EUROPEAN ACADEMIC RESEARCH
Vol. I, Issue 10/ January 2014

ISSN 2286-4822
www.euacademic.org

Impact Factor: 0.485 (GIF)
DRJI Value: 5.9 (B+)

An Examination of the Role of Sound in Defining the City in the Context of Edinburgh

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Abstract:

The surfeit of generic and place-specific sounds that exist in the urban environment contribute to what has been referred to as the soundscape. Within the built environment sound has the potential to create thresholds and acoustic territories that define and colour the experience and social functioning of inhabited spaces. In this research, a robust critical examination of the literature by prominent sound artists and theorists is used to illustrate how sound contributes to the urban experience. This is reinforced by primary research undertaken in the city of Edinburgh where the analysis and synthesis of these secondary sources is tested using bespoke soundworks to determine the ways in which sound contributes to our perception, reading and understanding of our physical environment. This research concludes by illustrating the potential for the future, technological development of the soundscape.

Key words: Soundscape, Noise, Listening, Urban Environment, Design, Technology.

1. Introduction

1.1 Problem

This research examines our perception of 'soundscapes' and proposes that a multitude of experiences are operating within the acoustic ether. The study was designed to determine the effect of sound and noise on the human condition. This was achieved through testing the relationships of listening entities in their multiple perspectives of the soundscape, through the individual at the centre of their soundscape.

This research reflects on the concepts of 'aural architecture' and how it is critical in the recognition of spatial quality and revealing how sound fills the void of space and the relationship our bodies have in perceiving sound. Within the text, the influence that 'Acoustic Territories' have on the social functions of communities, through the proliferation of perceived ambiances and the thresholds which delineate boundaries of a hierarchical structure of sound in place are disseminated.

1.2 Significance

The results of this research support the idea that we need sound and noise to facilitate our navigation of the city safely and comfortably and to reveal the possibility for new experiences. However, the implications of the results show that it is a fine balance that is required between the visual stimulus of our world and the aural stimulus. It is concluded that there could be scope for the audible world to frequent or act as our primary sense more often.

1.3 Scope and Limitations

The findings in this study intensify an understanding of sound in the urban environment from the perspective of some prominent authors in this field. The interpretations provided aim to use the knowledge that has been accumulated to gain further understanding of how sound shapes our movement

through the city, and attempts to illuminate aspects that are of prevalence, due to the significant roles they play in perception and experience of sound. What this then alludes to is a crossing of thresholds to the realisation of the primacy of the body at the centre of the soundscape, mirroring Merleau-Ponty's statement, 'remaking contact with the body and with the world, we shall rediscover ourselves, since, perceiving as we do with our body, the body is a natural self and, as it were, the subject of perception.' (2004, 112)

2. Methodology

The methods used in this study involved, firstly, a thorough desktop survey of the key theories and texts pertaining to the subject of 'soundscapes'. The main theories were then deconstructed and retrialed with several different approaches, in contemporary settings around Edinburgh.

In this paper, the attributes of 'soundscape' have been examined. Primary research, in the urban environment of Edinburgh, was undertaken to investigate the relationship between sounds, the physical components of the city and the 'listener' (Barry 2000) to potentially reveal how designed sound situations can influence our interaction with the city, based on an amalgam of the secondary theories.

In the analysis of these thresholds of sound within the urban environment, this study has drawn conclusions from 'ethnographic' research undertaken in city of Edinburgh. The primary focus of the research is concerned with the relationship between architecture and architectural configurations, and sound. It also references the phenomenon of auditory spatial awareness, the social, navigational, and aesthetic experience of aural architecture and the phenomenology of hearing.

Through the use of sound recordings, interventions and installation work the authors attempted to analyze how different locations within the city, each with their own physical,

cultural and social characteristics, could inform us about the relationship between sound, architecture and the listener.

The primary research, carried out in Edinburgh, was comparatively analysed alongside works by prominent sound artists and used to show how sound can be manipulated in the urban environment to create unique experiences. This was reinforced by the secondary sources, which enabled the further testing of ideas on how sound could be used in the urban environment, through considered, 'designed' sound works. This stage of the research concludes by hypothesizing on how sound can play a part in influencing our experience of the built environment and showing the potential for the development of the soundscapes.

In researching sound in the urban environment, it was considered important to recognize that the researcher is always part of the soundscape, as sound is a publicly exposed arrangement of varying factors and degrees that are measurable for example, in decibels. However, each individual has their own absolute threshold as to what they can perceive. This may differ from a collective group of individuals as they may have a group perception. This is where it is possible for the researcher to withdraw from the soundscape to create an 'etic' or outside perspective on proceedings.

In undertaking this study, it was seen as important to try and understand how sounds move through their immediate contexts and also through the wider urban fabric. How it fills it, as it were; with space seen as a hollow void with thresholds and extremities. A singular source cannot produce constant sound because sound is ephemeral in its nature and is essentially the product of acoustic energy generated by a source which cannot individually have exponential acoustic power.

In order to avoid aural chaos, sound must be manipulated, reflected, and absorbed by a network of acoustic conditions. Ultimately, it is about control but it is not just as simple as turning down the volume. These aspects of the study

are addressed through primary research undertaken in Edinburgh which analyzes the affects that sound and noise have on inhabitants of a 'space' and 'place'. The research goes on to interpret behavioural responses that occur through experience of and interaction with, specific micro-environments and locations in the wider city context.

Examining patterns of interaction with sound in the urban environment can illustrate how sound and noise shape our experience and interaction with the city fabric. Sound is an experiential phenomenon. This characteristic defines straight away an empirical research methodology that concentrates on senses, on the experience of space, as well as on the relationship between space and praxis.

The methods used have aided in the understanding of social, spatial and physiological experiences of sound and noise from two perspectives. In immersing the research target in the subject matter and then subverting this to gain an 'emic' perspective, by removing the researcher and covertly recording and analysing the environment, this has provided contrasting viewpoints. In order to achieve both of these scenarios, studies involved observation and documentation of participants through listening, alongside visual studies. Site specific experiments - sound events - were undertaken as a study of cause and effect. This involved the deliberate manipulation and juxtaposition of sound and place in order to stimulate participant experience and to test emotional responses. In terms of findings, it was considered that quantitative measures would usefully supplement and extend the qualitative analysis to create categorizations and to define its meaning.

Our sonic journey through the spaces and places of everyday architectural environments begins with an introduction to the differences between hearing and listening. This is followed by a discussion relating to the manipulation and testing of existing and invented acoustic landscapes. Recordings of the aural environment during soundwalks

provided contextualizing vignettes of Edinburgh's urban soundscape. These were introduced to participants involved in a discussion about their aural perception and memory.

Further to this, an installation was constructed in an elevator to test our suppositions about the symbiotic relationship between sound and place. This architectural micro-environment provided a malleable *non-place*, a transitory and anonymous environment where human experience is held in temporary sensory stasis, as a testing bed for sound/place manipulation and somewhere to gauge participants' responses to the constructed landscape/soundscape amalgam.

Following the research of various authors who discuss the soundscape, the primary research undertaken intended to test ideas which allow for the synthesis of micro-epistemologies of how sound and noise affect the design and experience of space and place. (LaBelle 2010) These include supporting the notions of the body as a listening entity in their multiple perspectives of the soundscape. The contexts for these interpretations enabled the application of theories based on Aural Architecture Blesser Salter (2008), Acoustic Territories (Atkinson 2011), Thresholds and Ambiances (Thibaud 2011) and Evolving Earlids (McLuhan 1994) to the primary research.

3. Methodology – Literature Review

3.1 Literature Review – The Concept of 'Soundscape'

There are many distinct sources of sound in the urban environment which contribute to what has been referred to as the 'soundscape'. (Schafer 1977, 3) He said, 'It would seem that the word soundscape has reached an apex of vulgarity in our time, and many experts have predicted universal deafness as the ultimate consequence unless the problem can be brought quickly under control.'

For Barry Truax, the soundscape composition simulates a journey, or motion, through a landscape. From that point, an

idea of *acoustic ecology* evolved into an *acoustic communication* proposed by Truax. It largely examined mutual dependant sound, listener and environmental behaviours as a complex system of relations, not as separate entities. Emily Thompson in *The Soundscape of Modernity*, is also close to Truax approach toward the sound phenomenon, where the soundscape is a physical environment and a method of perceiving this environment the same time.

Sound is transient, specific to time and specifically resonant with the individuals who hear it or feel it through reverberation. Moreover, sound, or more precisely listening, reveals to us a world in a state of permanent transition. (Kohlmaier 2011, 7) stated that 'When we listen, we hear life's perpetual battle against entropy. In architectural terms, sound equals 'occupancy'. Listening is a contemplative act that requires our presence in a place over time.'

In his statement, "Let's walk together through a great modern capital, with the ear more attentive than the eye, and we will vary the pleasures of our sensibilities, it could be argued that Luigi Russollo started an appreciation of everything audible. In his original manifesto of 1913, he called for a 'new order' in music where he believed all sound, particularly that created by machinery, which in a fast developing industrial world, was of such significance that it would one day override what he saw as the banal, limited capabilities of what music had been, up to that point. (Russollo 1967, 7) The Futurist manifesto 'The Art of Noises' since its publication, has been shown to inspire many musicians, artists, architects and designers in delving into the realm of the meaning of sound, in the context of their own disciplines.

Pallasmaa (2005) has stated that we live in an 'occular centric' culture. He believes that, within the timeframes of one day, it is almost impossible to not see an image that is represented graphically, that has the intention of giving us something to interpret semiotically. However, as we are

naturally equipped with eyelids and can block out these images and visual cues at will, we are able to exclude our optic sense as we please, for example if something was offensive or unsatisfying to the eye we can simply physically turn away.

In contrast, as McLuhan (1967, 111) states "we are not equipped with ear lids" thus the human body is incapable of blocking out noise and sound without external assistance. We are surrounded by omni-directional sounds in the urban environment, that along with the full range of senses, we use to piece together our perception of reality. The perception of sound plays an important role in adjoining the senses so that we may navigate our surroundings with safety, comfort and with the intention of discovering new meaning in everything that affects our environment. This, in turn, affects how we create and use architecture, how we navigate space and place, and our behaviour towards each other within space and place. It is from this standpoint that the potential for design in creating sound situations and experiences, through various mediums, to reveal the effect of sound and noise on the human condition, has been investigated.

Since Russollo, many individuals have experimented with noise for different purposes, particularly in music and art, and conversely, this is where further differences have been drawn between noise and sound. He said, 'For scientists, noise is not the same as sound. A volume of sound can be expressed in terms of pressure. Noise, by contrast, is primarily of interest in that it is heard. It involves a relationship between sound and *listener*…Noise is not simply out there; external to the individual. It is a measure of the place of the body in an environment of sound'. (Barry 2000, 168)

This can then be followed with analysis into the nature of 'silence'. Zwerin and Cage (1970, 166) suggest that 'silence is all of the sound we don't intend.' Therefore every sound has purpose in its cause and its resulting effect. This is the foundation of what has become to be known as 'Cagean Theory'.

Cage saw all sound as useful, even noise which is usually perceived as sound that is unwanted or uncomfortable to the human ear. These theories are used in describing how aspects of sound affect us in the current definitions of soundscape.

In his research, Atkinson has defined urban space in relation to sound as being, 'a kind of hive, with a cellular social and physical ecology, that creates complex outcomes in terms of cyclical and spatially organised sonic geographies that flow, modulate, and change as the chronology of days and seasons pass.' (2011, 21)

As urban space is constantly changing, so do the sounds that are ever present from separate sources as a result of the makeup of urban layers and complexities, collectively urban space produces. Brian Eno describes this as 'the general hum of the city'. (Tamm 1995, 138) This reveals the structure of sound and the results of the influence it has on our perceptions of time and space. Secondly, it can be seen to be important to reverse the roles to understand, in turn, what sound is in relation to space. An example of this is where sound originates and how it spreads throughout the city in addition to how sound operates in urban space, to produce a measurable effect.

There is a necessity for unwanted sounds in cities to be avoided for basic human physiological serenity. Throughout history this has been facilitated, to an extent, by the physical structures we use for shelter. Scientifically, sound is understood, but through analytical processes and qualitative, alternative research methods, it has been possible to further understand sound in the urban environment and the relationship we have with it as a 'listening body' 'Sound affects us depending on whether we feel it is out of place, threatening to our well-being, suggestive of unpleasant experience and so on – there is a phenomenology to this experience of the urban that has not often been recognised. The urban soundscape is also, in part, an emotional and fleeting ecology of the city – it has the power to affect us and in shifting ways as sound and noise ebbs,

flows and modulates.' (Atkinson 2011, 25)

3.2 Literature Review – Soundscapes and 'Aural Maps'

In defining the term 'soundmark' Schafer (1977) brings forward a discussion of sonic landmarks to which we can listen to as we walk through the city and identify with individually. "The term soundmark is derived from landmark and refers to a community sound which is unique or possesses qualities which make it specially regarded or noticed by the people in that community. Once a soundmark has been identified, it deserves to be protected, for 'soundmarks make the acoustic life of the community unique.' (Schafer 1977, 10)

In navigating a city visually, we read the city as a text, interpreting the semiotics of visual stimulus and drawing correlations between points. We do this by starting from a base reference to form an interpretive map in the mind. This is based on Lynch's theory of the image of the city. (Lynch 1960) Lynch defines a mechanism with which we use physical forms or 'elements' that can be interpreted as paths, edges, districts, nodes and landmarks. Ultimately, it is about the role of the form of urban features being used to reinforce meaning. If we can read the city as text, it is therefore possible to hear the city as audio and produce an aural 'map'.

Producing an aural map is not as mechanically simple as producing its visual counterpart. In his notation of soundscapes, Schafer describes the limitations of microphones in producing an aural panorama to form an imprint, sonically, compared to a camera optically. However, it can still provide a detailed impression but one that is fleeting; paralleled to one that immobilises the visual world. Therefore, the aural 'map' that is researched is recorded and then used to interpret the social function of the inhabited place. However, there is some disparity between what a machine can record and what a human can perceive.

Just as sound is ephemeral in its nature, so too is the

nature of our interaction with spaces. When patterns of interaction are altered, it denotes another feature of how sound moves in urban space. It creates a hierarchy of sound through the movement of people socially and spatially. This hierarchy of communal dynamics is echoed in the writings of Jean-Paul Thibaud (2011).The emergence and disintegration of ambiences in the urban setting illuminates these communal dynamics. An ambiance is a compiled arrangement of sensory signifiers for perception that unify the emotional aspects of a place. Again using visual metaphors to imply what Thibaud means in relevance to the soundscape, it is as if a *coloured lens* can be placed over our ears as ambiances are not particular to objects but more to the entirety of our surroundings. Therefore, it could be argued there are hierarchies of ambiance based on a scale of emergence and disintegration. An example of this may be the perception of 'muzak' when entering a shopping centre or coffee shop. Crossing the aforementioned physical thresholds changes the ambiance of the previous environment by constructing a new ambiance, depending on which corporate image needs to be put across. By using the term *image* it implies a setting of a scene, by using sound to convey a specific emotive paradigm. "Every act of perception, is to some degree an act of creation, and every act of memory is to some degree an act of imagination. (Sacks 2008, 148) This is not to say that the soundscape is entirely imagined but in perceiving the sounds around us we construct our own version of the soundscape as we all experience the urban as a singular *listening entity*. The role of imagination is reinforced by the idea that "The inner ear of the imagination is very much more powerful a stimulant than is any amount of outward observation.' (Gould 1990, 6)

Structures have the ability to physically create thresholds which delineate boundaries to provide shelter from external conditions. Within the urban environment, it is also be possible for sound to create thresholds and acoustic territories. According to Atkinson (2011), these are territories which

control the social function of inhabited spaces. Thresholds ultimately set up a point or line which, when crossed, can create a change in the psychological and/or physiological state of the individual.

3.3 Literature Review – The Human Experience of Soundscapes

Atkinson suggests that 'an understanding of the body, as both listening object and as social animal, has rarely been conjoined in theoretical and empirical excurses into the city'. (Atkinson 2011, 21) LaBelle's research (2010, 26), corresponds with this stating 'in the promiscuity of sound, its reproducibility, in its anxious and restless transfiguration, we might identify a means for occupying and exploring the multiple perspectives of the present.' In undertaking this study, it was our intention is to test the relationships of *listening entities* (Atkinson, 2011) in their *multiple perspectives* (LaBelle, 2010) of the *soundscape.*

The effect of sound on the human condition is holistic - it affects the entire environment. Even the pace that we walk in the street can be seen to become dictated by a communal ambiance. Labelle (2010, 25) said, 'sonic materiality operates as 'micro-epistemologies,' specific ways of knowing the world…Sound creates a relational geography that is most often emotional, contentious, fluid, and which stimulates a form of knowledge that moves in *and* out of the body.' This observation of what can be perceived as resonance reflecting off buildings helps to place us in the soundscape. It locates the human body at the centre of the sonic environment, facilitating the experience of hearing a sound source modified by spatial acoustics and simultaneously experiencing the spatial acoustics revealed by sound.

Blesser states that "sound sources '*illuminate'* the audible properties of space." (Blesser 2008, 118) Labelle mirrors this hypothesis stating, '*Sound explicitly brings bodies together*. It forces us to come out in, lyrical, antagonistic and beautiful

ways, creating connective moments and deepening the sense for both the present and the distant, the real and the mediated. If, as the contemporary situation seems to pronounce, we continue to meet each other, in the flows and intensities of so much connectivity, then sound and audition readily provide a paradigmatic means to understand and engage such dynamic." (LaBelle 2010, 26)

Sound manifests itself across the range of human perception. It is not limited to the aural. In characterizing the term *sonic effect* Augoyard states; 'no sound event, musical of otherwise, can be isolated from the spatial and temporal conditions of its physical signal propagation. Sound is always shaped subjectively, depending on the auditory capacity, the attitude, and the psychology and culture of the listener. There is no universal approach to listening: every individual, every group, every culture listens in its own way.' (Augoyard 2005, 56) Blesser and Salter also state; 'Hearing, together with its active complement , listening, is a means by which we sense the events of life, aurally visualize spatial geometry, propagate cultural symbols, stimulate emotions, communicate aural information, experience the movement of time, build social relationships, and retain a memory of experiences.' (Blesser and Salter 2009, 4)

Blesser and Salter revealed the notion of audible cues which create auditory spatial awareness. The audible cues of these locations are affected by the functions with which the spaces are populated by. It can be argued that these cues reveal a collective emotional awareness of the inhabitants of the space being analysed. The materiality and spatial quality add exponentially to what we perceive in the city alongside the primary visual sense. 'Where a visual space is an organized continuum of a uniformed connected kind, the ear world is a world of simultaneous relationships.' (McLuhan and Fiore 1967, 111) In experiencing space through sound, it resonates from epicentres and appears non-linear and therefore requires

reference points to interpret it. These reference points such as the sound wall created by noise from the road juxtaposed against the facades facilitate the functions of the intermediary inhabited space of the pavement.

Blesser (2008, 118) created the concept of aural *spatiality* of which there are five types: social, symbolic, navigational, aesthetic and musical to better depict the point of view of the listener. This was done so designers could consider how they influence the experience of a space by being aware of how the inhabitants relate to their *spatiality* therefore he advises that designers 'Consider that aural boundaries are dynamic, walls are not. As we move through the city we encounter architecture immediately with the visual and haptic senses. However, we also instantaneously experience buildings being held in place against external factors such as sound. What is evident is that it is also possible to listen to architecture to navigate our surroundings, in the same way as we use our eyes to look at it and use our hands to touch it.

The combination of the material and physical properties of the space, added to the perception of a cacophonous reverberation perceived in the spatiality of the aural boundaries experienced, is most notably in transferring from one acoustic threshold through to another. This concept of dynamic aural boundaries in perception of space helps us to understand the nature of auditory spatial awareness. Therefore, the structure of aural architecture facilitates what can be perceived as an architectural negative or void which noise fills with abundance. These theories of spatiality harmoniously concur with the installation series "Filling the Void: The Infrasound Series" which intends to 'explore the complex relationship between sound, space, perception, and the body.' (Arford and Yau 2011, 196)

In their manifesto, Arford and Yau outline what they intended to achieve for each individual person experiencing their series of installations. They said, "Hear with your body.

This is not about music. This is not about performance or the performer. The goal is sound and the explicit translation of sound into physical force. The goal is external and internal realization. It is about provoking new modes of perceiving and experiencing one's own body – triggering variable and autonomous psycho-physiological response. It is about the total acoustic sense of space – observing sound to measure the capacity of architecture. It is about the phenomenon of resonance or sympathetic vibration – all things working in one continuum.' (Arford and Yau 2011, 202)

Through their sound works, Arford and Yau, make space tangible by resonating sonic waves through it using Infrasound as a mechanism to place the epicentre of perception in the individual, so to experience the internal and external realisation that the individual is at the centre of the soundscape. Therefore, sound is solely interpretive depending on who is hearing it and where it is being heard and felt. What this revealed was that there is an unperceivable void of vacuous space which is simultaneously activated and perceived by resonance.

As Arford and Yau state 'the void is an artefact of our perception. This is how we fill the void: we make it perceptible. The void exists until something activates it, makes it palpable, and vibrates it into existence. The void exists in the absence of perception as activated by vibration.' (Arford and Yau 2011, 206) What they stress is that between the 'void' and external realisation and internal realisation there are thresholds much like Atkinson describes, where there is a reference point or line or plane which once crossed, transcends a change of state. It is important to consider that in crossing these thresholds there is an ostensible resistance. This becomes applicable in that the 'threshold of perception, audience experience, and psycho-physiological response is highly subjective and specific to the individual' (Arford and Yau 2011, 206) These spaces are inhabited acoustically by material factors which all contribute

to the aural architecture of the space. The changes of state allow for a new method of perceiving one's own body in space as an acoustic entity, a sounding board or simultaneously as a reflector and an absorber. This is appropriate as the architectural space of the city can be perceived in the soundscape in an entirely new perspective of time and place. In the creation of ampules, levels, layers that are at the same time, osmotic in their transference of sound and solid in there reflection of it and the design of space has a profound effect on the aural architecture of a space.

3.4 Literature Review – The Soundscape and Technology

Technologies are adding to the soundscape, in the creation of noise emitting objects such as mobile phones, which can cause annoyance when people are in close quarters. 'All of these may or may not have headphones but, in the case of the phone, the impact on social life in public space has been profound: the development of rudimentary etiquette, aggressive behaviour by users and unwilling listeners, as well as the more general spillover of work/office life into commuting and domestic spaces' (Atkinson 2011, 16)

Aural etiquette is often abandoned on public transport by random individuals who choose to impose their music choice and transmit poor quality sound – noise - onto other passengers.

Noise travels through sound waves. However Bull (2008) further suggests that due to technological innovations, noise travels in its physical mobility, in the sense that new technologies and sources are adding to the soundscape, for example mobile phones and iPods. 'Mobile technologies, from the automobile to the iPod play their role in the neutralisation of urban space; these technologies empower the citizen in the very creation of the city as an alienated space. The automobile, train or bus, whilst facilitating the movement of people through the city vies with the pedestrian for space in the city. These

pedestrians, in turn, increasingly use mobile technologies like the iPod in order to manage the contested spaces of the city." (Bull 2008, 173)

IPod Culture has facilitated the individual privatisation of public space. In jostling for space in the city, Bull (2008) claims that in our orientation of the urban and managing space it is now possible to walk in our own sound world that is removed from the public soundscape. Our iPods are an intimate expression of who we are, and allow us to change cities to a functioning representation of our playlists. In doing this we negate Lefebvre's idea of understanding the city through 'chance encounters' (Lefebvre 2004) as iPod users never purposely interact with others whilst listening in their own 'hermetically sealed soundscape" (Bull 2008). As a result, it can be argued that human beings are outsourcing functions of the brain in societal conditions such as interaction.

McLuhan made similar claims to Bull, but through the function of memory and in relation to computers. He stated 'A computer as a research and communication instrument could enhance information retrieval, obsolesce mass library organization, retrieve the individual's encyclopedic function and flip [– reverse –] into a private line to speedily tailored data of a saleable kind'. (Mcluhan 1995, 295) This then provides the context to describe how we move through the city where an alternative soundscape is emerging; a soundscape of our own interiority (Bull, 2008). In plugging in to our iPod worlds, it can be argued that as McLuhan (1967) states these media devices act as extensions of the human senses and that communication technology is the primary cause of social change. Therefore 'chance encounters' have become archaic as the computer outsources the need for a library of books, the iPod outsources the need to interact with the environment around us in obsolescing our library of human connections. (Lefebvre 2004)

Bull (2008) claims that this need for removal from the soundscape is also combined with a need for social proximity

and interaction of our lifestyles through our media devices which create a powerful combination of music, connections and privacy. We can drift through the city at our own rhythm driven by personalised auditory soundtracks to urban life. 'Yet the auditory appropriation of space invariably represents the opposite of the flâneurie.' (Bull 2008, 173) In detaching themselves from their environment, iPod users create a private world which allows them to alter their experience of urban space and move to their own 'beat'.

"Hey You! What Song are you Listening to? NEW YORK" (Cullen 2011) is a video documentation which can be argued synchronises the ideas of Bull (2008) and Lefebvre (2004). Cullen proceeds to interrupt passers-by as they listen to music while they walk and asks the title question "Hey You! What Song are you Listening to?" The responses generated, by interrupting the public's personal sound worlds could be interpreted as showing how they are moving to their own individual rhythm. The answers they provide give an insight into their movements and perception of the 'place' they are in based on the genre of music which can have a significant emotional effect on the ambiance.

4. Primary Exploration of Theories in the Urban Edinburgh Context – Statistics Used

This particular research involved the analysis of sound maps, produced for the Scottish Government, which revealed where specific locations in Edinburgh had particular noise levels. (Crown 2007)

This part of the research intended to identify and explore the sonic landmarks of the city which define its identity, shape its communication and transform the perceptions of its visitors and inhabitants. It was initiated with the intention of producing an aural 'map' of sonic landmarks that form the make-up of the public places chosen for analysis.

The goal was to contextualise the place in reference to its functions and then re-contextualise the sound through a content analysis of the sonic qualities of the community space through the ear of an aural 'flâneur'. This is in reference to how the researcher is no longer a separate 'listening body', but becomes part of the public, of the crowd and therefore part of the soundscape.

The range of our aural perception is not limited to the constraints of walls and structure. Conversely, the human body doesn't experience just the sound of a space but the sounds of place. It was intended that this research would define the acoustic territories of four Edinburgh locations as these acoustic territories control the functions of inhabited places. The elemental paths, edges, districts, nodes and landmarks can all apply to the soundscape. These elements of sound denote the acoustic territories and their functions, for example, on Princes Street it was revealed that as a quasi-public space it is used for a variety of temporary installations, or sporadic events that draw attraction and contribute to the transient nature of the soundscape at this site.

Four locations were chosen for analysis: Princes Street, Calton Hill, an underground parking space at the John Lewis city centre shopping mall and an elevator at Napier University's Merchiston Campus. The decision was influenced by several factors. Primarily, the aural experience of the chosen places had to be readily imagined and their aural personalities recognizable. Further, it was deemed important to investigate a diversity of soundscapes in terms of variety of sound stimuli and the multifarious intensity of sonic experiences that exists in each place. And finally, it was found to be of interest that the chosen locations exhibit contradictory social and architectural functions and attributes.

Observation, documentation and analysis of an aural identity of selected spaces include a number of recordings, detailing sounds by type and intensity, tracking patterns of

change over different periods of day and night, supported by detailed visual representations.

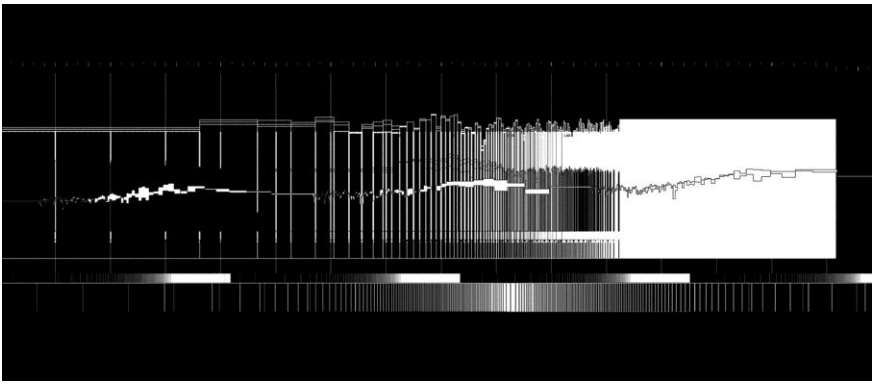

Figure 1.

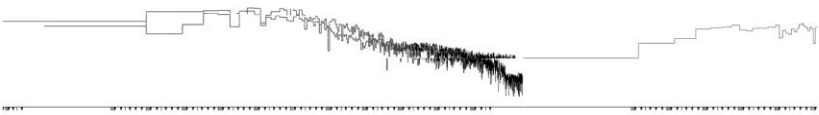

Figure 2.

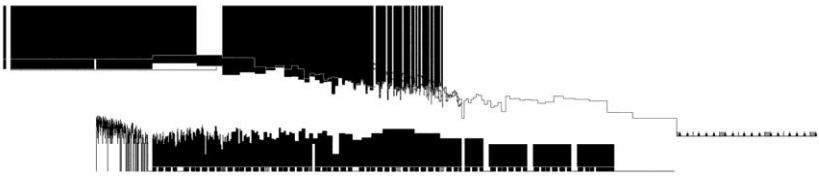

Figure 3.
Images 1-3 are graphic amalgamations of landscape and soundscape contexts for each of the chosen city locations - Princes Street, Calton Hill and the underground parking space. They illustrate the potential for mapping the city in terms of unique, location-specific sonic/ spatial signatures, Koralia Maciej, 2013.

Princess Street is an environment composed from multiple auditory channels that compete with each other. Here, the noise is important because it shapes both the target's acoustic arena and the listener's acoustic horizon. There is a multiplication of constantly fluctuating sounds coming from

mechanical and human encounters. Princess Street is the main commercial street in Edinburgh and as such offers a wide range of facilities for inhabitants and tourists. The social and sonic atmosphere of the street is very intense and changes significantly throughout the day and night.

Calton Hill is an example of park within a city. It is at the same time a recreational place and tourist attraction. Aurally, it accumulates the voices of a nature, visitors and the ambient, atmospheric sounds of Edinburgh. The sonosphere of Calton Hill is relatively constant over time due to its geographical location within the city.

The underground parking space represents an enclosed place designed for a solitary purpose. It is characterized sonically by an excessive reverberation which degrades the intelligibility of spoken communication that makes the space aurally unpleasant. This place is visited briefly and is somehow overlooked as a place of experience. Nonetheless, as with every physical environment, it possesses distinct aural characteristics - the sound of engines, distant footsteps, the programmed elevator voice and a constant mechanical background hum.

For the authors, the elevator at Edinburgh Napier University in Merchiston, Edinburgh represented for compact space and void to fill; a place of silence waiting for an invasive sound. These environments provide for immersion in particular soundscapes that are component parts of the city's overall sonic landscape. The key element is that they are soundscapes that in their own way provide an almost tangible feeling of detachment. From the macro-space of Princes Street (a semi-open, aurally chaotic environment), to Calton Hill (an open and sonically balanced island above the city), through to the underground city centre parking space (an enclosed but vast structure immersed and lost in reverberation), to the elevator, a micro non-place; a void existing in a larger space that operates in a perpetual space - time sound loop, these places provide distinct but somehow sonically related experiences.

To experience space is not to comprehend it, but to be in it and to move in it. The process of walking, observing and listening whilst moving through space, allows for the discovery and characterization of place through sound. To this end soundwalks were organized to establish aural memories and to provoke emotions whilst participants the ephemeral yet distinct 'spatial ambiences' of the selected location on the route.

Our objective was to try and ascertain how phenomenon of soundscape is experienced, perceived, remembered and recalled both individually and collectively. Nine males and five females with ages ranging from twenty one to sixty were interviewed between 13th and 17th December 2012. Seven of these are students; six are professionals, and one a student/professional. The results from Princes Street, Calton Hill and the underground parking were categorised in terms of acknowledging general elements of a daily aural space, that is; descriptions of sonic/spatial qualities, emotional experience, reflective thoughts after listening to the soundtrack and consideration of aural changes over a day and night.

In referencing Lyotard when he states an event is 'not a thing, but a caesura in space-time' (Lyotard 1987, 11) a sound experiment was devised for an elevator at Edinburgh Napier University's Merchiston Campus. The experiment was of twenty minutes duration and ran over a three day period in December 2012. Recordings from the three aforementioned locations in Edinburgh where played on consecutive days from concealed loudspeakers to provide juxtaposed landscape/soundscape contexts. The reaction of the elevator users was filmed and recorded. The elevator users were then interviewed about their experience.

The results from the elevator experiment proved difficult to categorize and clearly illustrate the need for further study and experimentation in this area.

The other spaces in Edinburgh were analysed through descriptions of sonic/spatial qualities, responses to 'introduced'

sonic elements and reflections after listening. The following results were found.

Participant Engagement with Sonic Contexts
Awareness of the general elements of aural environments:

Princes Street: Busy, traffic noise, human sounds (footsteps and conversations)
12 people acknowledged and articulated the general sound characteristics of the location
2 people emphasized particular sonic elements

Calton Hill: Quiet, the sound of nature (birds and wind), people (conversations), background city noise
7 people acknowledged and articulated the general sound characteristics of the location
7 people emphasized particular sonic elements

Underground Parking: Cars, echoes, people, machinery noise
7 people acknowledged and articulated the general sound characteristics of the location
6 people emphasized particular sonic elements
1 no comment

Participant Descriptions of Sonic Contexts
Description of aural environments:

Princes Street:
9 people gave reflective and detailed descriptions
3 people gave simple descriptions
2 people gave emotional descriptions

Calton Hill:
5 people gave reflective and detailed descriptions
3 people gave simple descriptions

6 people gave emotional descriptions

Underground Parking Space:
4 people gave reflective and detailed descriptions
6 people gave simple descriptions
1 people gave emotional descriptions
1 no comment

Participant Engagement with Sonic/Visual Ambience
Emotional perception of environments:
Princes Street:
1 person liked the ambience
9 people disliked the ambience
4 people were undecided

Calton Hill:
7 people liked the ambience
7 people disliked the ambience

Underground Parking Space:
8 people disliked the ambience
6 people were undecided

Participant Reflection after Listening to Recorded Playback
Reflective interpretations of environments:

Princes Street:
8 people identified new components of the sonic environment
5 people did not identify new components of the sonic environment
1 person was undecided

Calton Hill:
6 people identified new components of the sonic environment
6 people did not identify new components of the sonic

environment
2 people were undecided

Underground Parking Space:
6 people identified new components of the sonic environment
6 people did not identify new components of the sonic environment
2 people were undecided

5. Conclusions

There is a strong relationship between listening entities in their multiple perspectives of the soundscape, which has been reported in the literature. These ideas test the notion of how sound and noise affects our movement through the city. It has been significant that in all aspects of the primary research undertaken for this study, it was shown that the human body acts as a listening entity in the perception of auditory spatiality. It is also evident that there is not one soundscape for everyone. Soundscapes are individual and are reliant on perception of experience and consequently imagination or construction of a soundworld dependant on the individual's absolute threshold of perception. However, the perspective of the soundscape can change as a direct effect of the emergence and disintegration of ambiances from a variety of sources. These often induce social, spatial and psycho-physiological variations of functions in inhabited spaces. It is therefore important to note that there can be multiple perspectives and alternative soundscapes simultaneously operating. Bull's theory of iPod culture combined with Lefebvre's notion of chance encounters was revealing and unexpected as these findings suggest that an alternative soundscape has emerged where we have evolved through the symbiosis of technology and body to evolve ear-lids as our mobile devices are an intimate expression of ourselves. These studies produced results which

corroborate the findings of a great deal of the previous work involved with how sound and noise shape our experience and movement through the city. It was confirmed that sound facilitates our understanding of the city through Aural Architecture, Acoustic Territories, Thresholds and Ambiances. These conditions have been proven to affect our social, spatial and physiological wellbeing through studies of space, place and experience conducting our behaviour. This study has however been unable to demonstrate the extent to which sound affects the whole environment as it is the opinion of Schafer (1977) who insists that noise is at an undesirable peak. We are affected by noise but it is an aspect of our environment that we have evolved to deal with. These findings have revealed that as sound is a necessity for our survival it is silence that we should resolve to avoid.

The observed correlations between our perception and our experience of the soundscape can be explained through primary research's expansion and interpretation on existing knowledge. It is easier to explain and perceive the notion of Aural Architecture when surrounded physically by walls. The results achieved in the specified locations are only a small sample of the soundscape that illustrates how sound can affect our movement through space. Acoustic Territories use mechanisms to define the social functions of place. In crossing the thresholds of different aural elements, it was possible to locate reference points from the audio recordings and create an aural 'map' of the communal surroundings.

Through interrupting the public in the midst of their personal sound world, it was revealed how people when locked in their own interiority and move to a completely different rhythm as they navigate their surroundings, desensitised to the external soundscape. However, these findings cannot be extrapolated to all spaces, places and social conditions as each soundscape is site specific and time dependant. Sound is located to the individual perceiving it.

6. Recommendations

These findings suggest that sound could be considered as a powerful tool to engage inhabitants of towns and cities in realising that there is benefit in focussing themselves at the centre of their own soundscape. This has important implications for developing the potential for sound in the design of the urban environment. This has also raised issues for future research as it has shown that consideration of inhabitants of the city could be scrutinised further, as both listening object and as social cognisance. This could be tested and contemplated in more rigorous academic and experimental endeavours into the city.

This study has investigated the nature and role of sound in the urban environment. It has reviewed empirical evidence and current theories that attempt to define what sound and noise are and how they shape our experience of the built environment. In doing so it goes some way to further existing discussions on the role of sound as a phenomenal component of both our physical and experienced worlds.

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