment, surrounded and attacked by broad band noise which destroys all sense of time and space with an unbreathing, unending cacophony. The environment has a poor signal to noise ratio; that is, it has become low fidelity in character. When the balance is destroyed, the first victims are the delicate and beautiful sounds of man and nature. Unless we can listen critically and act on our awareness, the balance will not be regained.

III. The World Soundscape Project:

The above summary outlines the basic approach taken by the World Soundscape Project, founded in 1969 by the Canadian composer R. Murray Schafer, and currently based in the Department of Communication Studies at Simon Fraser University, British Columbia. Its members (including Schafer, Howard Broomfield, Bruce Davis, Peter Huse, Hildegard Westerkamp and the author) are mostly composers, with many areas of expertise included in their fields of interest. Activities include a great deal of field recording, studio analysis and the preparation of documents and other pedagogical tools for the presentation of soundscape studies. Various kinds of lecture-demonstrations at all educational levels, as well as for the general public and professional groups, are a common part of the group's activities.

Group members teach various sound courses in the Communications Department, following the general soundscape approach, and utilizing the facilities of the Sonic Research Studio located in the department. Teaching ranges from introductory courses in acoustic perception and the soundscape, through advanced and often highly individualized projects dealing with specific problems and involving library and field research, recording, public surveys and media presentations. Support in the past has been received from the Donner Canadian Foundation and UNESCO.

An occasional journal devoted to soundscape research is soon to begin publication by Universal Edition, Vienna, entitled **The Music of the Environment,** the first issue to contain a longer article of the same name by R. Murray Schafer, the ideas of which are being developed at length in a

forthcoming volume, **The Tuning of the World.** Existing documents include Schafer's **Book of Noise,** a primer on noise pollution; **Okeanos,** a quadraphonic composition by Schafer and Davis dealing with the symbolism of the ocean; **A Survey of Community Noise Bylaws in Canada (1972),** a subject which is currently being extended to a world survey; **The Vancouver Soundscape,** a detailed study of the acoustic environment in the city where the Project is located, consisting of a study booklet and two LP records. Work in progress includes a series of radio programs on various aspects of the soundscape, based on material recorded across Canada; a dictionary of acoustic ecology, bringing together many of the widely derived terms that apply to soundscape research; a book of soundwalks, interesting sonic routes for the listener. Information regarding the availability of any of these may be obtained by writing the World Soundscape Project, Department of Communication Studies, Simon Fraser University, Burnaby 2, B.C., Canada V5A 1S6.

Proposal for an Interactive Computer-Music Facility

by Stephen W. Smoliar and M. Joseph Willson

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M. Joseph Willson is a 1967 graduate of Princeton University in electrical engineering in the fall of 1967, where he developed an interest in computer applications. He is presently enrolled in the Computer and Information Sciences program of the Moore School and is working toward his Ph.D. degree. He is also a guitarist; and after graduation, he plans to continue research in applications of computers to musical performance.

Abstract

This investigation undertakes the design and implementation of an interactive computer-music facility. The hardware for this facility will involve a general-purpose mini-computer controlling a network of peripheral digital modules dedicated to the task of sound-synthesis. The software will be developed primarily to control this network and secondarily to provide a user interface which will be convenient to the musician who has had little, if any, experience with computers. This software will be based on a language which will be designed in terms of a general model of musical activity and which may then serve as a tool for abstraction in the areas of musical analysis, composition, and the teaching of analysis and composition.

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The ultimate purpose of this investigation is the cultivation of inherent similarities between musical activities and programming activities. Current techniques of both hardware and software design enable the development of a general-purpose computer facility which may be flexibly applied to the composition and performance of electronic music, composition in general, style analysis, music theory, and the teaching of composition, analysis, and theory. Furthermore, these design principles may provide a workable abstraction for musical activities from a more general point of view (what Laske calls *performance models* for music).

Fundamental to this investigation will be previous work on EUTERPE, a programming language designed and implemented as a tool for constructing formal models of musical compositions (Smoliar, September 1971). This language is based on four major design principles. First is the necessity for a real-time facility. The second design principle, developed with the first in mind, is to regard the note as an instruction (known as a note word) for a hypothetical computer whose execution entails the sounding of some specific frequency for a given duration. In addition to being able to represent individual notes, we want to be able to represent contrapuntal structures. Thus, this hypothetical device has been designed to be able to execute up to six note words in parallel. Finally, the remainder of the instruction set has been conceived with the intention of developing an analogy between program structures and musical structures. At the heart of this analogy