

# Sound FX and the city

City-dwellers may hate traffic noise or loud parties late at night, but let's not forget the upside of the urban soundscape, says **Trevor Cox**, and how to cultivate it

I WENT on a "sound walk" in London in spring last year. Thirty people gathered near Euston railway station and then, in absolute silence, we meandered down backstreets, along major roads, through railway stations and ended up in Regent's Park. For 2 hours, we tuned into the city's soundscape. I had not expected to hear birdsong on a backstreet close to a noisy main road, and I was surprised to find that I enjoyed the sound of a lock banging against a bike frame as a cyclist rode by. Nor had I ever realised quite how annoying the sound of roller suitcases was until I heard travellers trundling their luggage into St Pancras station.

As an acoustic engineer, I found this walk a real ear-opener. Urban design is only really concerned with abating noise made by public transport or industry: the subtle and interesting sounds that can enhance cities are overlooked. With the internal combustion engine on its way out, though, the acoustic fog created by cars, buses and trucks will finally lift and other sounds of the city will emerge. Will we like what we hear? All those annoying sounds currently masked by traffic noise, such as humming ventilation systems and music escaping from pubs, restaurants and cars, will become more audible. It's time to work out how we want our cities of the future to sound.

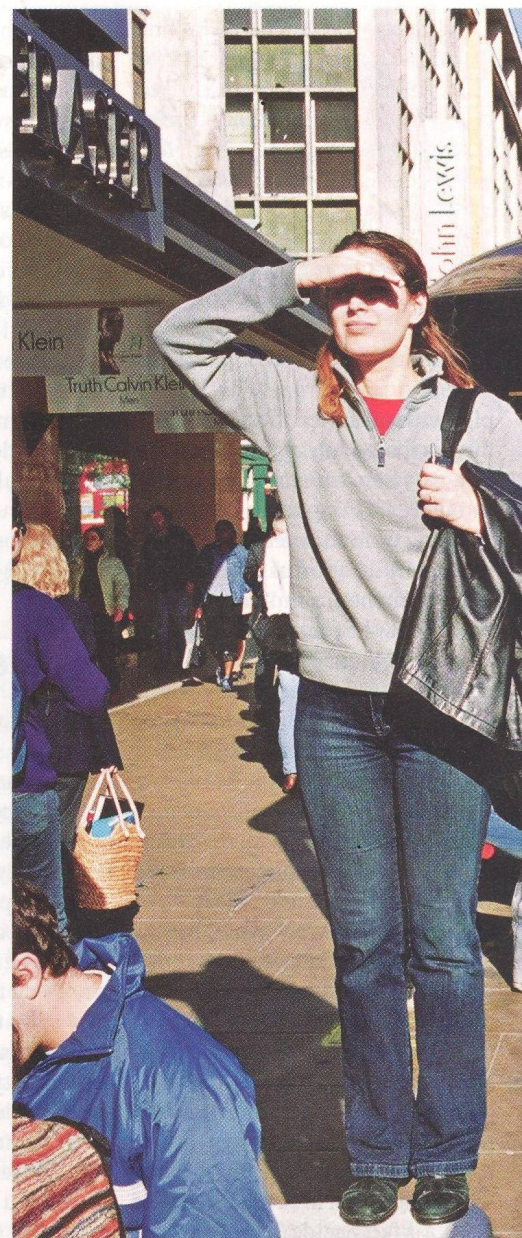
In the past, researching urban soundscapes was simple. I would measure street noise in decibels, then canvass public opinion using a battery of tests borrowed from experimental

psychology and combine the two. I might play a couple of city noises I had recorded and ask subjects to say which sound was more annoying. Since all that researchers wanted to know was the relationship between noise levels and people's responses, we tended to treat our subjects rather like lab animals.

Inconveniently, human response to sound is complicated and not captured well – if at all – by the decibel, except when noise is relatively loud and constant. Even so, crude decibels rule in planning regulations. Noise maps illustrate how bad this reductionist approach can get. Worldwide, engineers use expensive computers to generate maps of the sound environment. These look so much like pretty, coloured road maps that some researchers joke it would be cheaper and quicker to colour in a map, using red crayons for busy roads and blue for quiet backstreets.

Take my house in Manchester, the heart of northern England. It appears on a sound map with a decibel value of between 60 and 64.9 decibels. Even with a PhD in acoustics I struggle to interpret this. How can the complex way sound varies during the day and between the seasons be meaningfully summed up by a single number? It also seems too large for the quiet back road I live on. Most importantly, it ignores important issues such as neighbour noise. This cannot be included on maps because there are no databases showing where inconsiderate people, players of loud music and raucous lovers live. Moreover, all this takes no account of a listener's perception: has years of working in acoustics made me overly sensitive to noise?

Yet the crude noise maps we make drive policy. Advocates argue that they have been vital in making politicians take noise seriously. This must be a good thing: noise has many deleterious effects, ranging from sleep



disturbance to increased levels of stress hormones in the blood, reduced performance in schoolchildren, and poorer wellbeing overall. Yet noise is still not high on the political agenda, despite reliable estimates that 54 per cent of the UK's population live in conditions exceeding daytime sound levels prescribed by the World Health Organization – 55 decibels for steady, continuous noise.

One problem with decibel measurement is that it does not differentiate between "negative" and "positive" sounds. Take the sounds made by a fountain in a town square, happy children in a playground or the cheerful toot of the Manchester tram – any one of which might exceed permitted sound levels. Increasingly, researchers have been pressing

## PROFILE

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Once we have abated the noise, though, what do we want to hear? The Positive Soundscape Project, funded by the UK's Engineering and Physical Sciences Research Council, has given us pointers. This unusual interdisciplinary research came out in favour of what seems contradictory: a "vibrant, calm" soundscape. In fact, this makes good sense. A city thrives on vibrancy, so an urban square needs to have a sense of activity: the barista making coffee, the clack of high heels on the pavement, or snatches of conversations from passers-by. Yet we don't want this vibrancy to be so intense it becomes intrusive: it might be nice to have a busker

### "It's time to work out how we want cities of the future to sound"

in the square, but you don't want them playing in your face. Subtle changes in urban design alter how people use places and consequently the soundscape.

One of the major problems will be getting designers to use soundscape research. Beyond bare compliance with regulations, architects and planners receive little acoustics training. Sound is treated as an engineering constraint, and given as much consideration as, say, whether the street drainage system will work. Where does that leave the emotional response we have to sound (usually stronger than our response to guttering)?

No one wanders around the street with a beauty-ometer; people make aesthetic judgements without having any idea about the tangible "rules" underlying them. If we acknowledge that urban sound has an aesthetic, which I believe it does, we urgently need to know what governs it and then how designers can work with it. Similar to that of the visual world, it will be built on a complex understanding of cultural theory, sonic art, cognitive and social psychology, engineering, physics and the relationship between them.

Powerful technologies can also help in this exploration. One promising avenue is virtual reality with realistic sound, enabling soundscapes to be explored before being built. The fancy fly-throughs of virtual developments which are so popular with architects are too often silent, but researchers are working hard to rectify this.

Hopefully, by building an aesthetic of sound, using the best technology we can get our hands on, we'll be skipping to work through a positive soundscape before long. ■

**As the noisy internal combustion engine is phased out, how will this scene sound?**

for these positive sounds to be considered within urban design alongside more traditional noise-control approaches.

This is going to be tricky because we cannot measure the sound level for a water feature in decibels and hope that this also captures the different responses of listeners. Babbling brooks, gushing fountains and pounding waterfalls all have very different sound qualities.

Many researchers approach this problem by embracing social science methods, setting up focus groups, going on sound walks, trying to capture the emotional response to sound. Others persist with computer algorithms

to model people's reactions, gathering extra data, such as the listener's age and gender, to use in the algorithm to redress the inadequacies of the decibel. They might also measure the complex aspects of audio signals, such as the balance between treble and bass or whether it has a distinct tonal quality. To tap the moods evoked by given sounds, listeners are asked to fill in personality questionnaires.

As the complexity of these models grow, so does my feeling that there must be a better way. Consider a small, relatively quiet, urban square – an acoustic oasis. To design such spaces, traditional engineers quieten intrusions from traffic, rail and planes. Buildings, walls and baffles can all be used to block out the sources of noise and reduce intrusion.

MATT STUART