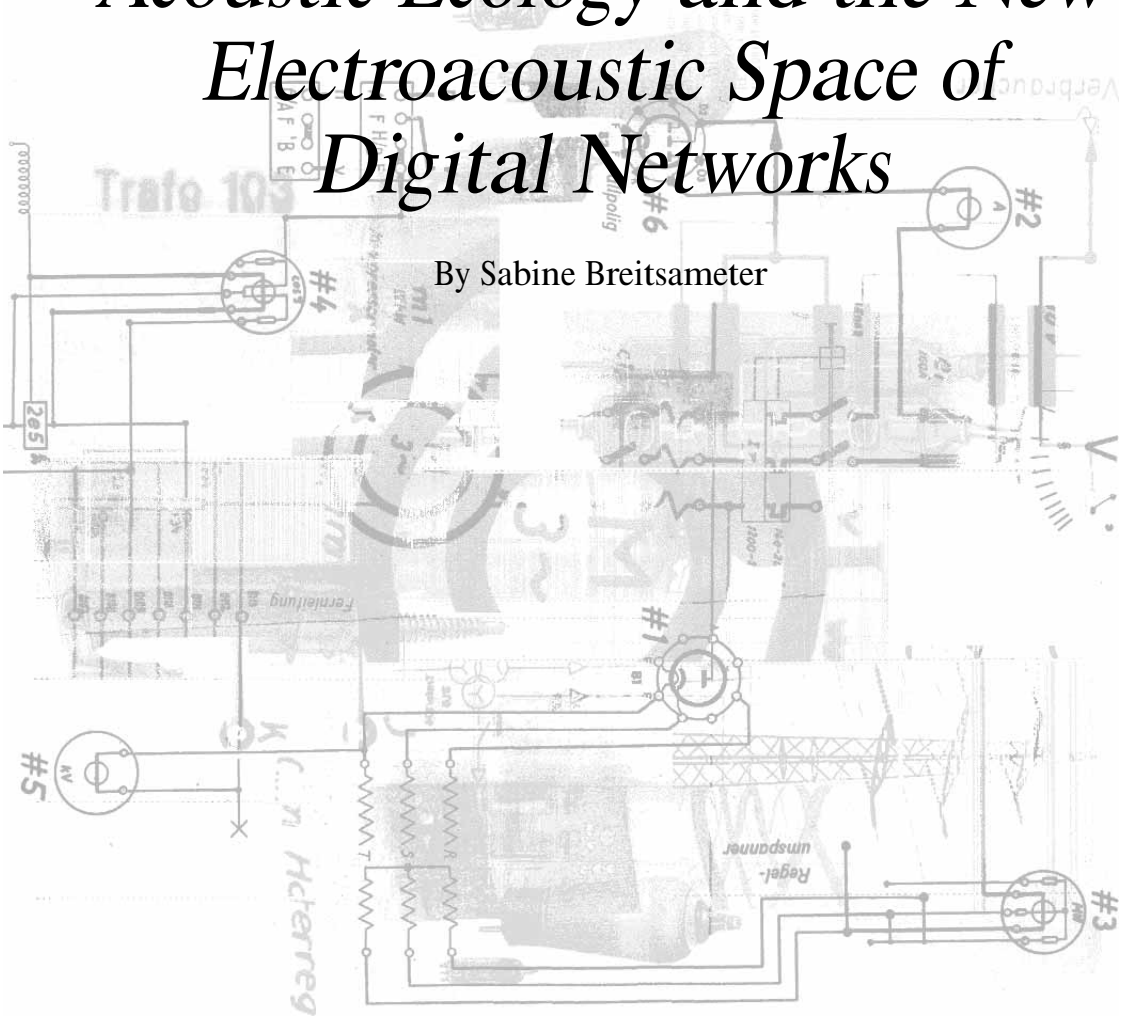
Acoustic Ecology and the New Electroacoustic Space of Digital Networks



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This symposium's title has changed since I saw it on the web—before my departure from Europe. The title Acoustic Ecology was then squeezed between two question marks: ?…acoustic ecology…?. This showed at a glance, that Acoustic Ecology (AE) as a term was somehow put into question, at least a topic of discussion in itself. I don't know why these question marks have been erased. But I think it is interesting for many reasons to see that AE is being questioned. It is not only questioned by people from outside of the movement, but also by those who have been dealing with the topic for quite a long time. The latter is particularly interesting: in one of the last issues of *Soundscape* (Vol. 3 Number 1) some people responded to the question of how they and their work relate to the term Acoustic Ecology, that they would prefer the term Soundscape, as it is less loaded with values. Can artistic and ecological values co-exist—or more specifically: can they inspire each other without trivializing each other and,—at the same time,—create something which is alluring and captures the mind and senses. There are enough people, who would doubt this spontaneously. Some of these doubts, not all of them, are due to the fact that—for reasons which remain to be discussed—AE carries the burden of a certain image.

It is a widespread thought, a prejudice mainly, that AE is a nostalgic movement, considered not only weird because it is dealing with sound—a topic which is rather intangible for many—but also, so at least is the saying, celebrating ancient times without cars, machines, electric or electronic technology. I sometimes hear, that Acoustic Ecology creates art, which aims for "ecological correctness", and therefore, some say, judges and restricts the compositional material, dividing it between being "natural" and therefore ecologically correct, and being technical/artificial and therefore not feasible. Again, it would be interesting to discuss where these—and a number of other likeminded assumptions—originate. I am sure that they cannot have been derived from the written or composed discourse of Acoustic Ecology, but may have other reasons and sources. I think, it is vital to discuss and correct this impression in public, and this symposium can contribute and initiate such a discussion.

Many people assume, that Acoustic Ecology is not participating in the ongoing contemporary discourse about new technology—and to a certain extent I would say they are right. Although most of the people involved in the movement use new technological devices for recording, composing or performing, its contradictory role has not yet been discussed in detail and not with the perspective of the immense technological innovation about to happen. The undeniable and mostly very skillful practice of technological use in soundscape composition has rarely found its way into reflection and theory about its compatibility with ecological thought. However, the world of electronic media technology often referred to as "disembodied" and inauthentic, lacking the touch and feel of the material world, is imbued—as

many would claim—with eroticism. As we all may know—and you can read more precisely about it in Roland Barthes' writings—eroticism is one stance with which to connect to our environment: engaged, sensitive, trying to find fascination and maybe even pleasure. So, why then not try to bring together both, AE and technology? Maybe the two already are having a secret love affair anyways. Why then not drive further the discourse about their relationship to each other? Again, we need this discourse in AE, as the public image of AE as an anti-technology movement persists and as there is neither an internal discourse of any significance about this issue nor a public one.

It might be surprising that AE and Soundscape in context of digital networks and multimedia data spaces share paradigms. Or at least AE notions and concepts have anticipated paradigms which, I think, form a valuable approach to understanding the cultural and social implications of digital networks and their sonic use and applications. To illustrate this, I first want to focus on AE and summarize the basic principles of it. What is AE? I have tried to condense it into five fundamental theses.

1. AE is based on a sense of dissatisfaction with the sonic environment. In its aesthetic criticism it touches not only on artistic questions, but also on those of the individual's autonomy or interdependency (which is a political issue), health and well-being.

2. AE studies the mutual sonic influences/interdependencies and effects between living beings (humans, animals, plants) and their environments (natural and/or physically or electronically human-made). Its aim is to support and enhance the ability and willingness to listen to the environment's sonic manifestations and to evaluate them.

3. Listening to the environment means listening to what we call soundscape. An awareness of the soundscape requires an environmental auditory perception as opposed to the frontal perception encouraged by literature, stage, mass media or traditional education. The notion of soundscape makes noise and signal—usually put into a hierarchical relationship—equally important for the understanding and evaluation of the environment. It assumes that the listener is always an active, influential part of its environment. Soundscape awareness also implies not only to be aware of the actual sounds happening, but also of the sonic potential of the space's, place's and object's shape, material and movement.

4. AE assumes a direct relationship between the characteristics of the sonic environment and the listening abilities of its inhabitants. AE's aim is to extend critical listening capabilities in order to encourage a wide range of sonic modes of expression and creation.

5. AE identifies mainly urbanization, destruction of nature, industrialization, and consumerism as the main causes of the impoverishment of the sonic environment. AE assumes that these factors hinder or suppress the possible or existing multitude of sonic timbres and the diversity of acoustic perspective.

6. AE's aim is not to silence the world in order to create a more satisfactory acoustic environment, but to orchestrate its sonic manifestations, i.e. to design actively the sonic occurrence and potential of objects, spaces and places.

With spaces and places we do not only mean physically defined locations, but also those which exist electronically or virtually. So, AE is also dealing with electroacoustic spaces, for example radio or the sound of movies, the Internet, or more generally expressed, the digital networks, which form quite a new electroacoustic space.

So, why are digital networks and their sonic use so interesting within the context of AE? What is their contribution to enhance and encourage listening—and soundmaking for that matter? What is Acoustic Ecology's contribution to understand the way in which the networks function? What will become of listening in the age of digital networks? I will try to suggest some answers to these questions. I will focus on the architecture of the media and its impact on defining the relationship between sender and receiver, thus coining different concepts of listening and initiating, what I would call, the growth of different ears.

Listening—Understanding — Appropriating

The famous pianist and sonic media artist Glenn Gould once said that radio and electroacoustic media in general mutate, when they transmit artistic content—and thus *always* and inherently an artistic aura—into an environmental experience, with which every single member of the audience can deal as he or she likes.

He meant: what comes out of loudspeakers into the spaces of everyday life becomes an integral part of our daily environment, which is at the disposition of the audience. Why? Because sounds, reproduced by these means, enter diverse and multiple situations and contexts, in which the ways and modes of perception cannot be controlled by the producers. Where the concert hall's well-known codes of behaviour are generally observed and obeyed, listening to media in every day life's spaces cannot be sanctioned.

Whether listeners do their exercises while the radio plays Beethoven or whether they read the newspaper at the same time, whether they listen or not cannot be influenced and controlled.

At the moment where something is broadcast by electroacoustic means, its appropriate reception—i.e. the audience is receptive to it in order to understand it—is no longer guaranteed.

But what in fact does listening mean? What are its characteristics? I suggest that listening can best be described by the process "hearing - understanding - learning - integrating into our intellectual or sensual system". In this process of appropriation recipients make what they perceive their own, i.e. they transfer it into their personal categories of thinking, feeling or acting. In this sense listening is active, because it implies conscious involvement and sometimes effort. In another respect, listening also has a passive quality—in as much as a sonic continuum, which is following the flow of time, has to be received and accepted in total and continuously, if it wants to reach its goal—that is, it has to be understood. But if while listening, you step out of the process and enter it again sometime later, the process of understanding will most likely be incomplete. To understand completely, listeners would have to expose themselves to the sound in its entirety. This seems—in a civilization, which emphasizes being active and being selective in order to be efficient—quite opposite of a contemporary attitude.

Compared to simply hearing, listening is a discipline. The listener/recipient focuses on the significant levels of a sound event, on its signifiers, in order to explore and understand it. Additionally, recipients may also distance themselves from what they hear, which enables them to be critical and discriminating. Both can be practised, exercised and learnt.

I want to give you an example: in Germany, in high school, our English tests consisted mainly of re-telling a story in writing. A story was read by the teacher, and the task was then, to write it down in our own English words within a certain time frame. This is an experience many Germans and Europeans share. From the students this requires enormous attention to the teacher's reading of the story, effort in listening and much discipline:

- The first hurdle was to follow the foreign language.
- The second was to understand the story's content.
- The third hurdle: if you did not understand certain words you

would have to reconstruct the sense ad hoc or speculate about it during listening.
- Fourth: from the neighbouring class room you heard wild noises, which threatened to mask your teacher's voice, and you had to make the effort to ignore those irrelevant noises.
- The fifth hurdle was your motivation: outside the sun was shining, and you dreamt of going for a swim.
- Sixth: pressure of performance made you nervous and affected your ability to focus on the teacher's reading. And so on, and so on...
- Finally, if you could circumnavigate all these obstacles more or less successfully, you had to find enough distance to what you had listened, in order to reflect on the story and re-narrate it in your own words.

I am giving you this example to illustrate that listening in such a classic educational situation follows clear standards of behaviour. Perhaps this is why listening recently has been referred to as a cultural technique. These are standards, which are taught and learnt through a socialization process, leading to internalization, so that they can be exercised without too much conscious reflection or even automatically. Being in command of this cultural technique is quite useful, at least for the retelling of stories in language tests and for a number of similar sound situations. But we have to be careful, not to identify listening exclusively with the attitude I have described here.

Of course there is nothing to be said against this concept of listening. It is not at all outdated or invalid. However, it relates to a certain context only: it is an appropriate form or attitude for the perception of the Logos—to identify and decode signs and signifiers such as words, terms, sentence structures, languages, discourse types and performatives. If I say "logos", it doesn't mean that it applies only to language-based sound, but also to music or any other sound, as long as it is presented in a context, which requires the attitude of listening and decoding.

How else can such listening be characterized? It is mono-directional and a one-way communication. From this results a relationship of authority or power, which is inherent in listening: usually one listens to something or somebody, when important or not yet known information or experience is transmitted. And it is significant in this context to learn and to experience that the recipient *needs* the directive, "Listen!" in order to understand what his counterpart has to share. This is the main reason why superiors, who are willing to listen, are highly appreciated by their co-workers, as they are able, at least for a limited time, to reverse the power relationship through the act of listening.

The value and success of listening are dependent on the credibility and the authority of those, who express themselves. This is also your, my listeners, experience right now in this situation in Melbourne. I feel happy, that most of you are still seated. This too, is a characteristic of listening: listeners take their seat, and voluntarily become mute. Thank you very much! So far, you have been excellent listeners.

The Radio Ear

This way of listening described here, is the assumption behind radio broadcasting and is pursued very consistently in the programming concept of news, information and—with some exceptions—cultural radio, especially in Germany and Europe. When radio, or more specifically broadcast, was still a new medium for the public, in the early 1930s, the media theoretician Rudolf Arnheim coined an aphorism: "Broadcast means: one speaks without being able to listen, and many listen without being able to reply." This sentence illustrates the communicational paradox of the broadcast medium. The German media theoretician Friedrich Kittler related it to the spirit of Imperialism: the one big voice speaking to the masses, which are transfixed and silenced.

Radio was invented during WWI to spread news important for military action within the combat troops. Until today the medium carries this stamp of having been derived from news—even where it transmits predominantly music—as its whole production refers to this relationship.

News is a condensed and most standardized form of message, which renounces subjectivity, atmosphere and aesthetic components. Fact is the essence of news. And to identify Fact, the production aesthetic of radio makes clear distinctions between signal and noise—technically, formally and content-wise. Radio transmission is a chain of signals which breaks through the ether's noise, claiming attention: it is the radio 'call', a linear, syntactic and homophone sound format. The radio call represents an order. Its subtext says: "You have to listen now!"

Derived from news, the production aesthetic of radio, even where it does not exclusively articulate itself journalistically—in pop, music, radio drama and even many radio art programs—follows the dichotomy of signal and noise, especially in dealing with the parameters space and time.

This radio call, its powerful and politically supported claim, developed its organ of perception, the radio ear—an ear ideally suited for perceiving the radio call adequately. It is an ear which, in the prevalent public discourse, became synonymous with the listening ear in general.

As the listening of such a radio ear is based on selecting signals from the noise, identifying and decoding signals, one could even say that it is a kind of 'reading' ear, quite close to literary reception. The radio ear and its related radio concept is inevitably based on a clearly defined relationship between sender and receiver. The receiver, the recipient, is supposed to perceive the output in the sender's intended sense: to listen in order to understand the message's meaning as intended by the sender. It is not surprising that the term transmission—which implies mission—not only connotes the transport of sound, but also connotes something quite religious. Those, who send out the radio call give directives and want to evangelize. They need to be convinced by their mission, and they have to prove that they are serious about it, as the radio ear depends on its belief in the speaker's authority.

At this point I would like to refer to Glenn Gould's statement which I had quoted earlier in my presentation. He once said that radio and electroacoustic media in general mutate, when they transmit artistic content—and thus always and inherently an artistic aura—into an environmental experience, with which every single member of the audience can deal as he or she likes. Glenn Gould's statement illustrates that media's claim, to make people listen in order to get the message across, collides with a different reality. Fortunately, the days are over, when—like for example in Nazi Germany or nowadays in countries where dictators rule—listening to the voice of power was organized collectively and controlled by the authorities. Today another attitude prevails: if the audience does not listen in the way we want it to, why then create significant content and form?

However, if the basic assumption of the relationship between sender and receiver is put into question by social and political development, it does not mean that listening as such does not exist anymore. It exists within different circumstances, which necessitate new or additional prerequisites and possibilities of rethinking and revising the sender/receiver relationship. So, it is useful to identify other situations of aural appropriation, other concepts of listening in order to become aware that different media require different ears.

Grandma's Storytelling

I am hoping here, that you all have experienced someone during your childhood who narrated or read fairy tales to you, maybe your uncle or your father or your grandmother. This could have happened in different ways:

Possibility No.1: Grandma reads a story. The child follows the given text, tries to understand it, sometimes asks questions for clarification and listens. This communication is partly bi-directional.

Possibility No. 2: Grandma's reading is replaced by a cassette and a cassette player. In this situation the child will follow the text as well, trying to understand it, but will not be able to ask questions. This is listening in the classic sense of the word, in the broadcast sense.

There is also a third possibility, and this was my favourite when I was a child. My grandma narrated the text and added spontaneously her own little stories. Or she made the current situation, the place, the mood we were in, part of the story, integrated perhaps even one of my toys, a doll or a stuffed animal, and asked me how the story might continue ("what would you have done, if you were the prince or the wicked witch...?")

What my grandma had been practising here, and hopefully people still practise, is not mono-directional, not necessarily linear and doesn't keep the recipient mute. It is process-oriented and is not interested primarily in a consistent result or a finalized and complete story. It therefore does not follow the classic listening concept at all, but of course, is also a way of listening: it is a listening-in-dialogue—interactive listening.

Different ways of performing require different ways of aural appropriation. Not all performative auditory situations are adequately perceived by using the radio ear, the logo centric or signifier-oriented ear, which separates signal from noise. And in any case, one enters a grey zone, as every listener can identify subjectively what is a signifier and what is not, even if the originator had different intentions. If you listen to something for hidden emotions or secret political hints, or if you are listening to study for an exam or to be entertained, inevitably the signifiers will vary.

Soundscape Listening

Spatial parameters in particular become quite neutralized in the news oriented production aesthetics of radio. We can summarize it as follows:

Voices and music occur—as a general rule—quite near to the microphone. The significant sound materials, especially speaking voices, have a fixed position in the stereo spectrum and usually do not move. Spatial sound is usually standardized, in order to appear neutral, so that it is not an object of aural appropriation and does not become part of the message. In this way, signal and noise can be separated clearly, and the conventional way of listening can take place.

But what is the adequate way to listen to the following situation? Imagine a lively market on a Saturday. I would recommend Winterfeldt-Market in Berlin. It is fascinating because of its visual and sonic atmosphere. Imagine you want to perceive the market sonically. It would not work, if you go to the opposite side of the street and try to listen to it frontally. You have to go inside, move through the whole event in order to discover the full range of sound constellations, which you will find aesthetically interesting.

Your experience of such a situation will be fascinating and successful not by frontal but by spherical attentiveness. Not to keep the distance is what works here, but to dive into and to perceive being enveloped by the sounds. In such a sonic context, no sound is unimportant or without value. The distinction between signal and noise becomes irrelevant. Also, the recipient as the one who perceives, acquires an important role in this setting.

Let's imagine another scenario. A vast landscape, covered in snow, like in Murray Schafer's award winning radio piece "*A Winter Diary*". The landscape is quiet, sometimes you can hear the snow flakes falling, and in the distance the train is passing. Those who want to listen to this silence, those who want to record it, so that the media audience can listen to it, have to go there and—purely through their presence—become themselves an active part of the space. Every step, every breath, every movement, every activity of the listener/recordist fills the soundscape with sonic shades, which simply cannot be described adequately with the signal/noise dichotomy.

In soundscape listening, the relationship between sender and receiver is no longer defined clearly. The listener is a participant, immersed in an environment which reacts to him, and, if it is an environment inhabited by living beings, it has eyes and ears, and a voice, which emits its response to what the environment has perceived. So listening and responding is in continuous interaction, and therefore considerably different from the listening in the conventional broadcast sense.

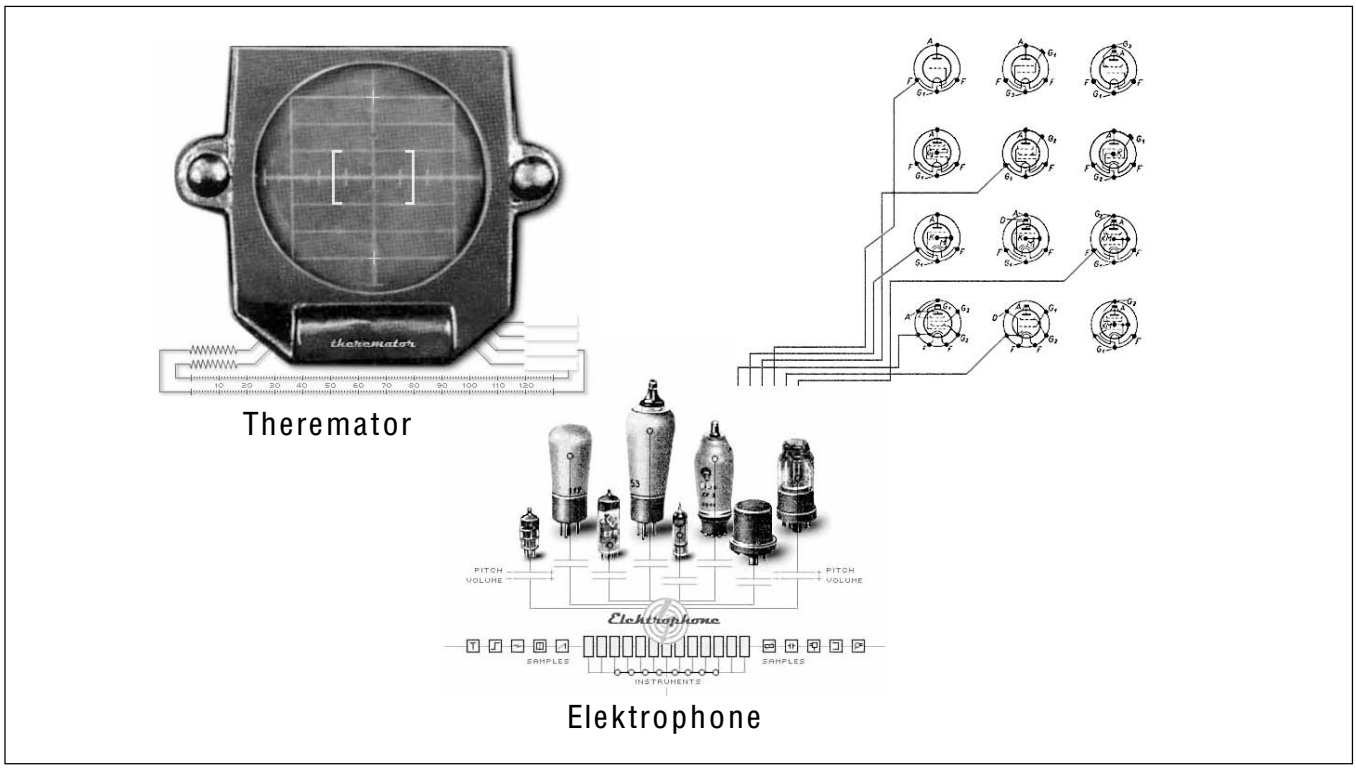
Listening within Networks

It has not been long since the Internet—which is the most popular of the digital networks, and also a new electroacoustic space—came into being. First attempts to send sound through the lines in the early 90s were disappointing. In the meantime the sound quality has improved considerably, and it promises to get better as broadband Internet access will become available to the general public. However, compression techniques are also subject to acoustic ecological critique, as an article by the German computer scientist and audiologist Christian Oliver/Hamburg suggests. ("Ear damage by mp3, DVD and digital television?" Source: http://www.informatik.fh-hamburg.de/~windle_c/Logologie/MP3-Gefahr/MP3-risk.html)

What I want to talk about now is not the Internet making live streams available or audio on demand, and thus functioning like broadcast or CD. I want to discuss the specific auditory experiences which the Internet can create, due to its media architecture. We have already internalized the traditional media architecture of broadcasting and the specific listening mode it requires. But the apparatus which has come up with the digital networks is significantly different. The question is, what kinds of aural appropriation does this medium provoke? The digital computer is the key tool of this new apparatus. The Internet is a connection of computers, more or less, all over the world and the digital computer's properties define the properties of this sonic space, its possibilities of sonic creation and the adequate modes and attitudes of auditory reception.

The Computer

- is like an encyclopedia: it stores, organises, retrieves data.
- is process oriented: it creates results, modifies, compares, writes, combines.
- is participatory: without input there is no output; users have to be active, have to process the data they want and interact with the computer by two-way communication.
- is a multimedia tool: any sensual representation can be transformed into another kind of representation: auditory to visual, text to audio, visual to text etc.
- can be used in a non-linear fashion and can realize branched and multidimensional data-orders.
- is spatial (or more precisely, it can be experienced as a spatial concept): spatial concepts and media architectures can be derived from its telematic principle combined with the computer's properties. The Internet is distributed space—i.e. its



Images of sound generating devices for web sound installation *Electrica* http://electrica.leonid.de/cgi-bin/index.cgi

data are stored on globally distributed servers—and it is a sharable environment, because its users can work on the same data, even if they live geographically far apart.

- makes the relationship between sender and receiver flexible, not static. Without much effort any recipient can become a sender and vice versa. The term "interactivity" is derived from this dynamic relationship.

Being a sender is no longer a privilege nor an unchangeable fate. The sender-receiver relationship can fluctuate between mass communication and individual exchange. The Internet can realize the broadcast principle—where one speaks and many listen; or it can realize the one-to-one-communication, like the telephone, for example; and, in our media system almost a novelty, it allows the communication from many to many. The latter—I want to remind—was how the early days of radio sounded: like a chat on the Internet, except exclusively aural. So, the Internet's media architecture is in fact not completely new, nor are its auditory concepts, which have been emerging since the early 90s.

Network based audio concepts already existed in the times of "traditional" analogue media. Stockhausen's network concept *Music for a House* from 1968, Max Neuhaus' *Public Supply Series,* which he realized at the beginning of the 70s within the radio network of the US; Alvin Curran's telematic compositions *Crystal Psalms* and *A Piece for Peace,* which were performed at the beginning of the 80s in Europe, with Frankfurt being the hub; Murray Schafer's interactive music theatre concept of a *theatre of confluence*; the first German radio drama by Hans Flesch in 1924—there are many more examples of artistic work, which imply that the network media architecture was invented or publicly accessible already before the Internet. However, most of these early examples could only be produced through extreme technological effort, which is no longer necessary with today's digital networks. Such productions have become quite easy.

So, what has been created so far within this media architecture offered by the Internet, besides streaming, audio-on-demand and a big number of live jams from remote performance venues? The procedural and participatory characteristics of the Internet play an important role, if one looks for media-specific network-based art, and I am going to demonstrate some examples to you.

If I say, I will be demonstrating, I want to emphasize, that the productions are not supposed to be shown to a passive audience, but that they have to be tried out and played by every individual listener/participant. Simply showing these works, which are based on the activity of the user, soon shows up its limits. So, trying it out on your own is strongly encouraged here. You can access them, together with other examples, with reflections, reviews, discussions and interviews on the website which I am producing for the Südwestrundfunk http://www.swr2.de/audiohyperspace.

But given these circumstances, I will try to familiarize you as best as possible with some of the basic principles of a number of sonic artworks, which are accessible on the Internet and which invite the web visitor to participate. I chose sonic artworks, where the participant can act much more creatively than just clicking on a number of limited options, but where the media architecture and the properties of the electroacoustic space of the Internet are applied specifically in order to create something which cannot be created by other tools or other media.

A wonderful example, which has become a classic by now, is the web sound installation *Electrica* by the German artist group "skop". The essence of *Electrica* is navigation and immersion. Visually it takes place in the ambience of an electric power plant from the 1930s. Sounds and visuals are strongly connected with electricity, voltage, valves etc. And by navigating through the visuals the visitor of the website can explore its sonic diversity. There are also sound generators and virtual instruments, with which you can produce sounds and mix samples with nearly unlimited possibilities. And you can leave your own contributions on the website, so that others can listen to them or even rework them. Although one needs to use the mouse and click a lot, I think *Electrica* is an excellent example of a whole universe in itself, into which one can dive, immersing oneself into a well-composed sonic experience.

One is not manipulating a limited field of options, but a sonically complex multitude of sounds in an audiovisual context.

The second example is the *Webdrum*—a multi-user application created by the US-American musician and programmer Phil Burke and the New York composer Nick Didkovsky. The basic idea is, that a number of people—I think it has grown to twelve by now—can make sound and music together on the web simultaneously, by using an interface, which consists of drum sounds. If you go to the website you see a grid, from which you can "grab" the sound of one or several drums and assign your rhythm to it. Your counterparts on the other end of the lines will do the same, and you can have a drum remote session, in which you are even able to adjust spontaneously—in real time—your rhythm to keep the drum session developing and going. You can do this with complete strangers, whom you happen to meet on the website, you can do it with your friends from all over the world. You can meet at a certain time on the website in order to make music together. So, the webdrum is an aesthetic communicative experience, which happens from the remote. I would of course agree, that it is more desirable to play together in each other's physical presence and it is probably more interesting to touch the drums with your own hands than to just click them. But as we all experience, this togetherness is not always possible. So the Internet facilitates even non-verbal communication and by its ability to transmit sounds over thousands of kilometers. And if the principle of the webdrum would also be applied to other kinds of sounds, such as environmental sounds or samples of the spoken word, a lot of co-compositional possibilities could arise.

Thirdly, I have been producing a combined radio-Internet-project by the American-Japanese composer Atau Tanaka.. It's title is *Frankenstein's Netz/Promethee Numerique/Wiretapping the Beast*—a long multi-lingual title, which illustrates the international character of the project with a huge number of co-producers in Japan, Canada (McGill University and Radio-Canada, Montréal) and Germany (Southwestgerman Radio, ZKM in Karlsruhe etc.). Its online premiere was in February 2002, its on-air and stage premier was in March 2002.

Being the producer and dramaturgical director of the work, my main goal was to offer to the public a creative-communicative experience by using the Internet and acknowledging the creative potential of any participant. This was the basis on which the composer and I developed the concept of *Frankenstein's Netz*. The work focuses on the idea of the Internet as a living organism, which the listener/user feeds, raises and activates through the input of text, visuals and especially sounds. Similar to the Frankenstein-novel and the Prometheus myth this living organism gets out of control, as a result of the participants' input and by its contact with the web visitor, and has to be tamed and finally sedated. The latter happens during the performance of the composer's live mix, which is fed at the same time by streams coming from remote performance sites in Montreal and Tokyo.

One month before the performance of March 2002, a "living entity" was created electronically, that reached out to its listeners, communicating with them via short messaging system (SMS) and e-mail, and inviting them to visit the website and upload data. Users were asked to enter audiovisual input creatively, contributing to the overall theme of the web installation, the human-machine relationship. Quotations of Aischylos' *Prometheus*, of the Frankenstein-novel, of Donna Haraway's *Cyber-Manifesto* appeared as part of the visual concept. The "living creature" which the participant could nurture and contextualize, processed and combined the input through its sophisticated programming. You could say that the electronic being was acting as a virtual composer, which was co-performing during the live event.

Thus, the production *Frankenstein's Netz/Promethee Numerique* can be accessed in a non-linear way. It is under constant development, as web visitors can participate, create their own audiovisual creature and listen to it interactively. It can also be listened to in a linear way, in accessing the radio piece—which can be done on the website—and listening to it from the beginning to the end, in the traditional way, where the listener is receptive and mute.

The works I have tried to introduce briefly to you here are prototypical, and although I have presented sonic art on the Internet only, there are other digital networks with the principles of participation, immersion and environmental experience that are important and even more obvious than on the Internet. The CAVE for example is a multimedia environment, which was once conceived as a projection system simulating the visual experience of a space as a visitor changes his/her position. Meanwhile a number of composers have started to make the spatial experience more complete with sound, that changes and interacts according to the visitor's movement. This indeed is an almost perfect digitally created illusion or simulation of an environment, and artists, namely composers, have just started to work on it. Bi-directional data exchange, sensors, which respond to gesture or temperature, tracking systems, which follow the movements of a body in a certain space—all these devices and their data input can be used, to connect the listeners, make them act, make them trigger sonic processes. Just briefly I want to mention, that a very strong trend in musical composition and performance currently is the creation of new interfaces. Their purpose is to escape the physical and mental constraints created by sitting in front of a computer screen, handling the alphanumeric keyboard and being subsumed by the machinery, even if one is involved in creative sonic interactivity as I have described in the project mentioned earlier.

These projects do not only illustrate the artistic use of a new or at least different media architecture, but also show cultural shifts of production and perception, caused by network based concepts. Within this context, artists do not act as the creators of a finished and complete work. Instead, they offer a frame within which others can become active. They are less a "concentrator" who distill meaning and shape the exact physiognomy of the piece, but they are moderators, who define the topic and have formulated a set of rules, a frame or algorithms, by which form and content of the input is processed. As this frame stays empty without input, artists need the recipient, whom they have to motivate to become operative.

Where a framework needs to be filled by the interacting user, the process of appropriating and understanding of the artwork happens less through contemplation (that is, receptive listening), than through operation. It is not the classic contemplative listening here that will unfold the qualities of an art production. Instead, understanding and appropriation take place through the operational activity of the listener. This is quite different from receptive listening, where you perceive and at the same time construct or reconstruct sense. The operational audience is a completely different concept than the receptive one, as it can profoundly change the substance and appearance of a sonic art work.

A model of perception based on what the German theoretician Walter Benjamin—already at the beginning of the 1930s—called "tactile" reception, illustrates the different listening attitude, which participatory sonic media art in the digital networks requires. Benjamin compares it to the perception of buildings, which are "perceived in a double way: through tactile use and through contemplation. (...) The tactile reception is not based on attentiveness, but on habituation." According to this reception model, appropriation of the artist's intention by the audience does not primarily

take place by listening, but through operations like searching, trying out, intervening, rejecting and trying out again. So the listener becomes a user, dealing with an aesthetic content ad libitum. Here we touch again Glenn Gould's sentence of electroacoustic media changing sonic content into an environmental experience.

The set of rules offered by the artist shapes and alters users' input. The system's treatment and processing of their input becomes a central characteristic of the artwork. Such a process is conceived and programmed as part of the artistic framework and plays a crucial role for creating the intended sense and meaning. This influences the concept of art. As the British media artist and theoretician Roy Ascott said: "Not so much meaning, content, appearance, in brief: semiology, will be important for the future of art, but its behaviour toward the recipient", and therefore its response toward the user's input. As a situation where input is altered and undergoes transformation and processing, the artwork becomes a dynamic environment or even a living entity, with which the recipient can communicate and converse. Talking about understanding, it is not so much a decoding of signs and signifiers which must take place here, but a way to conceive these interactive offers as environments, or—following the suggestions of Benjamin—as buildings, which need to be inhabited rather than 'read.'

So, these kinds of participatory sound works require engagement from the listener/user. Only those who take part are able to experience the artistic offer. A judgment from a distant point of view, from an objective perspective outside the activity is not possible. There is no objective perspective which gives to the observer a fixed view or standpoint. Distancing is not possible besides ignoring the artistic setting itself. Those who participate become part of the aesthetic concept and—at least in the beginning—confirm it through their participation. Perceiving is participating, like during the process of soundscape listening. And listening means being part of the environment.

Besides the substantially new creative possibilities which the interactive nature of the digital networks is making available, there obviously are also a number of problems. To keep it brief, I will refer only to the main ones: if the rules and the frame of an interactive setting are too complicated, the recipient might be overwhelmed and uses the offer for participation only in a superficial and trivializing way. However, if the frame is too simple, the value of the experience as well as the motivation to participate will be small.

The biggest risk concerning the topic of listening and aural appropriation is, in my opinion, that the strong operational involvement of the user implies a tendency for the listening activity to be replaced by zapping and non-stop interactivity. Related to that is the question of how to identify the borderline where a responsive artwork becomes perpetual animation. This can result in a loss of autonomy for the recipients, as it becomes unclear, whether is it they who appropriate the artwork or whether it is the art, the system, the digital environment, which appropriates them.

These problematics show clearly, that listening in the classic sense of the word must not and cannot be replaced by the interactive listening of the digital age. And broadcast media will be as important as ever, maybe even more important, as their role becomes illuminated by the networks, their possibilities and their limitations.

As one of AE's major aims is to encourage listening and soundmaking, it is indispensable to create a differentiated auditory awareness in relation to the situation, the media and media architecture, in order to establish appropriate attitudes for aural appropriation in each of these situations. Listening as a cultural technique implies that we master these attitudes of listening and are able to use and develop the different ears in order to listen and understand. Listening in the classic, contemplative way is still important, and so is any situation and medium, which requires this more passive receptiveness, as it is the pre-requisite for profound understanding. The trials and errors of interactive aural appropriation can stay incomplete, and might give—depending on the participant's operational and technical capabilities—only a limited impression of the sonic potential of the artwork.

My goal, as the producer or curator of such works is to create an aesthetic-communicative experience within a culture of listening. This can be compared to the satisfaction one experiences during a good conversation: a conversation exists within a framework of topic and behaviour, which then is filled by the improvisational liberties and the intellectual and emotional qualities of its participants. If they constantly refer to the framework, then the conversation is directed and re-directed towards sense and meaning. This does not only need the participants' operation and active engagement, but also—very essentially—their willingness to listen in order to understand their counterpart.

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http://www.swr.de/swr2/audiohyperspace/index.html
http://www.sonic-media-art.net