Urban Studies

Ecology of Sound: The Sonic Order of Urban Space

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Ecology of Sound: The Sonic Order of Urban Space

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Summary. Sound provides an often-ignored element of our conceptualisation of the urban fabric. The power of music, sound and noise to denote place and demarcate space is used here to develop the idea of a sonic ecology. The paper attempts to map the relative order of this unseen city and to theorise its spatial and temporal patterning. The sonic ecology, a relatively persistent and chronologically ordered quality to sound in urban space, is used as a means of examining the distribution of sound and to weigh the broader social impact of these qualities. The ambient soundscape of the street is made up of a shifting aural terrain, a resonant metropolitan fabric, which may exclude or subtly guide us in our experience of the city, thus highlighting an invisible yet highly affecting and socially relevant area of urban enquiry.

1. Introduction

Louis Wirth knew the city when he saw it; his well-known definition focused on its size, density and heterogeneity (1938). These attributes were also discussed to some extent by Lewis Mumford (1937/1996), who extended these concerns to concentrate on the 'theatre of social action' that the city represented. Wirth himself called on urbanists to look beyond the physical, economic and cultural structure of the city to uncover the underlying elements of urbanism. In this paper, some of these underlying and otherwise under-theorised elements are reflected on, through an analysis of the constituent and shifting bundles of noise, sound and music emanating from shifting patterns of industry, traffic, leisure, talk and other sound sources in the city to create a sensory departure-point for defining and further understanding the fabric of the urban. Sound also provides a means of exploring the more ephemeral and shifting elements of urbanism that often slip through

our fingers when we try to give concrete assessment of its character. This ambient envelope of urban life is difficult to reduce or to measure in meaningful ways. In this sense, the sounds of the city have uneven exposure effects as different groups are subjected to the various rhythms and volume of sound dictated by a range of daily, seasonal and spatial chronologies that have specific social, economic and other modulating drivers. The power of this apparently intangible domain has generally been underexamined in urban studies, a gap that this paper aims to address.

On considering the differences between sound and noise, Gurney (1999) has usefully suggested that "noise is a sound which is out of place" (p. 6), so that it is not simply that the city is louder than other places; rather, our sense of 'volume' is always the result of subjective assessments. Apparently quiet urban oases and noisy spaces themselves

often change according to the temporal rhythms of each day and according to other cycles, such as street festivals, nocturnal house parties or the daily flows and routes of commuting workers. In this sense, the spatial and temporal ordering of the urban soundscape (Smith, 1994, 2000), its ebb and flow, is often programmed, regularised or ordered in ways that can rarely be defined as random. These patterns may be linked to industrial uses and districts, for example, or to the social and temporal functions of sectors, places, dwellings and buildings. This relative 'stickiness' of sound in place, to take the example of urban commuting flows in cars, gives sound its ecology, or a relative fixity, even as its complexity and relatively unbounded nature need to be acknowledged.

The tendency for order, spatial delimitation and daily chronology of urban sound suggest that we might view it in terms of a sonic ecology. By this I mean that urban sound, even in its complexity, has a tendency for repetition and spatial order which, while not fixed, also displays a patterning and persistence, even as these constellations and overlapping ambient fields collide and fade in occasionally unpredictable, multiple or purposeful ways. This paper seeks to make some sense of the organisation and functions of this varying yet tendentiously organised soundscape and considers its significance and social impacts.

The power of sound and music to denote place, but also critically to demarcate space (Ingham *et al.*, 1999), is used to consider the possibility of developing this idea of a sonic ecology. Drawing on a series of diverse studies, the paper attempts to map this unseen city, its invisibility belying an ability to produce profound physiological (for example, deafness), social (anti-social noise) and political (resistance to the siting of new airport runways) consequences. Sound creates an urban 'aether' (Scanner, 1994) yet it may also mean helplessness from neighbour noise, the subtle control or scripting of consumption (Hopkins, 1994) and work (Packard, 1957; Lanza, 1994). Noise has also been shown to have significant

deleterious physiological and psychological effects, such as stress, high blood pressure, deafness and tinnitus (Rodda, 1957; Staples, 1996). Such examples hint at the diversity, but not perhaps the spatial ordering, of sound and its effects. This disconnected body of investigation may form the basis for reconceptualising the city in terms of its sensory impacts which appear to have these social, economic and political consequences.

A developing area of enquiry, acoustemology describes the possibilities of an 'exploration of sonic sensibilities' (Feld, 1996). Existing studies in this field have predominantly been focused within anthropological work. For example, in the domestic soundscapes described by Pink (2004), the sense of place and performance of home detailed by her interviewees draw attention to their associations of place and even particular rooms with the use of radio, music and the sounds of housework as integral aspects of these environments. Outside domestic settings, Rice (2003) has further explored the acoustemology of institutional contexts. In his work with patients in the Edinburgh Royal Infirmary, Rice highlights the distinctive soundscape and the experiences

> created by the activities and work of care ... The sounds of medical practice, equipment and technology that punctuate and pervade hospital life (Rice, 2003, p. 4).

Extending the spatial scope of studies like these, and the aims of acoustemology, we might begin to profile the city and its own distinctive flowing aural scenery and furniture.

The work of Bull (2000) begins to hint at the complexity and layering of sound within urban spaces. In a study of personal stereo users, he uncovers how such users employ these devices as a way of escaping the urban soundscape in which these aural sanctuaries create 'bright' experiences which can be contrasted with the mundane world that lacks this personal soundtrack. The experiences related by Bull highlight the ways in which the dominance of city soundscapes is seen as something intrusive and to be blocked out through the substitution of a personal soundtrack.

Bull (2000, p. 2) goes so far as to argue that the privileging of sight in accounts of the urban has led to a situation in which "there is no contemporary account of the auditory nature of everyday experience in urban and cultural studies". Like Bull, Thibaud (2003) observes 'musicalised' wanderers taking shelter from the sonic ecology present in the city. The implication of this relatively ordered soundscape is not only that it is in some sense organised, but also that it is socially *organising*. While we are often not aware of it, sound and music not only exist in differing configurations and volumes, so too does this aural envelope guide, invite, deter and otherwise subtly influence our patterns of sociability, modes of transport and interactions in urban space—influences we are often not aware of. The city is not then simply an open sensory experience (Frisby, 1994), but one which impacts on us in ways that perhaps we are only beginning to understand.

The structure of the following discussion is presented in three further sections. The first assembles a series of notes to suggest a clear agenda focused on the ideas of a sonic ecology. This is followed by a study of functional music, sometimes known as 'muzak', to provide an example of an acoustic territory and its functions, in order to develop further the idea of ordered and ordering qualities to sound in urban workplaces and streetscapes. Finally, a brief discussion explores the implications of urban noise and muzak for understandings of social regulation and conduct in the city. The paper concludes with a renewed call to think of the city in its broadest physical and sensory constitution, as a means of extending our understanding of the social effects and inequities that the city may present.

2. Ecology of Sound

In E. M. Forster's allegorical story 'The Machine Stops' (1909), a bleakly presented future/past is described in which the titular machine provides its citizens with all their communication and transport needs across cellular living spaces and in a world where contact with nature, its sights and sounds, is no longer considered necessary; 'the terrors of direct experience'. The 'hero' of the story, Kuno, transgresses these normative boundaries by considering and prefiguring the end of the machine's existence. As he says to his mother, "The Machine hums! Did you know that? Its hum penetrates our blood, and may even guide our thoughts" (p. 9). This allegorical manifesto against sensory and social desensitisation might also be interpreted as a spur to a remapping of our own urban spaces, to realise that these too 'hum' and that perhaps even the very ubiquity of these experiences shields us from a more intuitive and connected interpretation of how the city is organised and affects our lives.

The musicologist Murray Schafer promoted an awareness of the musical qualities of environmental sound to his students. His central argument was that the promotion of 'ear-cleaning', an awareness of the range of sounds around us, was an important part of a new receptiveness to the sounds of the city and to challenging preconceptions around what might legitimately be considered musical (Schafer, 1972, 1994). These ambitions coincide with those of artists and theorists like Brian Eno, one of the ambient music pioneers, who have observed and subsequently recorded music using environmental urban sound. Listening more closely to such ambient sound may help to sensitise us to how sound affects both how we live and, indeed, is a produce of how we live.

Among all of this there is the sense that cities are becoming noisier places (Bull and Back, 2003). While this is not a straightforward trajectory given changes in patterns of industry, the effects of travel and neighbour noise in particular have become significant impacts on contemporary urban life. For example, in 2003 the Chartered Institute of Environmental Health recorded 224 502 complaints of domestic noise, equivalent to 5573 per million population. A MORI study commissioned by the Commission on Architecture and the Built Environment

found that 63 per cent of people experience neighbour noise, with nearly one in three people experiencing annoyance. In cities like São Paulo, these impacts can be linked to social fears and anxieties, as well as increased congestion (Davidson, 2005), where the sound of helicopter fleets servicing fearful high-income-groups has made urban noise intolerable for many residents on flight paths and in tower blocks. These transitions coincide with political battles over the rise of these noisier cities, although evidence of anti-noise and traffic campaigns in Western cities goes back at least a hundred years (Bijsterveld, 2003). There has been a sometimes overwhelming growth of ambient noise and pollution by car alarms, dogs, noisy neighbours and parties, air traffic, banging doors and so on in urban areas. These problems may have a direct effect on communication or the relative coherence of our actions in the busiest and noisiest places, but also intrude and disempower us in those spaces where we may otherwise feel sovereign. For example, the sound of a neighbour's music does not have to be loud, to compromise our sense of autonomy in the domestic setting.

In this growing urban commotion, lobbying groups, like the Royal National Institute for the Deaf, have initiated campaigns to have 'piped music' turned off in pubs to allow those with hearing aids to communicate while the Noise Abatement Society continues to protest against 'unnecessary' noise. Planning offices have occasionally attempted to demarcate these problems through 'noise mapping' techniques to present the location and effects of noise and thus enable the strategic planning of key transport nodes and corridors. In short, the spaces of the city form an ordered as well as a temporally defined ecology of noise, sound and occasional silence and one which is regularly contested at both the individual and broader political scales.

Music has also been implicated in terror, power and territory (Warren, 1972). As amplification was enabled by technological advances, music was used by the Germans to demoralise Russian soldiers at Stalingrad (Beevor, 1999). More recently, a deafening onslaught was used by Israeli soldiers to try and break the resolve of sheltering Palestinians in the Church of the Nativity in Bethlehem. Similarly, the principles of these 'sonic cannon' were applied to reduce the willpower of Chilean kidnappers and an aural assault arguably provoked General Noriega's submission to the US in Panama just as today's soldiers in Iraq have in-helmet music systems that allow music to be played to increase adrenaline as they enter conflict. This systematic deployment of sound leads inevitably to a consideration of the power relationships implied by access to these technologies.

Rice (2003) has suggested that these various strands of noise and sound extend Foucault's analysis of the power relationships implied by the panopticon and visual surveillance, to those of a 'panaudicon' in which acoustic power relationships relate not just to being heard by some kind of Orwellian 'always-on' ear, but also to being aware of hearing an authoritarian presence. In subtle ways, the implications of being surveilled by our soundprints lead us to manage ourselves in ways which reduce the sounds we make and how we make them in such a way as to avoid being traced, embarrassed, located or identified by others (Gurney, 1998). These rhythms and patterns of everyday sounds can be linked to social control, discipline and enforcement

> Everywhere, power reduces the noise made by others and adds sound prevention to its arsenal. Listening becomes an essential means of surveillance and social control . . . Today, every noise evokes an image of subversion. It is repressed, monitored. Thus, the prohibition against noise in apartment buildings after a certain hour leads to the surveillance of young people (Attali, 1977, p. 122).

More recent links between urban music and power could be clearly seen in the Criminal Justice Act (CJA) (1995), seen as legislating against the lifestyles of 'new age' travellers

and urban ravers. The CJA contained directives against the playing of repetitive beats and was met with resistance from a wide range of civil rights groups. Musicians were also vocal

> We advise you not to play these tracks if the Criminal Justice Bill becomes law. Flutter has been programmed in such a way that no bars contain identical beats and can therefore be played ... under the proposed new law. However, we advise DJs to have a lawyer and a musicologist present at all times to confirm the non-repetitive nature of the music in the event of police harassment ... by breaking this seal you accept full responsibility for any consequential action (Sticker seal to Autechre's *Anti* EP, 1994).

All in all, these various changes to city economies, leisure habits and technologies have affected the distribution and aural character of segments of the city, affecting our exposure to noise as well as particular types and qualities of sound at work, home and in spaces of consumption and relaxation. For example, the decline of heavy industry in the urban West has lessened some occupational exposure to noise at the same time as growing numbers of club spaces provide comparable exposure levels. However, these trajectories are often differential and contradictory. While contained spaces like cinemas now amplify soundtracks to the point that safe thresholds are exceeded, other spaces, like the finance offices of the BBC, have reportedly been engineered as more sociable places via the introduction of recorded 'mutter'. Such cases illustrate the range of problems and curious directions that our lives, amplified or otherwise, have taken as well as the apparent ordering of these sounds.

The effects of these changes are slowly becoming more clearly understood. Chan (1988) related an awareness of the social and physiological effects of sound and their ecology in the city to the need to plan urban environments with more consideration to reduce residential exposure in particular. However, this is by no means unproblematic

as long-running debates around expanding airport capacities attest. These arguments have focused attention on the physiological cost to nearby residents, although the economic rationale or political legitimacy conferred by such uses has consistently triumphed over the articulate opposition of middle-class resident opponents. Nor are these effects restricted to physiological impacts. Baranzini and Ramirez (2005) have reported that the overall economic impact of urban noise on private rents in Geneva is 0.7 per cent per decibel and 1 per cent when airplace noise exclusively was modelled. These effects were more pronounced in neighbourhoods where the prevailing background noise level was low, in other words when sounds 'like airplanes' were seen to be 'out of place'. More importantly, such studies elaborate what is tacitly understood in residential choice, that quieter areas have an intrinsically higher value.

The attempt to control and delimit the extent of these 'acoustic territories' has also become an important role of the local state which has increasingly pursued socio-legal strategies to control anti-social behaviour generated by social nuisances. Recent by-laws in New York, for example, have also tried to quieten the city by clamping down on noisy dogs at night and ice-cream vans. Technologies increasingly complement these actions to reduce the effect of these sounds out of place. Orbital roads, such as London's M25, have many miles where walls act as sound curtains to help contain the sonic pollution of roadways with concrete and wood barriers preventing some overspill to adjacent residential development. According to the Department of Communities and Local Government, which deals with housing and planning matters, the noise arising from urban road surfaces has been reduced by the equivalent of a reduction in traffic by one-half, through the use of the latest technologies in quiet surface construction techniques. These technologies of silence have also been applied to the kind of personal shielding generated by new headphone technologies which act to cancel, or significantly reduce,

environmental noise thus creating mobile sanctuaries and autonomy within intrusive sound ecologies. In contrast, proposals to introduce mobile phones on some transcontinental flights is likely to produce significant debate and conflict between different modes of travellers, competing either for silence or contact.

The ecology of residential choice and house values is partially determined by proximity to noise such as that created by roads, railways and the flight paths of airports. The sovereignty derived from wealth is, in part, an ability to manifest control over potential auditory disturbance in one's home as much as it might be about maximising the amenity of location. The increasing demand for space associated with rising incomes would appear to be evidence of this correlate. The experience of quietude is entwined with wider discourses about homeownership and the personal autonomy of these 'aural havens' (Gurney, 1998). Locational choice more broadly can be seen as a result of these aspirations to the extent that an interpretation of the social and spatial ordering of cities can be partially understood in terms of searches for quiet, in addition to traditional interpretations of suburbanisation as places of space and amenity.

Urban social ecologies also appear to delineate the relative consonance of their attendant sound ecologies. For example, while buskers on the London Underground are defined as criminals by its by-laws, in London's Covent Garden they appear as an important part of the cosmopolitan atmosphere—the distinction lying, critically, on the degree of choice in whether one wants to be a listener or not. In the search for relative quiet and predictable aural refuges, we often find that noises breach the defence of the proverbial Englishman's castle. This is generated by a diverse range of 'weapons' that include cheap audio equipment, amorous couples, house parties, crying babies and hard shoes on uncarpeted floors, amongst others—the sounds associated with our lifestyles and daily trajectories do not need to be loud to cause problems. The normative aspects of sound are tacitly understood

and revealed where sound in the home is generally synchronised to be consonant with our neighbours. Washing machines used at night or ordinary daily routines performed adjacent to nightshift workers may generate intense social friction precisely because they breach common expectations and daily chronologies of an acceptable soundscape. Within this context, it is perhaps no surprise that silence has been imbued with a high value, in which we say we find a space to reflect—somewhere we can 'hear' ourselves think.

3. Sonic Ecologies, Work and Consumption in the City

The kind of acoustic territories considered so far can be thought of as spaces defined, owned or contested by those who, relatively speaking, control the soundscape of public or private spaces. Such spaces serve territorial functions rather than being merely the result of randomly operating environmental or natural sounds. This can be linked to an interplay of power relationships within particular urban spaces and which have their own varying degrees of symmetry. A key example of the territorial control of commercial, and increasingly public, space can be heard in the functional music, or muzak, of many urban spaces. This low-volume background music is designed to fill uncomfortable conversational gaps but also to amplify purchasing behaviour through subtle uses of tempo and the tastes of desired lifestyle groups. Muzak is thereby used as an auditory territorial marker, effectively to brand space and lubricate consumption as well as manipulating an environmental variable which may also have been used to influence the rhythms of work. In this section, these elements of what might be thought of as orchestrated sonic ecologies are used to deepen our conceptualisation of the programmatic uses of music in urban space.

The history of functional music is entwined with Taylorist industrial management, as advances in technology enabled the dissemination of recorded music across large distances. Such music has, for some time,

accounted for the greatest proportion of music heard per capita. Jones and Schumacher view it as being

> used principally to support and encourage some other primary activity, whether the production and consumption of goods and services or the reproduction of social and symbolic order in public spaces (Jones and Schumacher, 1992, p. 166).

Functional music has thereby been used strategically for the purpose of creating untroublesome and socially useful subjects, as citizens, workers or consumers in territories where control of the soundscape may also be connected to the control of production and consumption functions. In this sense, such music might be viewed as a disciplinary technology (Foucault, 1977) that controls as well as excludes/includes users of public and semi-public spaces. Music has certainly been used as a strategy of pacification, by scripting public spaces and framing the range of behaviours deemed acceptable by the co-ordinators of these spaces (Atkinson, 2003). For example, in the context of urban workplaces and factories, Jones and Schumacher cite research which found that music in the workplace reduced absenteeism and enhanced productivity. As they put it

> Muzak became a variable to be added and subtracted in the complex of technical, economic, and social relations that constituted Fordism (Jones and Schumacher, 1992, p. 159).

While functional music has been described both as innocuous 'musical wallpaper' on the one hand, others like Attali (1977) have seen it as an instance of cultural totalitarianism that perpetuates alienation. However, more recent accounts (in particular Lanza, 1994) have eulogised an underrated art form dismissed or ignored by the majority of passive listeners. As Lanza argues, the apparent simplicity of muzak belies the strategies of its corporate producers to promote the goals of consumption, complicity and production with the corporation's marketing ideology based on claims to be able to motivate employees and

increase productivity. This kind of music can be linked back to the workplace through its history and association with the principle of 'stimulus progression' with early military research showing that vigilance and recognition tasks were significantly aided by musical programming which rose in ascending tempo. Muzak thus became a strategy for the uplifting of factory workforces which tended to become jaded at particular times of the day when the introduction of a particular stimulus could be introduced, thus

> fostering the illusion that time was passing . . . workers experienced 'progress' by moving through the musical programs (Jones and Schumacher, 1992, p. 160).

The apparent blandness of muzak stems from the use of suppression to 'smooth' music of its shifts in volume and tempo to avoid direct attention. For Adorno (1945), such music was to be viewed as a soporific that took away the need for concentration or thought, thus serving as a distraction from monotonous work, reducing boredom and fatigue yet leaving their structural social causes in a kind of sonic opium for the masses. As enthusiastic observers remarked, workers were "practically dancing to their machines" while an early chair of the Muzak corporation suggested that "Boring music makes boring work bearable" (Lanza, 1994, p. 143). Managers meanwhile were also keen to stress that music was a gift to the workforce that could also be used as a kind of environmental sanction. This sense of split modes between control and leisure, and the role of music in these domains, permeated the new urban workplaces and spaces of leisure even by the early 20th century. In contemporary towns and cities, the extension of functional music has been boosted by radio on buses and 'waiting' aircraft and in waiting rooms, lifts and numerous other spaces while, at other times and places, we sometimes try to create our own muzak

> For most people, radio isn't used as a source of information or entertainment. Instead, we employ it as a source of sound, an

accompaniment to other things ... Instead, we use radio as an anaesthetic to dull the pain of all those chores necessary to maintain life—shaving, driving to work, sitting in an office, driving home again, washing up, ironing (Hanks, 1997).

This urbanisation of music into interstitial and public space has opened a role for broader debate and understanding of the degree to which these shifts may have a more significant effect on social life and social order. Whether underlying subliminal or controlling forces can be attributed to such background music is more contentious (Packard, 1957). However, writers like Attali were sharply critical of the role of muzak; in his treatise *Noise*, Attali argued that muzak

> slips into the growing spaces of activity void of meaning and relations, into the organisation of our everyday life: in all of the world's hotels, all of the elevators, all of the factories and offices, all of the airplanes, all of the cars, everywhere, it signifies the presence of a power that needs no flag or symbol: musical repetition confirms the presence of repetitive consumption (Attali, 1977, p. 111).

Pubs and other leisure spaces in particular have developed their own musical idiom that again suggest their role as territories which attract particular clienteles while deterring others. The music in these spaces has become increasingly foregrounded and amplified with effects on the participation of particular social groups in these apparently open spaces. This 'foreground' music is increasingly programmed to allow licensing fees to be collected effectively and to control tempo and genres that allow different parts of the day to be appropriately paced and themed.

This new auditory semiotics of place might also be used to widen the preoccupations of a literature which has analysed the changing constitution of public spaces and their conditions of access (for example, Sorkin, 1992; Smith, 1996). As such space has increasingly been characterised by private control and

regulation, as well as access more often conferred through the role of consumption, there appears to be a particular sympathy between this agenda and the wider role of sound and music in structuring the experience and regulation of previously public spaces. Functional music in particular is predicated upon the idea that both certain activities and social identities are preferable, acceptable or consonant with particular acoustic territories. Indeed, such territories have clearly expanded beyond consumption locations and into civic spaces where street-relayed muzak and music from shops and mobile 'monster stereos' in cars (Muir, 2005) create an increasingly constant and contested presence, challenging notions of public use and access.

In a development that closely resembles Zukin's (1995) ideas of public space pacification, the Port Authority bus terminal in Manhattan uses classical music in waiting rooms with the aim of promoting a civilised reading of the environment by its transient population. Under these conditions, sonic wallpaper becomes urban aural text, by which recipes for action can be issued and potentially wild spaces subtly demarcated, rather than the deployment of more obvious and expensive security. In another example, this time from the UK, Virgin Railways used classical 'piped' music to put off gangs of youths hanging around its stations but found that while this was effective it also irritated residents living nearby highlighting that strategies are rarely contained experiments.

3.1 The Changing Functions of Functional Music

Functional music has altered in relation to changing work practices and leisure habits. The use of music to encourage hard work has been supplanted by the idea that it can be used to encourage hard shopping and play. Table 1 summarises some of the changes in the use of environmental music as shifts in the nature of production and consumption have occurred. Rather than representing a continuum or definite cleavage between two epochs, one can see an overlap

Table 1. The changing roles of functional music

Type	Fordist	Post-Fordist
Source	Audio	Audio + audio-visual
	Pop standards	Tracks by original artists
	Programmed	Storecasting
Context	Production environments	Consumption environments
	Predominantly private	Quasi-public
Congruence	Non-distracting	Subtle
		Attention-grabbing
Volume	Background	Foreground
Reception	Gift to the worker	Choice of consumer
	Lifestyle denying	Lifestyle-signifying
		Denoting client, sub-cultural or consumer group

between the two and there is a marked continuation of some of the elements of industrial-era muzak and its expansion into diverse and flexible situations and modes of delivery today.

Bickford (2000) has discussed the ways in which the physical architecture of the city may generate places which are hostile to democratic participation. In the case of themed consumption spaces, commercial interest may override alternative uses for previously public spaces. In this sense, functional music becomes part of this architecture and an ecological device in city living, another tool in an arsenal of public interdiction that ranges from Davis' 'bum-proof' bench (1990), zero-tolerance policing, revanchist urban political regimes (Smith, 1996), gentrification, gated communities, curfews, malls and anti-homeless legislation (Mitchell, 1997). Perhaps the most important theme among these changes is the increasing 'smartness' by which strategies of territory demarcation are used and promoted as extensions of lifestyle (Shields, 1992), a point which connects well with the sophisticated use of urban music in relation to patterns of shopping, leisure, consumption and politics.

Following Burgess' conception of the social ecology of cities and, latterly, Mike Davis' ideas regarding an *Ecology of Fear* (1998), we might begin to imagine the sonic ecology; a permeable, modulating, fleeting and occasionally persistent soundscape within and across different social and physical sectors of the city. These ecologies fade and

grow in intensity and scale according to particular temporal and social sequences.

Given this range of effects, it is important that an urban imaginary take account of the subtle ways in which sounds slip into social life in city spaces. These effects can include the simultaneous facilitation and closing down of particular types of sociability in particular domains (quiet talk yes; youthful or 'yobbish' behaviour, no). Equally, they may also be used as forms of protest or the temporary adoption of space, as found in street marches. All of this alludes to the way in which an ecology of urban sound extends our understanding of, and connection with, the life of the city and its effects on citizens, all of which may have myriad and diverging experiences of exposure to its different spaces and sounds. These listening 'positions' are also affected by socioeconomic position, since exposure to risks and unwanted noise is often indexed by market value, so that the positive and negative impacts of sound ecologies may be linked to sociologically determined variables. This also suggests the presence of an, albeit morphing, temporally and spatially enduring order that may be affected by changes in patterns of consumption, production and leisure. The layout and distribution are also linked to amplifying technologies that express the capacity of groups to redefine sonic spaces (such as the monster stereos of cars or protest marches) or to cancel out their effects and dominance ('piping-down' muzak, noise-cancelling headphones or socio-legal sanctions against noise).

4. Sound Affects: The Consequences of Urban Noise

In this last brief discussion, I raise the social relevance of a sonic ecology in urban contexts. What can we take from a more sophisticated understanding of, not only the relative *volume* of particular urban spaces, but also the intended role of such sound and music in place which is often used to 'filter' users and consumers by taste and patterns of consumption. Not long ago the Mayor of London released the city's Sounder City strategy after public consultations revealed that 46 per cent of Londoners polled felt that noise was a problem. The politics of noise was revealed in this document in which it was asserted that "our 'soundscape' needs as much care as the townscape or landscape" (GLA, 2004). The strategy included goals to create quieter roads, lower traffic, create places for pedestrian and community uses as well as improve noisy rail tracks and ban night flying from London's airports. The need to 'rest and recover' from the buzz of city living was acknowledged. Yet all of this raises a wider question: how can such changes be managed and implemented within a complex urban system?

The preceding discussion generates a critical question: how might we begin to measure the tangible effects of urban soundscapes and ecologies, their including and excluding moments? Given the social significance and patterning of noise, we need to understand the ramifications of this for responding to these issues. In a study of new flat-dwellers in central Liverpool, Allen and Blandy (2004) found a serious conflict of use between new residents and existing pubs, clubs and street users which were antagonistic to residential life. Such studies demonstrate that there are clear difficulties in reconciling and reshaping the character of the sonic ecology in particular districts and spaces.

In other contexts, it is possible to see a clear dissonance between the private experience of particular groups and the urban soundscape. To take one clear example, it is evident that tinnitus sufferers have a keen awareness of sonic ecologies which have a significant impact on their negotiation of urban space to the extent that places are avoided (noisy roadways, shops with loud music and so on) (Atkinson, 2006). The tangibility of this ecology is thus revealed, although rarely noted, by the everyday user of public space. For such groups, a sonic ecology is made tangible, sometimes painfully so, by their physiological condition.

Writers like Imrie (2000) have also argued that the negotiation of urban space by the disabled, in Imrie's words, is estranged, oppressed and otherwise made powerless by the inability of a broader society to take these use needs into consideration in the design of inclusive urban environments. The example of tinnitus sufferers echoes this problematic since their position is rarely noted, particularly since the condition of having tinnitus is not signified by particular physical characteristics. Like the 'revenge on our times' of head injuries, stemming from technological changes that have increased the risk of these injuries (Webb, 1998), tinnitus sufferers are similarly powerless to overcome their condition but look 'normal'.

All of this makes the assessment of risk, responsibility and urban management a blurred issue. This is not least because, as Gurney (1999), for example, finds, workers in loud factory environments often tolerate noise and are resentful of the use of ear protectors even though such protection is not linked to discomfort. As Honkasalo (1996, p. 32) puts it, "It is a tough man's job to tolerate it". Nevertheless, the patterns of association and spatial trajectories of tinnitus sufferers appear likely to be affected by the presence, volume and character of the sonic ecology of the city, even if these influences are subtle and hard to measure.

In Atkinson's (2006) tinnitus survey data, it was revealed that three-quarters of respondents *always* avoided bars and restaurants where loud music was played; this rose to 96 per cent if the 'sometimes' category was included. This suggests that the volume of music in public spaces has profound effects on the leisure patterns of this population,

particularly since three-quarters of respondents also felt that the volume of music affected their ability to communicate in social spaces, such as pubs and restaurants, even when low-level 'muzak' (functional music) was being played.

This discussion illustrates how making concrete our conceptualisaton of the city as an ordered ecology of spaces with specific acoustic qualities that affect the patterns and quality of sociability also filters directly into urban politics, the quality of social life as well as thorny questions about responsibility and risk. Given that both sound and noise are hard to contain, the idea that clear 'edges' (Lunch, 1960) can be discerned around which such flows might be planned and managed becomes problematic. Even while a sonic territory, such as a club, may be demarcated spatially, the sound shadow around such a space may be much more difficult, either to contain or to measure.

Respondents in Atkinson's (2006) work highlighted their inability to join friends in places they associated with high noise levels. Sometimes elements of the auditory experience of key locations were identified which might pass as unremarkable to other groups, such as supermarkets where adverts for 'special offers' were commented on. In certain cases, these feelings may be difficult to distinguish between personal taste, relative social intolerance and genuine personal discomfort. Yet these processes of self-exclusion suggest visually intangible yet important barriers and filters that challenged the choices of these tinnitus sufferers. In Rice's (2003) study, patients requested nurses to wear quieter shoes, placed pillows over their heads to drown out the noise of machines or televisions, and applied hospital radio headphones to muffle the sounds around them. These strategies are by no means restricted to groups such as these; it is equally evident that house prices, to take one example, function partly in relation to the ability of domestic space to shield occupants from unwanted noise and intrusion.

This discussion highlights how our engagement with the auditory experience of the city can be significant in ways that shape, exclude and otherwise affect our emotional, physiological and social engagement with a differentiated series of spaces connected by the relative presence or absence of different sound sceneries. This ambient architecture of place sometimes empowers or excites, just as other contexts may exclude or provoke anxieties about our ability to be in particular spaces. These explorations also reveal a daily changing ecology that is both fluid but also tangible in its effects. As cities appear to become noisier in some sectors and quieter in others, it is important to begin to think about how these changes will be mediated and managed and whose responsibility these decisions will be. The helicopters in São Paulo show, for example, that the overspill effects of the mobile sonic ecology of their flight paths are by no means restricted to poorer districts. Deliberating between the costs and consequences of these effects is likely to become an area of increasing difficulty.

5. Conclusion

Just as physical barriers in the city are being exposed and subjected to renewed analysis (Noonan, 2005), we are similarly enabled, through a consideration of the impacts of a sonic ecology, to comprehend the spatial and social patterning of cities. As with the study of physical boundaries, the influence of such invisible mediators of exclusion have been understated. Like a form of sonic false consciousness, we perhaps remain peculiarly detached or desensitised to the auditory life and possibilities of the city.

As I have tried to suggest here, acoustic territories can be delineated and appear to have a variety of social functions and influences. Music, sound and noise can be seen as spatial and temporal territories in the city suggesting that for particular groups the soundscape has a profound effect on patterns of social association, physical movement and interaction. While an aural geography may seem unimportant within a wider social scientific project, there remains little comprehension of the connections between the social sources of sound and music and both the

misery and elation that the resulting ecology create. A new mapping of this less solid, but no less affecting, aspect of the urban condition would seem to be both useful and important.

The power of music to pacify, excite and motivate has long been a theme of the sociology of music. The development of this area of urban social theory also needs, however, to consider the increasingly disparate sources and economy of music, noise and its effects on different social groups, particularly given that social inequalities and problems are unequally distributed in relation to these impacts. As functional music has developed from its intimate association with Fordist principles of productivity maximisation and worker control, it has also become a hybridised and commercially successful art form that has helped to blur the boundaries between consumption, public/private space and art/leisure. Since the time and space geographies of different social groups are differentially affected by these sonic ecologies, this is likely to remain a rich area for theoretical and empirical exploration.

This paper has attempted to bring substance to a distinctly slippery and 'invisible' area of urban analysis. However, the analysis of sound in the city and its social and geographical ordering intersect with a wide range of concerns of which perhaps we have been unaware or uninterested. Perhaps, like one of Schafer's students, this only emphasises the need for us to clean out our own ears and become more receptive to the qualities and impact of this most subtle ordering and influence that stems from the daily lived fabric of urban spaces.

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