Sound Studies

Background of Comparative Musicology and Ethnomusicology
Comparative musicology, the fore-runner of ethnomusicology, was first established as an academic field, branching out of musicology, in the 1880s. At the time its role was to compare Western classical music to the 'exotic music' which was being discovered outside Europe, primarily by people travelling to colonies. This way of comparing musical sounds was made possible by the invention of the phonograph in 1877 by Thomas Edison (enabling field recordings), and the development of the cents system of pitch measurement in 1885 by AJ Ellis (allowing for objective measurements of non-Western scales) (Helen Myers, *Ethnomusicology: An Introduction,* 1992, p.4). This was scientific enquiry, very much removed from the actual process of music-making.

At first comparative musicology was very 'hands-off', and early academics such as Carl Stumpf and Erich M. vo Hornbostel in Germany did not conduct fieldwork. Instead, they made scientific studies of music recorded onto wax cylinders by German ethnologists working in the colonies. However, into the twentieth century this gradually changed with the work of collectors in Europe and America including as Bela Bartok in Hungary, Percy Grainger in England, and Frances Densmore in the United States.

The term 'ethnomusicology' is relatively new, and was coined in 1950 (as ethno-musicology) by Dutch ethnomusicologist Jaap Kunst, and in 1956 converted to 'ethnomusicology'. This came from the Greek words 'Ethos' (meaning 'nation'), and 'Musike' (meaning 'music'). This term was considered more suitable because, as Allan P. Merriam wrote, 'music does not exist by and of itself but as a part of the totality of human behaviour'. During the twentieth century, Ethnomusicology has become more anthropological in nature, and has expanded to embrace the study of all musical styles from all parts of the world.

The Cultural Anthropology of Listening
In recent years, the concept of 'creative listening' in anthropology has been examined in some depth by the ethnomusicoligst Max-Peter Baumann. Baumann is the editor of the journal, *The World of Music,* and in 1997 and 1999 he produced two special issues of the journal which concentrated on the anthropology of listening. While creative listening in general terms is often a term attributed to the ability to actively listen to and empathise with a speaker, Baumann uses this term to describe listening habits of people within cultures related to the sounds which they hear around them. He considers the listening habits of people as culturally-determined, and argues that interpretations of the sounds which people hear around them are based on their cultural backgrounds and traditions. Sounds can be placed along a continuum from musical (at one end) to nuisance (at the other). Where a person places a sound in terms of its level of musicality or annoyance can vary between different cultures, and therefore the way in which sound is heard can be vastly different. Listening, according to Baumann, structures, orders, creates, forms, compares, understands and misunderstands. Listening is interpreted as a means of understanding our surrounding environment, and 'corrective listening' is a term used by Baumann to describe a way of placing the sounds which a person hears within their own culturally determined world view.

Systematic Musicology is an umbrella term used mainly in Central Europe (and particularly in the German-speaking world) for several subdisciplines and paradigms of musicology addressing music in general, rather than looking into specifics. This is one of three main sub-disciplines of

musicology, the other two being Ethnomusicology and Historical Musicology. The main focus of Systematic musicology is analysis of empirical data and development of theory. Systematic musicology combines sciences and humanities where the scientific side is mainly concerned with data and involves disciplines including psychology, sociology, acoustics, and psychoacoustics. The humanities side involves disciplines such as philosophical aesthetics, media, and culture.

Of particular interests in terms of the Soundscapes Rostock project was the area of **psychoacoustics**. This is the term used to describe a branch of science concerned with the study of sound perception. As a branch of psychophysics, psychoacoustics is concerned with way sound is interpreted by the brain, the way a person behaves with sounds, and the ways in which sounds affect a person's behaviour. (Schafer, 1994 [1977]: 4)

Acoustic Design

A new interdiscipline between science, social science, and art (most importantly music), Acoustic Design 'attempts to discover principles by which the aesthetic quality of the acoustic environment or soundscape may be improved.' (Schafer, 1994 [1977]: 271). The idea of acoustic design is to think of the soundscape as a 'huge musical composition, ceaselessly evolving around us'. Designers look at how the sound environment can be improved to bring benefits to those living in it - richness and diversity, never destructive to human welfare. Designing a sound environment to bring benefits to those living in it.

Acoustic Ecology

Closely related to psychoacoustics and acoustic design, acoustic ecology is the study of the effects of the acoustic environment (or soundscape) on the 'physical responses or behavioural characteristics of creatures living within it.' (Schafer, 1994 [1977]: 271). Of particularly concerned to acoustic ecologists is imbalances within the environment, where the acoustics have a negative effect on its inhabitants. This led to the founding of the World Forum for Acoustic Ecology in 1994. The main concerns of members, who cover a range of disciplines, is the state of the world's soundscapes, and members are engaged with the study of the 'social, cultural and ecological aspects of the sonic environment'. (http://wfae.proscenia.net, last accessed 12 February 2011)

In 2003, the Acoustic Ecology Institute was founded which is concerned entirely with the environmental effects of human sound. Through the institute, research has been conducted and conferences, lecture series, and soundscapes awareness programmes in schools have been organised. The mission statement of the Institute about its work is as follows:

> The Acoustic Ecology Institute works to increase personal and social awareness of our sound environment, through education programs in schools, regional events, and our internationally recognised website, AcousticEcology.org, a comprehensive clearinghouse for information on sound-related environmental issues and scientific research. One public policy questions, we tend toward the precautionary principle (erring on the side of caution while awaiting definitive research). Our over-arching goal is to help find pragmatic ways to bridge the gaps between extreme positions voiced by advocacy-oriented organisations, and so to contribute toward the development of ethical public policies regarding sound.' (www.acousticecology.org/aboutus.html, last accessed 12 February 2011)

The Idea of the Sound Object and Sound Event

The term 'sound object' (or *l'objet sonore*) was invented by the mechanical engineer Pierre Schaeffer following psychoacoustic experiments carried out in Paris by a French Radio research

group in 1946. He defined 'sound object' as 'the smallest self-contained particle of a soundscape'. With a beginning, middle, and end, the whole sound is heard from the attack to the decay. All sounds will have slightly different attacks, bodies, and decays, and some (such as bells, gongs, pianos and percussive instruments) will only consist of attack and decay. Schaeffer saw these sounds as separate to the actual physical sources of the sounds, the sounding bodies. While sound objects were considered as non-contextualised laboratory specimens, the individual sounds which are considered in context and alongside their associated meanings are called sound objects.

Soundscapes Projects

The World Soundscapes Project
Focussed on the comparative study of the world's soundscape, the World Soundscape Project was founded in 1971. It is based at the Sonic Research Studio of the Communications Department at Simon Fraser University, British Columbia. Research has been conducted through the project at a national and international level in the areas of aural perception, sound symbolism, and noise pollution among others. All the projects have attempted to unite the arts and sciences and through this develop the inter-discipline of acoustic design. More details can be found at: http://www.sfu.ca/~truax/wsp.html (last accessed 12 February 2011).

Five village soundscapes
Developing out of the World Soundscapes Project was a detailed soundscape analysis called 'Five Village Soundscapes', found at http://www.sfu.ca/~truax/FVS/fvs.html. Here, the villages of Skruv (Sweden), Bissingen (Germany), Cembra (Italy), Lesconil (France), and Dollar (Scotland) were analysed through acoustic profiling on hand-drawn sound maps and other means.

Hi-Fi and Lo-Fi Sounds
Being able to appreciate the difference between high fidelity (or hi-fi) and low fidelity (or lo-fi) sounds, and being aware of them, is an important aspect of working on a soundscape project. This was particularly so with 'Soundscapes Rostock', because the main aim of the project was to define the character of the city and its district through the distinctive sounds which could be found there. Hi-fi sounds, as defined by Schafer (1977, p. 272), are those where there is a favourable signal-to-noise ratio. A hi-fi environment is a place where there is a low ambient noise level, and where discrete sounds (such as birdsong, footsteps, a church bell) can be heard clearly and are not obscured by background noise. Lo-fi sounds are those with an unfavourable signal-to-noise ratio. In lo-fi environments, there is what Schafer calls an 'overdense population of sounds'. A high level of background noise which obscures the ability to hear hi-fi sounds. Lo-fi sounds include traffic noise, air conditioning and fans, refrigerators, computers, and machinery. The human environment has become increasingly invaded by lo-fi sounds which have shrouded many of the more subtle sounds which might otherwise be heard.

Transcription and Notation

While notation (*Niederschrift)* is the representation of sounds and aural facts through visual signs, transcription (*Umschrift)* is the actual process of writing down these sounds. Notation always needs transcription, which is a tool for representing the sound. Transcription and notation are an important part of soundscapes studies, and the representation of sound through unconventional means has been explored by those working in the area including Raymond Murray Schafer and Jonathan Gunderlach.

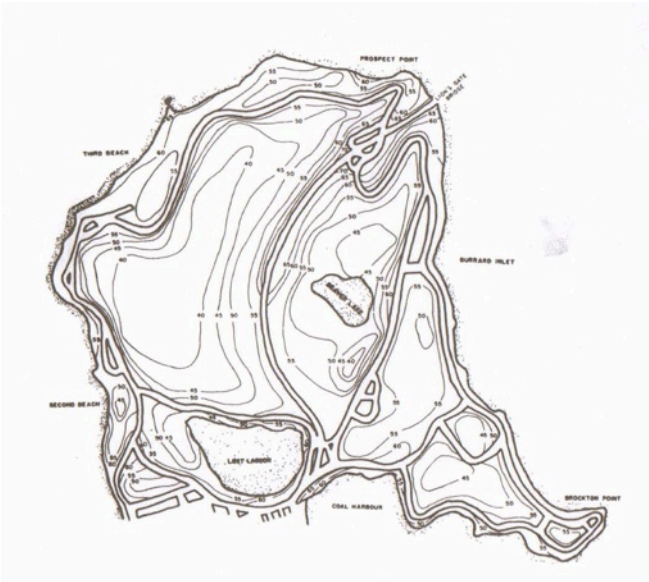
Types of Transcription

There are four main types of transcription. These are prescriptive, generalised, transcriptive, and descriptive. Prescriptive transcription is used by composers as a means of giving the performer exact instructions on how to play a piece. Prescriptive transcriptions are particularly found in Western classical music. Generalised transcription are simplified versions of a piece of music written down from several events where the piece of music has been performed, and thus standardised. One example of this might be where a folk song collector has recorded a number of people singing the same song, and written down a simplified version of the melody from having listened to a number of different representations of the tune from different performers. Transcriptive (or transcriptural) transcriptions are paraphrases in music, those departing from a particular event, and descriptive transcriptions are those which are explanatory, which illustrate the exact way in which a musician (or group of musicians) has performed a piece of music on a particular occasion. Much of the theoretical vocabulary used in transcriptions and analysis was borrowed from the visual arts and world of spatial appearances. These include high, low, ascending, descending, horizontal, position, interval, inversion, vertical, open, closed, thick, and thin.

Notation Systems

There are a number of notation systems in use, including staff, graphic, tablature, and syllabic. In terms of soundscape studies, the most useful type is the graphic representation of sound. Graphic sound representation began with the introduction of the phonetic alphabet, which is a system for prescribing the sounds of spoken words. In soundscapes studies, a number of different methods of graphic representation of sound have been explored, and these can be seen below.

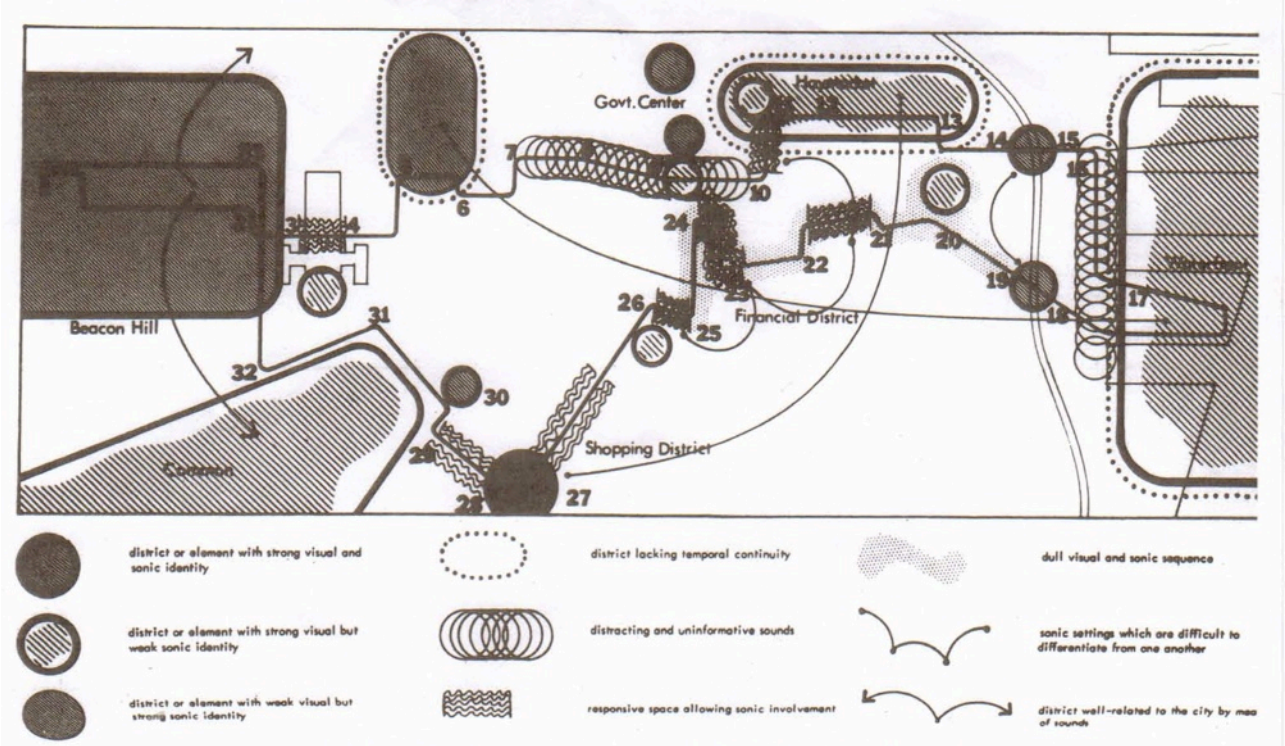
1. **The Isobel Map**



Stanley Park, Vancouver, British Columbia, 1973 (from Schafer, 1994 [1977]: 264)

The isobel map was derived from contour maps used by geographers and meteorologists, and shows the level of noise in different locations. On such a map the quietest and noisiest sections of a territory can be immediately identified. In the example above, the sound levels on footpaths in the Stanley Park in Vancouver were measured. This was done at intervals of roughly 100 yards between 10am and 4pm on a number of Wednesdays during May, June, and July 1973. Three readings were taken at each point and then averaged together in order to create the isobels on the map.

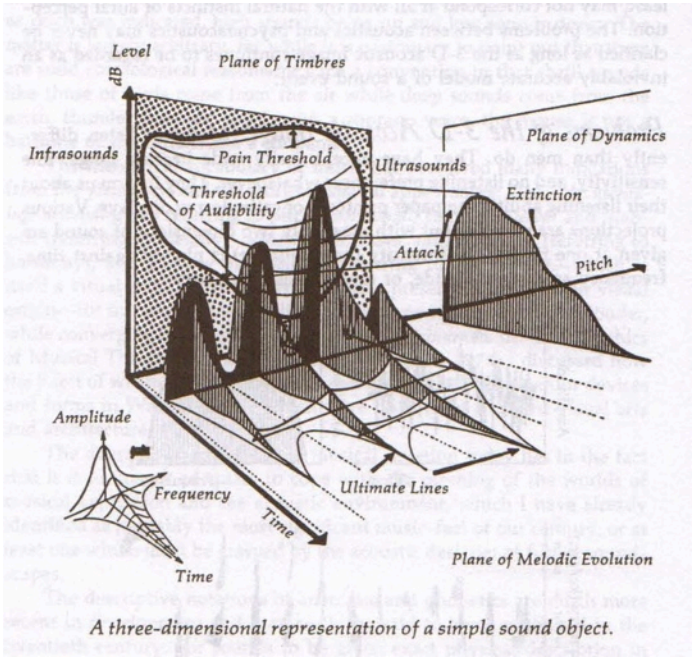
2. **Event maps**.



Boston Soundmap by Michael Southworth (Schafer, 1994 [1977]: 265)

These measure the distribution and recurrence of sounds. In terms of events maps, they are useful for comparing the sounds experienced at two locations and showing the more persistent or characteristic sounds. The material displayed in the events map is usually limited to a certain time period and collected by walking over or around the selected location.

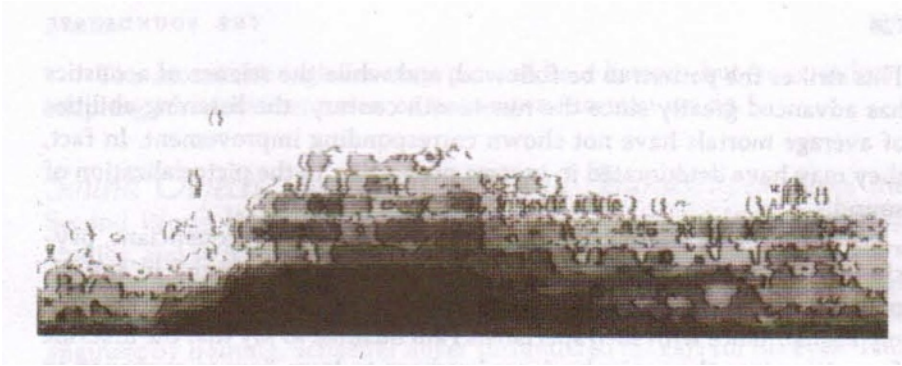
3. **3D Sound Representation.**



3D sound representation (Schafer, 1994 [1977]: 126)

These are three-dimensional graphs which show the amplitude (in decibels), frequency (in Hertz), and time period (in seconds) of a particular sound object.

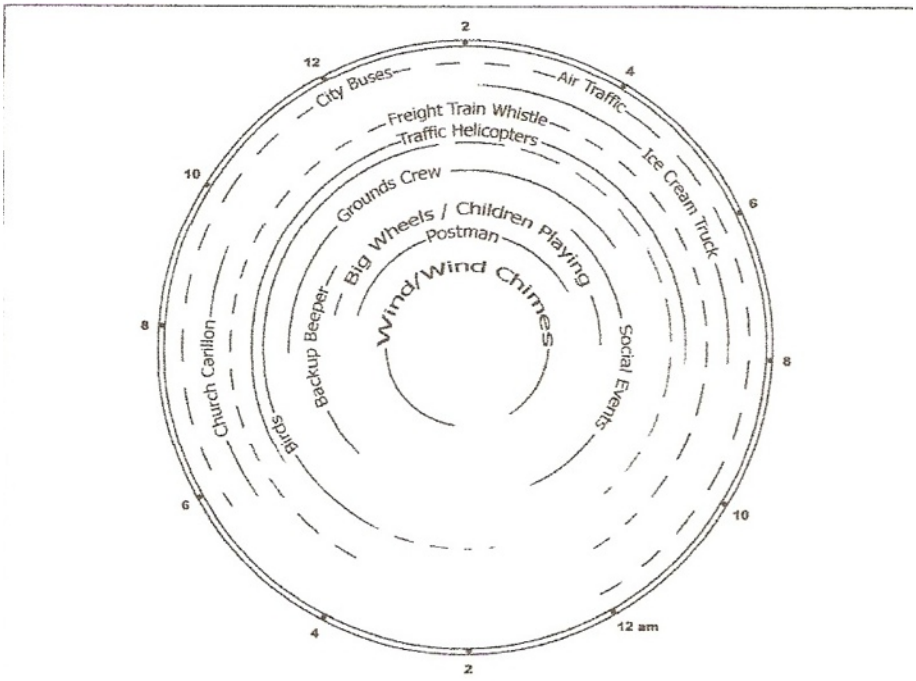
4. Sound Spectrograph



Sound Spectrograph of a Canadian Pacific Train Whistle (Schafer, 1994 [1977]: 127)

This was developed at Bell Telephone Laboratories in Princeton. and incorporates all three dimensions of sound with the shading showing intensity (or loudness, measured in decibels).

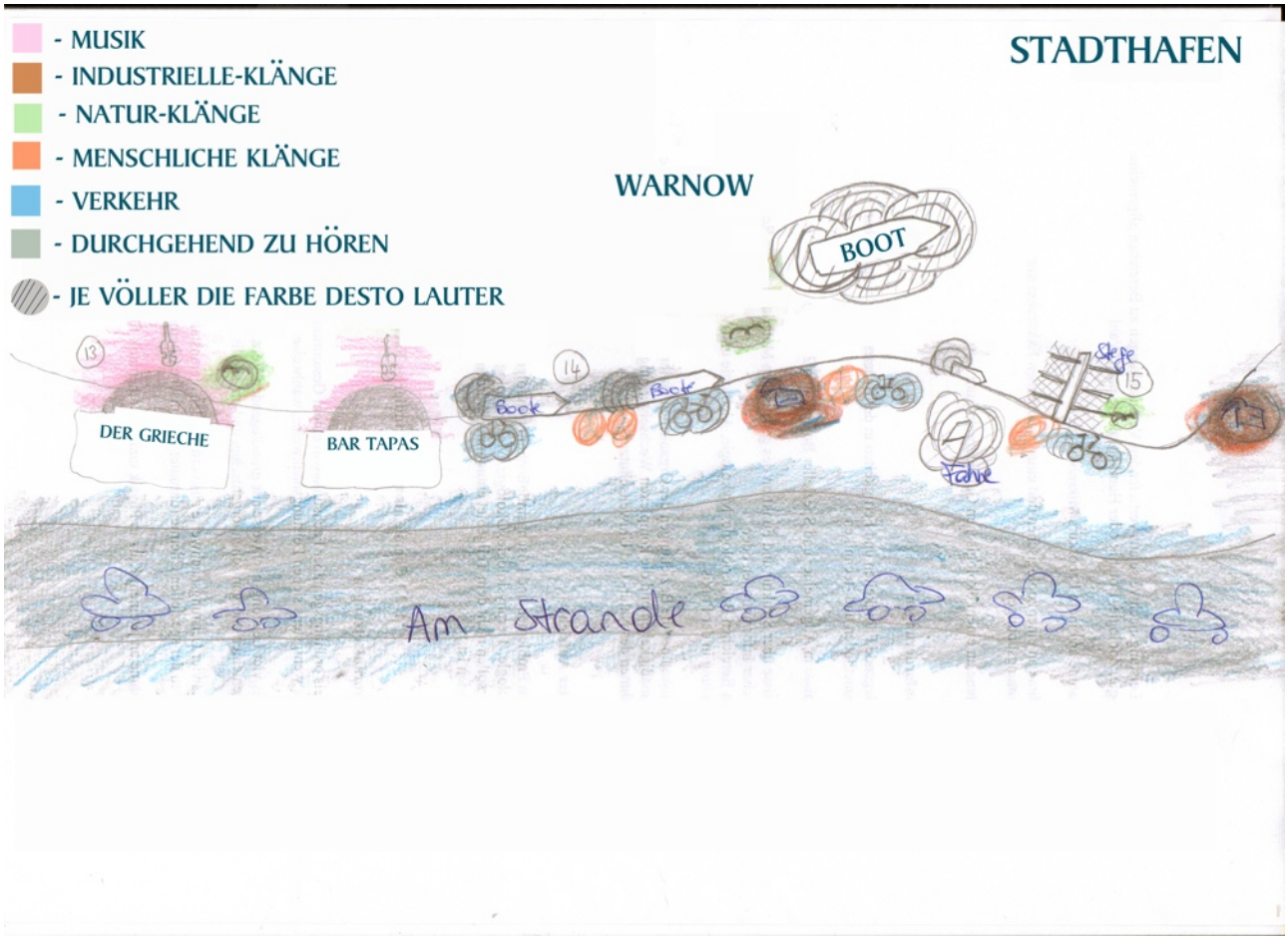
5. Cyclical Sound Charts



These charts show the daily or seasonal cycles of sounds heard in a certain place. The above transcription was made by Jonathan Gunderlach ('Sound: Exploring a Character-Defining Feature of Historic Places', *APT Bulletin*, Vol. 38, No. 4 [2007], pp. 13-20) to visualise the daily cycle of sound events in the village of Chatham, Pennsylvania.

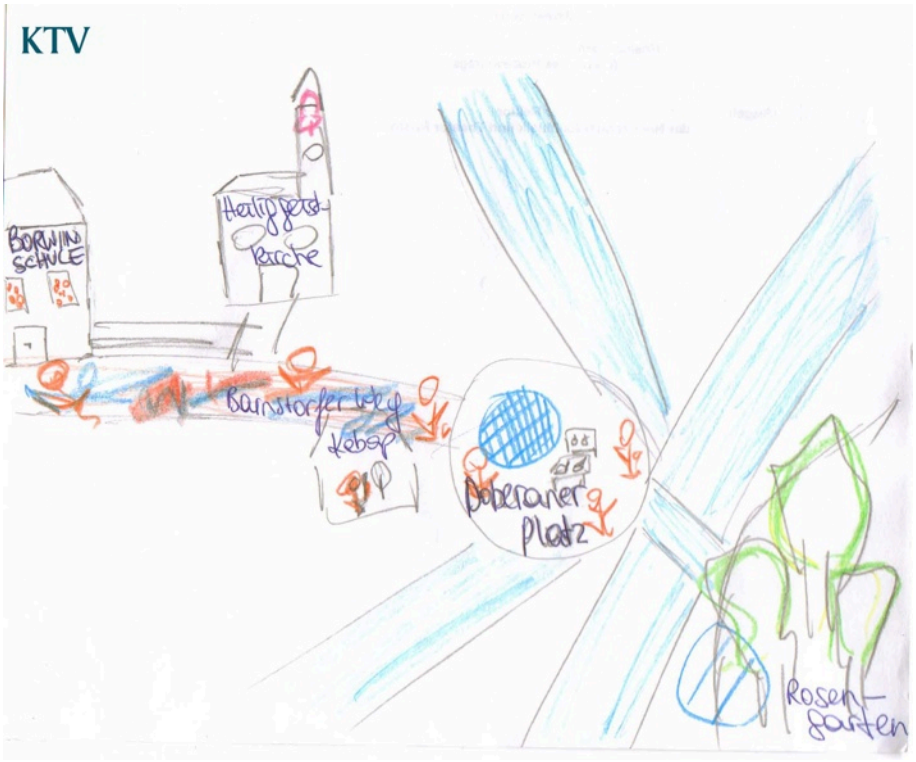
Transcriptions Made in Connection with the Soundscapes Rostock Project

Below are some of the transcriptions which were made in connection with the Soundscapes Rostock project.



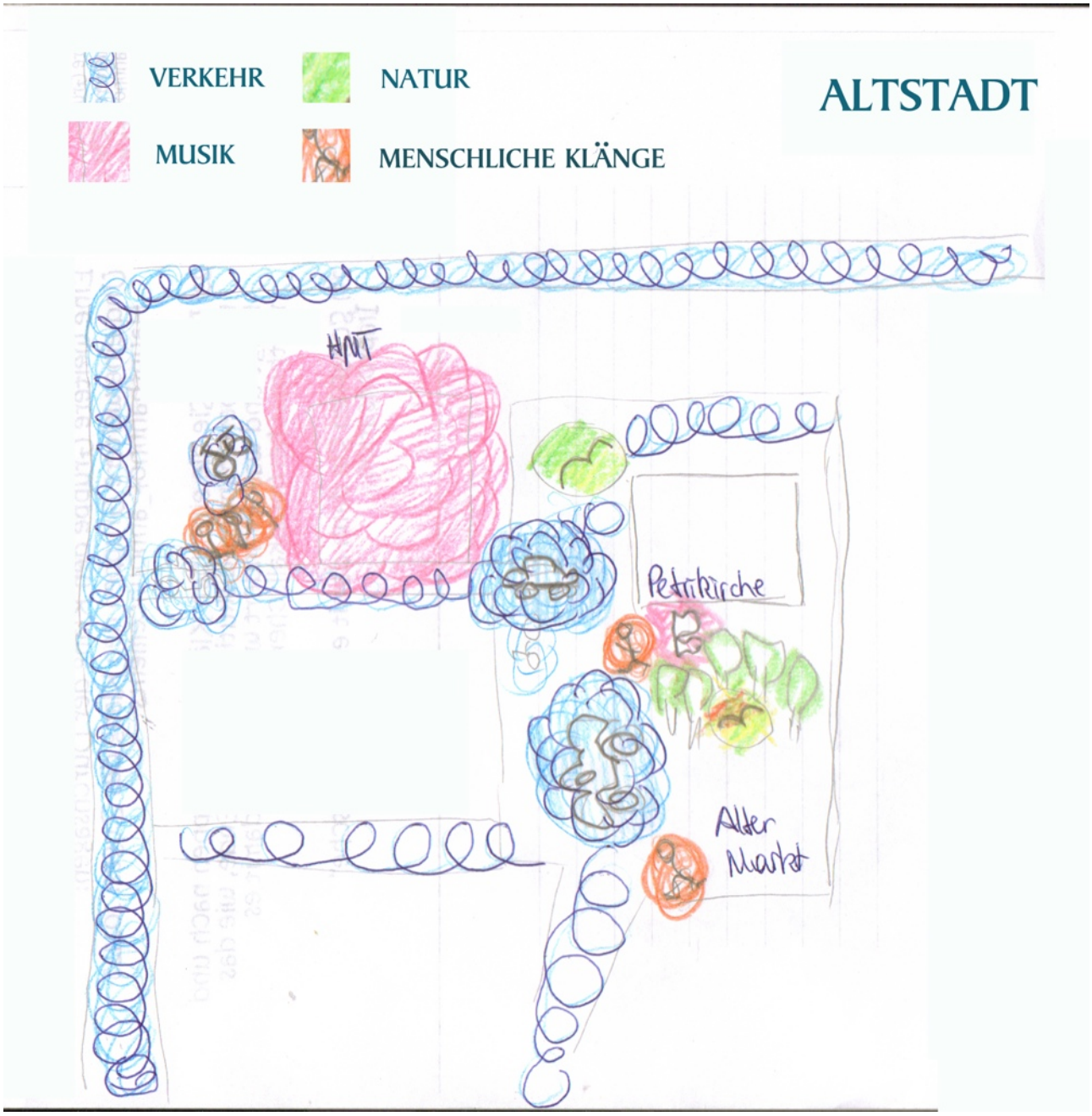
Stadthafen (drawn by Frances Wilkins)

The visualisation of the sounds experienced at Rostock's Stadthafen on 11 November 2010 during joint fieldwork by Frances Wilkins and Barbara Alge. The walk started near the HMT and continued along the Warnow River until we arrived at the Greek Restaurant. From there we went inland towards the KTV district. The sound of traffic, bicycles, boats, creaking pontoons, seagulls, industry, and restaurants are visualised on the map.



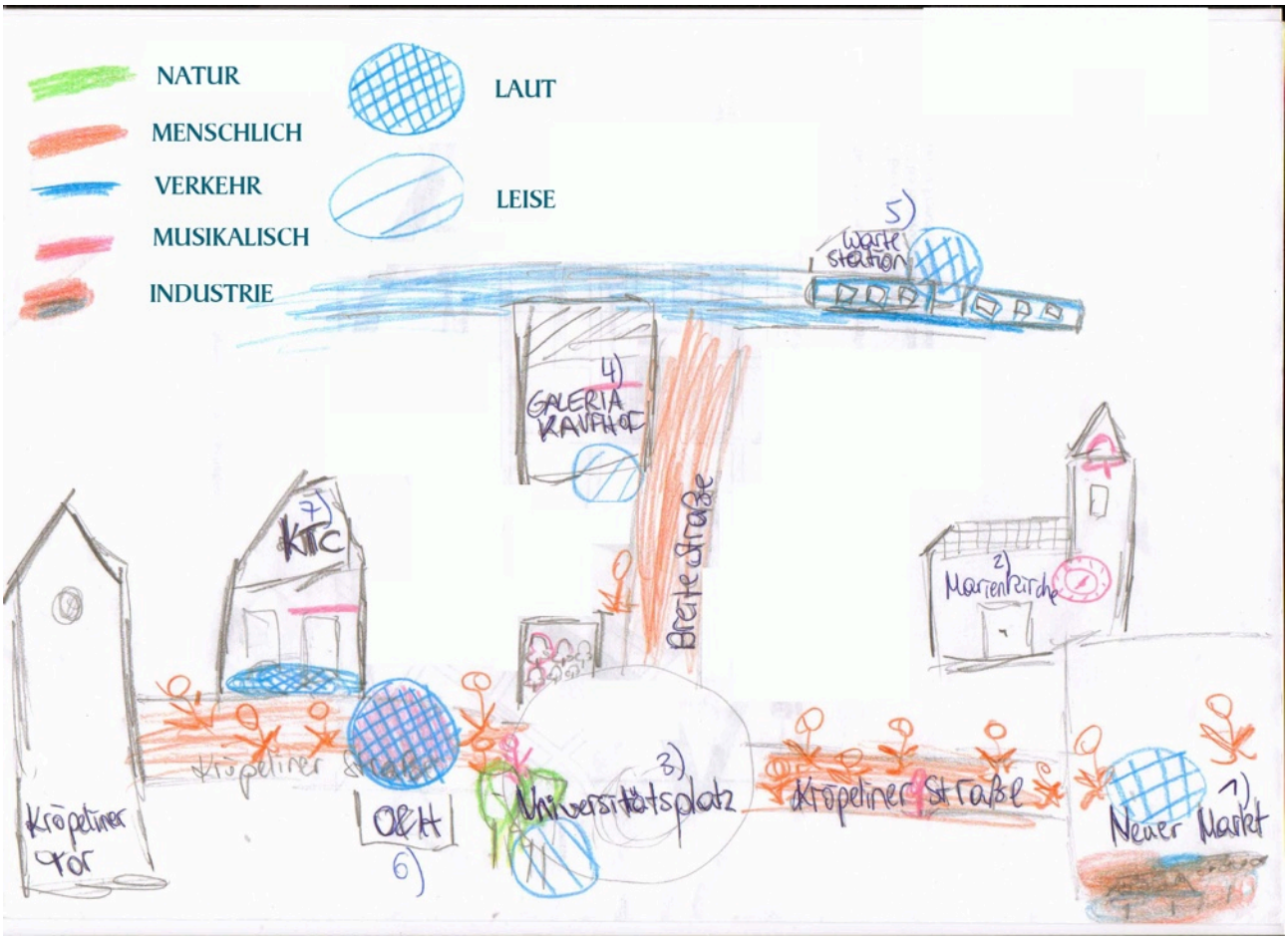
KTV (drawn by Barbara Alge)

Taken from the sounds experienced on the 11 November 2010, and at other times, Barbara Alge drew the event map above. Here the natural sounds of the Rosengarten are displayed to the bottom right, also the traffic sounds, the sounds of people, the market, church, and school.

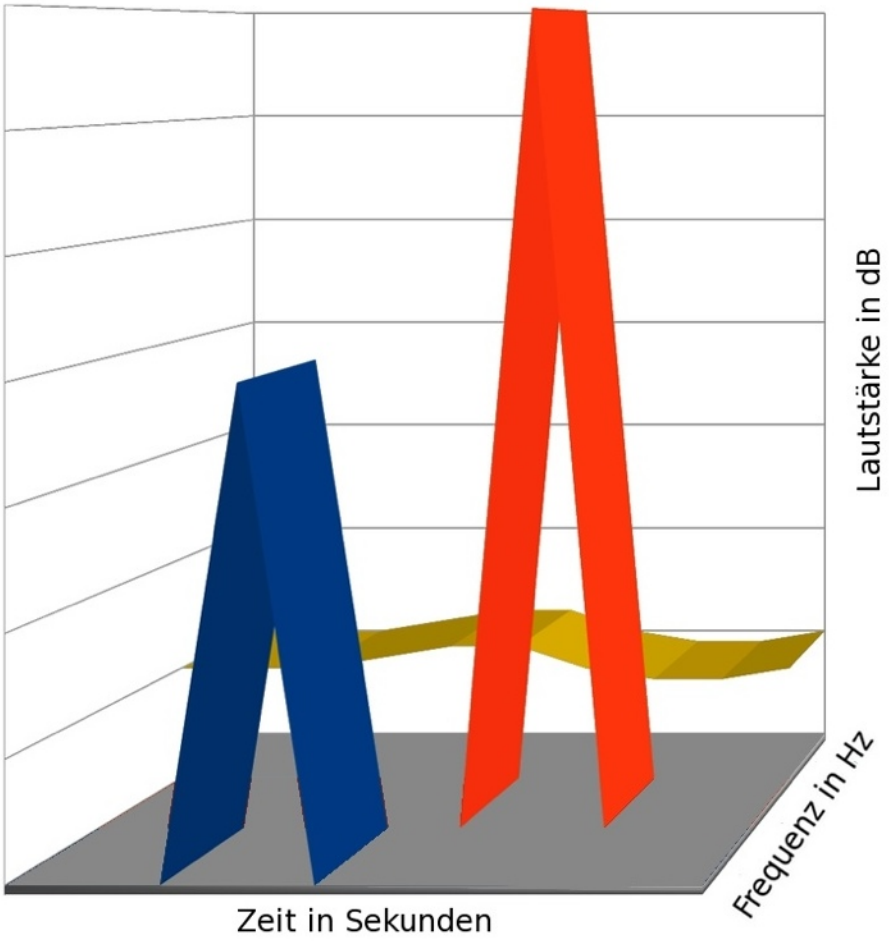


Altstadt (drawn by Frances Wilkins)

Taken from the sounds recorded during the fieldwork exercise on 13 November 2010, the traffic (in blue), music from the HMT and Petrikirche bells, natural sounds from trees and birds, and human sounds are represented.

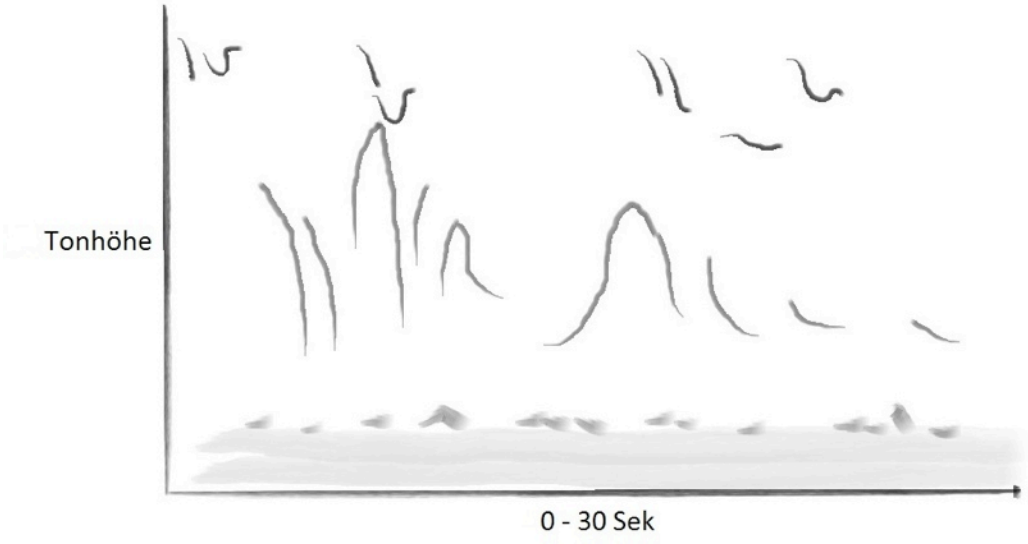


Zentrum (drawn by Barbara Alge)



3D transcription by Jacob Przemus

‘This Diagram tries to show the intensity and the frequency of sounds over a certain time. The advantage of this transcription is that you can read the length, loudness and the frequency (if a sound is high or low) of sounds. The example above could be a recording of street noise (low fidelity traffic noise during the whole recording - the yellow line). After a few seconds an ambulance was passing by (loud noise with a high frequency - the blue line) followed by the sound of a low flying helicopter (very loud noise with medium frequency - orange line).’ (Jacob Prezemus, February 2011)



Transcription by Daniel Wilke of the Geräuschen, Warnemünde

The more intense the sounds, the more intense the colours. Background lo-fi sounds such as humans and water are displayed as shading at a low pitch which covers the entire length of time. Hi-fi sounds are seagulls at high pitch and the squeaking of the cutter at a mid-pitch. The transcription model (time against frequency) was taken from R. Murray Schafer (Schafer, *The Soundscape. The Tuning of the World*, 1994 [1977], p. 125).