The Urban Nightingale or some theoretical considerations about sound and noise

By Detlev Ipsen

The *Zeit*, one of the important weekly journals in Germany, recently published a number of articles about noise (Die Zeit, august 9th 2001). They relate a lot of interesting information. For example, it is mentioned that the volume of a police car's siren has risen forty decibels since the beginning of the last century (this single fact can tell us a lot about the volume of other sounds in German cities). We are also told that during the last twenty years the average level of the urban acoustic volume has doubled and there is no indicator that this tendency will decrease. More than 65% of the people feel disturbed by traffic noise. More than 25% of the male population between the age of 14 and 25 years suffer from ear diseases.

But at the end of all these articles, there is no proposal that tells us what should be done either by the people or their politicians to reduce such noise. Henrik Karlsson has given us some important ideas about the political, economic and scientific barriers, which inhibit positive changes (Karlsson 2000, p.10). Karlsson proposes that a healthy acoustic environment should become common right.

To realize this political aim it is necessary to find a clear definition of noise and sound. On the one hand this may seem simple. We know that a physiological limit for acoustic volume exists which is harmful for an average person. But this will not be the normal case. In the everyday life the quality of acoustic environment is differentiated in comfortable and uncomfortable. But to find out which acoustic environment is comfortable or uncomfortable is even more difficult.

This paper will discuss a proposal to define the difference of sound and noise, which will hopefully become a pragmatic orientation: I will try to develop a theoretical idea about an acoustic environment which people find more attractive than another one. On the basic of these theoretical considerations this paper will discuss some proposals how one could design an urban soundscape which is a little bit more comfortable than the existing one.

Definitions of Sound and Noise

R. Murray Schafer proposed four types of noise definitions, which vary from subjective to objective (Schafer, 1977, p.182):

1. Unwanted noise

2. Unmusical sound (defined as non periodic vibration)

3. Any loud sound

4. Disturbance in any signal system

From my point of view, three of them (unwanted, loud, disturbance) belong to the same psychological concept: frustration. In the field of psychology, frustration is a key concept. Frustration means the interruption of behaviour at the level of one person. The unwanted sound, the loud one and the disturbance of any signal system are independent factors, which have a high probability to interrupt an ongoing process of action. Frustration is the emotional response to an interruption of a process, an action or behaviour, which would satisfy a person. Sometimes frustration is followed by aggression. To give an example: if a student concentrates on the solution of a mathematical problem and in the same moment a baby starts to cry this will interrupt him. If the student is stressed this acoustic stimulus will frustrate him. He will interpret the baby's cry as noise. On the other hand parents might perceive the same cry as a lovely signal.

Both the quantitative and qualitative indicators of noise can only be understood within a cultural frame of reference. Generally speaking, culture defines the signal and decoding system in which all forms of communication take place and culture also defines the acceptable volume of acoustic environments. In the Greek culture for example, in the mornings and at night a rather high volume is accepted, but in the afternoons. In the German culture high levels are accepted throughout the day but not during the night. Also the exceptions of this rule are culturally defined: popular festivals in Germany are so to speak the „permission" for a rather high volume, whereas between Sunday morning and afternoon the level has to be low.

In each culture again, one can identify various sub-cultures, group values and individual preferences referring to noise and sound in different ways. Which means for the definition of sound and noise, one can look at their level of social acceptance. In special places and defined areas these sub-cultural differences or individual preferences take place. The fans of car racing like the sound of racing cars but in every culture this sound is restricted in time and space. The sound of car racing in Monte Carlo is accepted and even loved in some parts of the city but restricted to a certain period of time. If some young drivers race cars in other parts of the city or outside the racing season in the same part of town, people will become angry and even the police may intervene.

Both culturally and individually, we can define the difference between sound and noise by our 'likes' and 'dislikes', by the sonic environments that we seek or avoid, by what arouses or frustrates us. This is very similar to the notion of noise as unwanted sound given by Schafer cited above.

But we have to make clear that sound and noise should not be understood as a dual relation but as a continuum. For this reason, one has a very broad and complex range within which the 'optimum' acoustic environment is identified.

Schafer pointed out, that it would be necessary to analyse the whole acoustic environment because it is not just one sound signal that may be disliked but a complex structure of various sounds. I would like to emphasize that it is necessary to analyse the whole perceptive field because there is a high interrelation between our visual, acoustic, olfactory and tactile perception of the environment. One can define an 'ecology of perception' as a balance of these different sensual modes. That way each sense is able to develop its optimal potential within the integrated or synaesthetic level of perception. This leads us to the concept of the perceptive situation. It includes all stimuli, which affect the individual mode of evaluating the quality of the acoustic environment of a person. To understand why sometimes a specific acoustic stimulus frustrates a person and sometimes not, we have to analyse the whole perceptive situation.

Some one may argue, that it is simply an overload of acoustic stimuli, which leads to evaluate a situation as frustration, but we hypothesise, that to analyse the perceptive situation will be more successful to understand the difference of sound and noise.

Avoiding a conservative bias

Since the very beginning of the *World Soundscape Project,* the quality of the acoustic environment was its main issue. Murray Schafer formulated a rather clear and simple hypothesis concerning the quality of a soundscape - „The transition from rural to urban life can be characterised generally as a passage from the hi-fi to the lo-fi soundscape." (Schafer 1976, p 6) The reason for this, Schafer argues, is the loss of daily and seasonal rhythms, of „synchronised beauty", which can be found in natural environments. In this sense, the European villages, which have been studied by Schafer's research group, seem to belong to the natural environment, or their soundscape can be described by the same rhythms. Just the opposite is argued to be typical for urban settlements. „An (urban) lo-fi soundscape is one in which trivial or conflicting acoustic information masks the sounds we want or need to hear. Everything operates simultaneously with much wasted acoustic energy and attendant destruction of nerves and eardrums" (Schafer, 1976, p 6). Besides the fact that this formulation has a clear anti-modern and anti-urban connotation,

(which is mainly motivated by the feeling of being separated from 'natural' and familiar patterns by the process of industrialization and modernisation), it can also be understood within the frame of a general theory of motivation, especially the theory of complexity which I like to use for the analysis of acoustic quality.

This paper proposes a different theory to that of Schafer; it is not the difference between countryside and urban places which produces hi or low fidelity, but the level of acoustic complexity which influences the evaluation of the acoustic environment.

The Theory of Complexity

Let us start with a short story. A friend of mine told me once to go to a certain place in the city to listen to the beautiful sound of a nightingale, singing in the middle of an urban industrial landscape. That same night I searched and found the described place. It was a triangular area between two rail tracks and a highway. A narrow path for railway workers passed some bushes and a number of small trees. At night I could hear the sound of the city, running trains, the voices of some men cleaning the wagons of a train, the rhythmic sound of cars leaving a tunnel and the song of one or two nightingales. Like my friend, I felt this place was fascinating because the acoustic experience seemed to be contradictory. I am used to hear the song of nightingales in the countryside. It is connected with a farmhouse holiday and not in the least – like here – with the context of my everyday urban life. This 'contradiction' or abnormality could be the reason for the song of the urban nightingale being more attractive to me than a rural one.

This story leads us to some theoretical considerations. An acoustic situation may be attractive because it does not fit into our normal experiences, such as the nightingale's song. But without doubt this does not apply to all persons. The urban nightingale will be attractive for a person who seeks new, unexpected, bizarre and complex information. But another person may define the situation as an unattractive one for the same reason. For him or her it is too unexpected, too new, too bizarre, and too complex. And a third person may feel that the situation is not attractive because he or she had bad experiences in cities at night. This person may feel anxiety in this dark and strange locality in between railways and an urban highway. If one is timid, he or she is stressed and not open to new information.

That means we need some more theoretical knowledge to come to clarify the different reactions to identical acoustic situations. To understand how people judge their acoustic environment, the stimulation theory seems to be useful. Berlyne, who did a lot of work in this field, stated a hypothesis and tested it with a lot of experiments (Berlyne 1974). The hypothesis follows the idea that the motivational value of a situation may depend on the information, which belongs to

it. The relation between the motivational quality of a situation and the complexity of its information is a non-linear regression. Let me explain: if the complexity of the information is rather low we find a situation less attractive. The same is the case if the complexity is very high and therefore not „readable". Between these two extremes, there is a level of complexity, which generates the highest possible motivation of an individual. This applies to any form of information including acoustic information.

Figure: Complexity of Information and Motivation (curiosity)
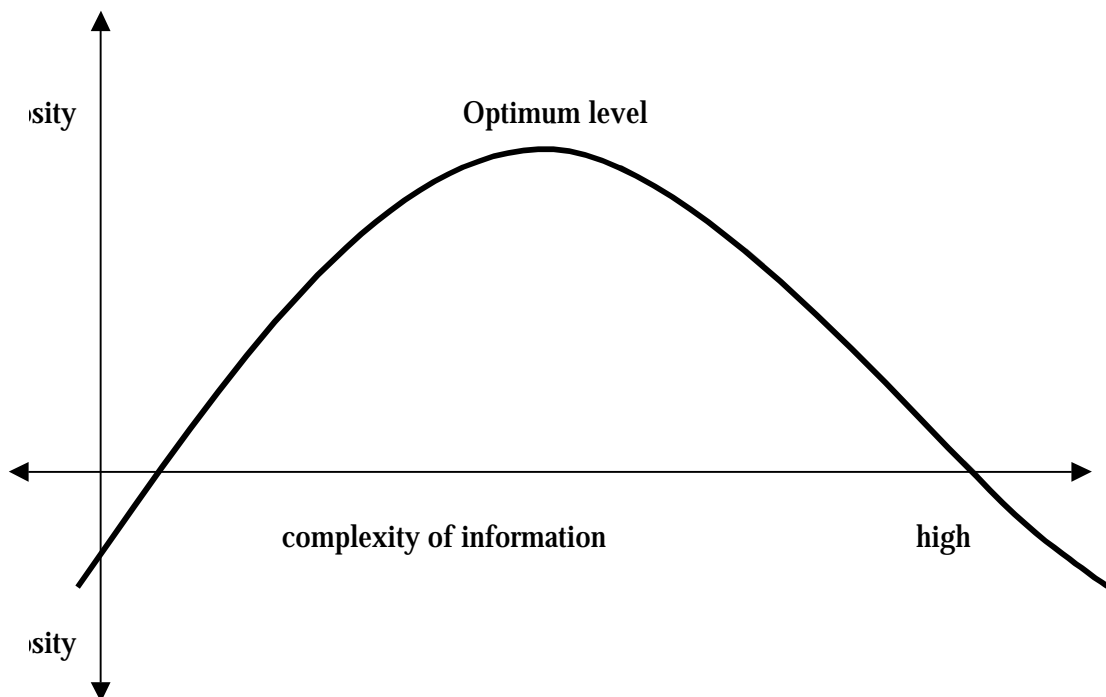
We do know this from our everyday life. If a situation does not have any new aspects for us, we feel bored. We will not be motivated to look for this kind of situation. On the other hand if we feel that a situation is overloaded, we try to escape. So the complexity of a situation basically determines the quality of a situation. We also know from our daily experiences, that the way in which people define a situation varies. For different individuals the same level of complexity may be attractive or unattractive. This shows, that the way the complexity of a situation is judged depends on the individual adaptability and the features of the situation. The more one knows a situation the less complex the information input gets for this person. A person with a high level of adaptability needs more complexity to find a situation attractive than another person with a low adaptive level. But even for one individual the level of adaptability is not stable but dynamic. A person may perceive a situation to be too complex one moment, tomorrow it is judged to be at the optimum point, and the day after it is too simple. All this fits into our

everyday experiences: We know a friend who is bored in a city which we think is very attractive, and we find ourselves becoming tired, if we hear the same story several times.

At this point one can conclude that the definition of the quality of a soundscape is partly a function of its complexity. The complexity itself is the outcome of a dynamic relationship between one individual's level of adaptability on the one hand and the informational properties of the situation on the other. This relationship varies between different individuals and also between different cultural groups. It also varies with time as a function of collective experiences and knowledge that individuals or groups gain throughout their lives.

Let us go back to the question for whom the song of the urban nightingale is attractive and for whom not. For myself the quality of the urban nightingale can simply be explained through the innovative character of the situation. This raises the complexity to a level, which makes this urban-industrial visual and acoustic landscape attractive to me.

This theory as far as it is developed up to now may explain the hypothesis of Murray Schafer as well: The perception of nature or a village from an urban perspective includes a lot of innovative elements. In this sense it may be the difference, which causes the beauty. In the unattractive urban soundscape, the feeling of conflicting information may be due to a lack of structure, which can be used to understand this soundscape as a melody or to speak in terms of psychology: to understand the soundscape as a gestalt (shape / figure), which makes sense to us.

An example may be useful: The one who likes the urban nightingale might be a student in urban aesthetics. He knows a lot of cities and different urban soundscapes. Because of his experiences with this issue he achieved a high level of adaptability. To be satisfied he needs unexpected and complex situations. Another person studies the song of birds in a purist way. Each acoustic or other stimulus frustrates him because it disturbs the pure song of a bird. This person has a high level of adaptability as well, but the focus of his interest leads him to another interpretation of the situation. He may perceive the urban context of the nightingale's song as noise. A third person visits the city after a long stay in a very quiet mountain area. His level of adaptability is rather low. Therefore he will interpret the perceptive situation of the urban nightingale overloaded and defines the acoustic environment there in general as noise.

The perceptive situation

In the next step we have to define the meaning of the perceptive situation. A perceptive situation has three components. The first one is the *focus*. In our story the song of the nightingale is the focus. It is the reason why my friend advised me to visit that place and it has been the motivation

for me to stay there for an hour or even more. The second component is the *context*. The contextual qualities of this triangular area were the sound of cars and of railway traffic, the voices of the workers and the murmur of the city. Besides the acoustic elements, the shadows drawn by some lights and the darkness of the trees and bushes are part of the contextual component. The third component of the perceptive situation is the *knowledge.* Knowledge, which was gained from past experiences in similar circumstances and the stories, associated with them. These residual elements are of great importance. They are not only the bridge between the different time intervals of our biography but they also connect our personal experiences with the collective knowledge of our culture. In our story, I remembered the songs of nightingales I had heard earlier in my life and associated these events with the countryside and my holidays. The particular attention I gave to the nightingale was caused by the exception of a bird singing during the night and the importance this bird had for the atmosphere of a summer night in the middle of Europe. In this way my former knowledge of a nightingale singing at the countryside has been placed in an urban context. This relation creates a rather high level of complexity and leads to a positive evaluation of the urban nightingales song.

 To understand complexity one has to analyse the whole situation created by the focus, the context, and the residual. Sometimes we do not like a soundscape because the context is overwhelming, but the focus we would like to hear. I guess this is what Schafer is referring to when he describes the urban soundscape as 'trivial'. Sometimes the quality of a situation is due to the fact that the context and the focus are changing all the time. This is very often the case if we describe an urban situation in a positive sense. In any sound portrait of Manhattan one can find the voices of people from different ethnic cultures and the sound of fire sirens. The most important factor for rating a soundscape is the residual element. The individual and the collective memory draw the frame of reference for our evaluation of the situation. If someone has an anti-modern, anti-urban or anti-technical attitude he or she will not try to find interesting sounds in such parts of our world. He or she will not understand people spending their weekend to listen to the sound of a car-race. The mixture of rap and the acoustic rhythm of skateboarding will be understood as noise. And if one has an urban and modern attitude that person will never understand the farmer listening to the cows mumbling in the stable. These attitudes are the more fixed parts of memories but millions of associations are a rich pool to create new melodies and form a new shape. I know that these arguments simplify the real world, which is not as dual. Postmodernism has been helpful to open the mind and escape the dual frame in which the world was seen before. Our experiences provide the possibility to combine contradictions with new images. But still it is true that our experiences of yesterday structure the perception of today.

To change the scope of our perception is not easy because we need a stable frame to keep our system of orientation working. In search of some strategies to create more awareness of environmental issues we developed, together with a group of artists, a sound installation in the centre of Frankfurt. People shopping in a market hall were able to hear different sounds of water where normally no water can be heard. The theory behind this installation was to change the normal acoustic shape of this place and open the mind to associate the urban daily routine with feelings or reflections on the use of water in the city. The experiment did not have impact on all the people crossing the square on their way to shop. But at least 30% spent significant longer time than the control group on the square and most of the people who were interviewed gave statements about the relationship between the urban and natural environment.

We can conclude that, if the success and chance to change peoples perceptive frame is measured of the number of persons who spent more time as usual in the new soundscape context, we can be optimistic.

Pluralistic soundscapes

This gives us the chance to switch from the theoretical remarks about complexity and the value of soundscapes to the question how acoustic environments using the stimulation theory and the idea of complexity as guidelines can be designed. We live in a pluralistic world and sociology tells us that in most western countries the trend of living in individual concepts will grow (Beck 1996). This leads us to some ideas how one could design the urban soundscape in a way, where different people, groups and cultures will find their own and appropriate level of complexity in their everyday life. Four types of soundscape patterns may help us to develop such a design.

The most traditional one is the dual soundscape. We know this as a general structure of historic European cities. The crowded marketplace and the busy main street is one image of the city. The quiet church or monastery, the semi-private square in a neighbourhood, the garden of a family home is the other side. The dual soundscape correlates with a dual organisation of space and time in general. So we perceive the space as urban or rural, the time as day or night, the life as public or private, the social structure as rich or poor, the demographic situation as young or old. All these dual patterns are associated with specific, mostly traditional, sound cultures and soundscapes. The soundscape of a village has been associated with traditional songs, the chime of the church's bell and the rhythm of work in a shop for handicrafts. The city is associated with traffic noise, the sound of running people and big factories. In a dual soundscape pattern one can easily switch from one level of complexity to another and even change the type of gestalt. But in fact this traditional dual pattern is more and more mixed and differentiated. The quiet parts of the

city are often colonized by tourism; the private space is penetrated with the sound of radios, televisions and telephones. On the other hand the sphere of the public becomes more private with mobile phones and highly fragmented social organisation. And this is also true for most of the other dual pairs especially for the difference between the urban and the rural. But even in this situation, we can analyse any space - a city, a village, a suburb, or a whole region - and try to identify the potential of dual soundscapes. Sometimes only small interventions are needed to transform a square into a place of contemplation or to organise a dialogue between a private pocket garden and a highly frequented street. A good example is the inner square of the Louvre. The sound of constant running water makes this square quiet though thousands of visitors are waiting there. One can try to develop parts of the city for different cultures and help in this way to differentiate the soundscape and lower the level of complexity. To differentiate the sound with time and space patterns will equip the cities with a more pluralistic soundscape.

The second pattern I would like to propose is the conversational soundscape. So one can define a soundscape, which is based on dialogues. To perceive a soundscape as conversational, the acoustic environment has to be understood as a process. A very well known example of this pattern is the horns and sirens of ships and trains in the Vancouver region. Sometimes this dialogue starts self-organised. You still find this phenomenon when the cocks in Athens or Cairo start their day. As soon as one of them starts crowing the next one will answer and after some minutes a conversational soundscape has been created. The modern equivalent of these cities is the dialogue of taxi drivers sounding their horns. But a dialogue can also be designed. The city of HannMünden has realized a sound performance, which is constructed as a dialogue between the designed sound and the self organized or auto poetic soundscape of the city. The sound installation reacts to the acoustic situation of the city.

The third soundscape pattern is synthetic. Synthetic means the combination of different images and sounds, which normally do not go together. With their gathering a new soundscape is created. We know this very well in the field of music. The mix of Andalusian and Maghrebean music is a successful example. The get-together of railway sounds and the song of a nightingale is another. The more our world becomes intercultural the greater is the chance to create synthetic soundscapes. As far as I can judge, the synthetic soundscapes will be more experimental and may fit better into a sub cultural milieu.

The three different types of soundscape patterns correlate with different levels of complexity. The dual pattern is the least complex one; the synthetic patterns possess the highest complexity. We have argued that the perceptive situation nowadays is very differentiated as well. Different

individuals and different subcultures need different levels of complexity. If the urban area is designed in a way that people can find the different patterns of soundscapes in different parts of the city then you will get a situation where people can choose their optimum sound place. In this way a pluralistic soundscape design may be appropriate for a society, which differentiates more and more.

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