Soundscape and Listening

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This text introduces concepts and definitions of the term 'soundscape', as well as key terminology and methodology that are often used in soundscape studies. Listening and listening strategies are closely tied to all types of soundscape practices, and are also discussed.

Defining soundscape

The term *soundscape* refers to the totality of sounds that can be heard at any moment in any given place. One can think of soundscapes in terms of how the listener's surroundings present themselves through sound, much in the same way as landscapes present themselves visually. In a soundscape study, nothing audible is excluded, and everything we hear is considered to be of importance.

An all-encompassing approach to sound opens up for several perspectives, depending on the purpose and intention of the listener. Studies of soundscape are concerned with both naturally and human made sound environments, and soundscapes are interesting from scientific, social and artistic perspectives. The field of soundscape studies overlaps areas also covered by other disciplines, and is a good example of a multi-disciplinarity that is gaining ground in research and artistic communities where it is recognized that competences and insights from different domains can create better results together than alone.

Results from soundscape studies can for example be 'value-neutral' descriptions of sound levels, action-oriented problematizations of how measurable changes in sonic environments inform us about underlying processes, or health-oriented reports on different types of noise, noise levels and noise-related illnesses, to name a few. This book fields yet another perspective – how artists utilize and treat different types of information embedded in sound, their composition and movement, their combination and communication.

Diversity in approaches to soundscape studies and desired result types yields different descriptions and representations of soundscapes, and where for example politicians and environmental activists would be interested in isobel maps for the design and

regulation of urban development, social scientists would be interested in semiotic and semantic perspectives on sound sources and what we know about them as the basis for more detailed descriptions of contemporary life and development. An architect would ideally be interested in how human activity is influenced by the acoustic and soundscape design of the built environment, while soundscape artists might work on more symbolic and aesthetic levels, unwielding and presenting material in ways that create new thoughts and reflections. Artistic sonifications of non-auditory data can also be considered as aesthetical soundscape treatments, as with for example Kristina Kubish's *Electrical Walks*, where she converts existing electromagnetic fields into audible information, and in this way draws the listeners' attention to invisible and surprising aspects of their environments.[1]

Methods used in soundscape studies include strict measurements of the physical properties of sound, reported or measured listener reactions to controlled signals, accurate descriptions of naturally occurring sound types and their appearance and variation over time, careful observations and reports of life practices in different environments, research interviews and other qualitative methods, and finally purposeful artistic manipulation of sounding material for public presentation in concert- and exhibition contexts. This mixture of research- and practical perspectives from both natural and social sciences is much in keeping with the founding ideas that were set forth by Murray Schafer in his book *The Tuning of the World,*[2] first published in 1977. A few other texts of his, about the same set of topics, preceded this book, but it is here that Schafer summarizes and further develops what has since become the theoretical foundation for soundscape studies.

The Tuning of the World was developed as part of *The World Soundscape Project,*[3] which was established as an education and research group at Simon Fraser University in the late 1960s, mostly based on an awareness of changes in the sounding environments, and on concerns about the increasing levels of different types of noise in the environment. During the years 1973-75, a number of studies of different environments were made, and these resulted in publications such as the LP (now CD) *Vancouver Soundscape*[4] and the text collection *Five Village Soundscapes*.[5] Barry Truax's terminological reference work from the project, *Handbook for Acoustic Ecology,*[6] was first published in 1978.

Soundscape terminology

Regardless from which perspective one enters the soundscape domain, there are some common terms that are useful in describing a soundscape. These terms relate to psychoacoustic principles, how our hearing and listening works, and how humans in general are affected by sound.

Of particular salience in soundscapes are *keynote sounds*, *soundmarks* and *sound signals*. *Keynote sounds* are sounds that dominate or give the different bio- or antropotopes their specific character. They can be made by nature, or they can be made by humans. Examples include the sound of lapping water that distinguish seaside or lakeside environments, or the sounds of a fountain that normally occur in urban areas. The presence of such sounds immediately provides the context and type of place. Keynote sounds contain information that provide the basic sonic character of a location.

Sounds that are unique to a specific area or location are called *soundmarks*. Examples include the sounds of a bell such as the one from Westminster Palace in London; most of the people that have heard it easily recognize it as being Big Ben. Another example is a foghorn, recognizable by both pitch and relative location. Many soundmarks also fall into the category of signal sounds. For example when both of the above keynote examples explicitly mark time and/or location, then they have specific functions in the contexts where they appear. *Signal sounds* are sounds that are emitted with the purpose of catching someone's attention and being listened to, and they can be anything from a dog's bark to electronic signals from cell phones and city crosswalks.

More general terms relate to the density of the soundscape, its transparency (or lack of it), and its seasonal and daily variations. Soundscapes with a low density of signals, where acoustic niches are easily distinguishable, are normally described as *hi-fi* – and listeners can hear a lot of detail. The opposite type of soundscape is considered to be *lo-fi* – characterized by a high density of signals, poor niche separation, and often the presence of broadband noise, such as, for example, engine and wheel noise from traffic. A hi-fi environment allows listeners to hear details, to hear weak sounds at a distance, and to hear the three-dimensionality of the auditory spaces. Lo-fi soundscapes provide little opportunity for details to push through the din, and sounds compete in the same niches, overwhelming one another, and making it difficult to perceive

foreground and background in acoustic space. The phenomenon of one sound covering another is called masking, and the result of masking is that the *acoustic horizon* shrinks. This type of blocking of the auditory perception of space, direction and position isolates the individual from the environment, and numerous studies from several research groups document that high levels of noise in the environment result in physical health problems, in particular where noise disrupts normal sleeping patterns.

In soundscapes, there is almost always noise – noise as unwanted sound, sound that is too strong, or sound that doesn't belong within the context. Growing noise levels mean that the density of audible information increases from either complexity or masking, and that navigation by ear becomes more difficult. In regards to navigating by ear, good perceptual links between a sound and its source is important; it is important to hear what is happening. However, electronically generated signals pose a relatively new type of challenge: they can be arbitrarily assigned to events and objects, and this challenges the experience of links between action and the resulting sound – anything can signify anything. In the 1970s, Schafer described this as *schizophony* – a disjunct between physical action and resulting sound – and this has become more common over the years; current soundscapes are filled with digital sounds. Our human-made sonic environment is growing in complexity and it poses new challenges to our navigational skills.

On a more philosophical note, Serres[7] suggests that noise can be defined as sounds that we are unfamiliar with and that we can't define, and a consequence of this view is that schizophony increases the sensation of noise. In the area of soundscape, meaning-making entails connecting sound to source and identity, and this process brings sound objects out from the noise. Thus, noise becomes a type of precondition for creative activity. Industry is well aware of the importance of sound as an identifier, and we know that sound design now plays an important role in a great deal of product design. Sonic identity assists in the profiling of products and makes them stand out, in product types ranging from cars to coffeemakers.

Analyzing soundscapes

Soundscapes can be measured in terms of sound pressure levels, averaged for different frequency bands and amplitude peaks, and different time cycles. Such measurements do not take qualities and

types of sound into consideration. This is their strength and as well as their limitation since the reaction to sound often depends on what type of action or object it is that produces the sound, as well as the social and cultural significance attached to it. Nonetheless, these types of measurements are used in the planning of road-, rail- and air traffic, and a typical associated representation are Isobel maps, where steps in sound levels are drawn in much the same way as elevation above sea level is in geological maps.[8]

In an extension of these traditional methods for gathering limited sets of data, a more detail-oriented focus on soundscapes has been developed, in particular over the last ten years or so. The current focus on soundscape depends on modern recording technology, which is a prerequisite for collecting material for analysis and evaluation, as well as an important influence on interest in recording and high-grade auditory experiences. Recordings of soundscapes make detailed analyses possible – listeners can easily verify the counting of events, types of sounds, sequential details about actions and consequences, and so on. These data types are useful for descriptions of the qualities of soundscapes: which actions and events the sound types evidence, and which conditions the auditory surroundings offer inhabitants and participants. Such detailed information is also necessary for historical and anthropologically based analyses, where the development over time of social actions and interactions come into focus.

In order to gain insight into human experiences and reactions in soundscapes, research interviews and questionnaires are useful, often giving rich, contextual information regarding complex auditory and social situations. These can be supplied through observations and data gathered from structured activities such as sound walks and school projects, where topics and actions can be designed to give specific types of information.

Despite the obvious differences in the approaches for gathering and analyzing data described above, they have a number of things in common. In the analysis of natural soundscapes, attention to *acoustic niches* is important, perhaps especially where acoustic signaling is crucial for the procreation of different species. Animals, birds and insects signal in different frequency bands, and at different times of day and year, most likely as an optimization of audibility in their different biotopes. Excellent examples of this can be found, for example, in Steven Feld's field recordings from Bosavi,

Papua, New Guinea,[9] where recordings made during different times of the day sound radically different, and where many different groupings in the overall sound are clearly audible at the same time because they occupy different frequency ranges. The efficiency of the type of signaling found in natural habitats is reduced with high levels of masking, and the resulting drops in acoustic horizon, and it has been shown that, for example, bird song patterns do not migrate well across generations that have been hatched close to broadband noise sources, such as highways. Song patterns change as a response to the poor acoustic conditions,[10] in particular for low- frequency noise.

Activity generates sound, and the understanding of soundscapes may open the way for studies on sound in itself, which is usually considered to be only as a 'passive' result of underlying processes. While this approach can provide good information on soundscape components, it will only allow studies on the results of actions, and thus not really come to grips with the underlying dynamics of situations. This is one of the reasons why Schafer[11] has posited that soundscape studies should be 'concerned with the nature of *interaction* between a community and its sonic environment.' From this perspective, soundscape studies should contain data on how the sonic environment 'actively regulates community behavior' in order to say something about how 'change in one aspect effects change in the other'. This approach understands soundscape as a 'system of communication where information is constantly being exchanged between the individuals of a community and their sonic environment', and is, according to Schafer, necessary for the word soundscape to have 'true significance'.

This is a tall order, and with this reasoning Schafer points towards action, not only for preserving the environment, but also for proactive efforts where acoustics, psychoacoustics and related disciplines can be used as effective tools in designing and building environments and technology. The approach leads to the term 'acoustic ecology', where the interdependence of all sonic elements, and which the life conditions the acoustic environment offers its inhabitants and participants, comes into focus.

Listening

The use of recorded sound in composition and performance has been at the core of electroacoustic music since musique concréte

was invented. The invention is normally accredited to Pierre Schaeffer who was employed as a sound engineer at the French National Radio, and dated to the years immediately following WWII. During his years there, Schaeffer built up an institution around the genre – Groupe de Recherches Musicales (GRM) – and the institution is still in existence, revolving around many of the same aesthetical ideas – music made from pre-recorded sounds and the processing of them. Schaeffer's main artistic program, however, revolved around constructing constellations of sounds based on their spectral shapes and temporal forms, not their origin, references or social significance. The principal concept was that of *reduced* (or acousmatic) listening in which a conscious disregard of the sound's identity was replaced by a deliberate focus on its material qualities. Schaeffer's approach can be described as a middle position between the German school's desire for new timbres synthesized in electronic equipment, and what we now call soundscape compositions. In soundscape compositions, the settings of the pieces are considered to be significant for how they could be appreciated and perhaps understood. It is, however, not difficult to understand the positive intention behind Schaeffer's position, it being one of several responses to the felt corruption of the tonal paradigm that many composers in post-WWII Europe shared. Furthermore, a coupling with modernism's strong focus on structure and material, and its conviction that art should be free from social connotations and responsibilities, makes Schaeffer's project fully understandable. It is not difficult to recognize the enormous influence his work with sounds as objects has had for nearly all modern conceptions of sound. However, the limitation of reduced listening in how one should work with electronically generated or recorded sounds was never accepted by all composers of electronic music, and the paradigm shift in electronic music that has happened over the last 10-15 years has rather been in the direction of expanded listening than reduced.

While the acousmatic approach does not bring social aspects into the situation (other than through the act of presenting material for consideration in a specialized concert situation), the non-acousmatic listening does. Theoreticians such as Hamilton[12] and Norman[13] argue that acousmatic and non-acousmatic listening live side by side: as experiences of sounds that by means of technology have been abstracted away from their origin, and of sounds, often the same, that have value exactly because of their origin in regards

to what actions or conditions they refer to, and which associations they evoke. By bringing the social aspect into listening, we are including terms that make it easier to discuss the perceived differences that exist between music, sound art, soundscape composition, and other forms of audible expression – differences that from purely aesthetical considerations have proven impossible to describe with precise delimitation. This holistic approach to listening has been nicely described by Seth Kim-Cohen as listening not only *to* the sound, but also *through* it,[14] in the same way as you can look *at* a window, and also *through* it. A holistic way of listening also corresponds well with newer musicology, where the totality of the musical situation is studied and not only the written or recorded representation of the timbral objects.

From the perspective of soundscape, *referential listening* is crucial – where sounds are considered as auditory evidence of the surrounding environment (nature, people and technology) and of what type of life and life conditions it conveys. We can hear what is happening around us, and in many instances why and how as well. When something has passed through our psychoacoustic filters, referential hearing tells us whether this is something that requires further reflection or action.

In *reflective listening*, the listener converts the stream of auditory data into objects for aesthetical consideration and enjoyment – through reinterpretation of the sonic information and corresponding assignment of value. A visual example of this is when one watches cloud formations and suddenly sees faces and different shapes in the changing patterns. A sound example is of birdsong, where ones' appreciation can expand from just hearing the proportions and positions of intra- and interspecies signaling to the appreciation of the song as music, adding the perception of melodic and rhythmic patterns to what is heard. Transcriptions from this type of experience have found their way into many musical scores.

This type of reflective listening is also much in line with John Cage's desire to let the sounds be as they are, and that it is the *finding* of music that is essential to any experience. Cage argues that finding music is possible in any sound and in any context, and his famous work *4'33"* from 1952 is perhaps the best example of this reflective listening. In this work, the musician (or musicians) will not play anything, and while the audience becomes aware of itself and its own sounds, it changes its perception of music from that of

experiencing an authoritative work of art to an experiential process where the audience is at the center. Bill Fontana has set forth similar thoughts regarding his recontextualization of sound: 'From a musical point of view, the world is musical at any given moment',[15] and when presenting sounds in settings different from their origin, he inspires us to employ reflective listening.

Referential and reflective listening both connect to what we can call *contextual listening*, where the listening situation itself is considered; the location of the listening colors the experience. When recorded sound is being migrated into a new context, issues of selection and representation become topics for discussion, such as which aspects of a sonic environment have been selected, and why. The framing of a presentation of sound adds to the experience, and the simplest example of this type of framing is perhaps Peter Ablinger's[16] placement of chairs in places where one would not normally find them. The presence of chairs, arranged in a concert hall-mimicking formation, indicates that there is something there worth spending time on, and suggests that passers-by should listen.

Performing sound recordings in gallery- or concert contexts also involves the same type of insistence on the validity of a sound material, and the most soft-spoken example of a gallery work where everyday sounds are presented could possibly be Kristof Georgen's work *Nr. 26*,[17] where everyday sounds offer an intimate rendering of existence. One would not normally notice the sounds he provides, but in an exhibition, one does. It can be argued that intentionality becomes more explicit in contextual listening than in referential and reflective listening, since it involves the purposeful selection of material by the artist.

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