Discrete mapping of urban soundscapes

By Olivier Balaÿ
Translated by Harry Forster

Abstract
Since the introduction of the EU directive of June 25, 2002 there has been a profusion of research grants and public-sector spending on quantitative acoustic maps. But what are they going to be used for? Who is going to consult them? Will they serve as the basis for upgrading our urban soundscapes? There is every reason to doubt this. This article reports on work that could form the starting point of a vast research drive to build sound maps of a new sort, maps that are more descriptive and able to supplement the information provided by mapping of acoustic measurements.

Keywords: Sound design, cartography, time-based representation, geographical information system, architectural and urban atmospheres.

Geography "focuses on the entire globe, much as we might look at a complete body, but chorography looks at just one part of the Earth as if we were to cut off just an ear or an eye from a whole body and then describe it in detail". (Eustathe Commentaire à la Périégèse de Denys.)[1]

Describing sounds rather than measuring acoustics

What is the purpose of acoustic mapping? For which users is it designed? What uses and what sort of renewal of the urban soundscape does it target?

These are not naive questions. Never before have we devoted so much energy to mapping physical measurements of urban sound environments. Never before have we invested so much in building and purchasing powerful measuring devices and software to represent soundscapes in two and three dimensions.[2] But in all this movement—and this is one of the most striking features of the history of our representation of urban soundscapes since the end of the 19th century—three points are of particular note: we have stopped describing sound and now only measure its quantity; instead of taking account of the perceptible effects of sound material we now study its acoustic impact; and we have stopped creating paths for the circulation of sounds in space and started fitting sound insulation. The facts are well known in the face of urban noise, and driven by the fantasy of control, a negative attitude to noise has gradually supplanted an approach that paid attention to the sound culture of city-dwellers. Little by little this process has destroyed the intuitive links that developers created between the design of urban spaces and the framework in which we listen.[3] Yesterday's architects and builders were anything but deaf. They listened to their surroundings and were fully aware of the sound sensibility of their time. But in recent years a sense of audible space seems to have disappeared from the know-how of those who produce our built-up spaces.

So what is the situation now? In the form in which acoustic impact studies are scheduled and carried out, in response to a "control" fantasy, they do not help developers to conceptualize the sound dimension of a city in a perceptible fashion. If, on the other hand, we posit that city sounds do not exist at the outset but are created by usage, that the sound matter of a neighbourhood or street is both given and to be obtained, we believe that we can restore a genuinely creative approach. In this framework we may be tempted to start listening to the sounds of urban cultures again, to describe their specific features, highlight their creative role in daily life and a sense of comfort. And, taking our lead from our predecessors' creative attitude to sound, is it not possible to propose that in the act of construction the "expert" descriptions should seek to link up with the sound culture of ordinary citizens, both actors and recipients in this process, with the general aim of improving city life?

All the work on sound phenomena done by CRESSON[4] since 1979 has tended towards this goal. I shall attempt to summarise it briefly. In yielding too readily to the conclusion that the urban sound environment was deteriorating developers forgot that sounds also help to disseminate information. On the contrary identifying, pinpointing and naming these phonic qualities provided us with a way of explaining and thinking our way through the sounds in a neighbourhood, street or housing unit. For many people avenues, courtyards and squares are lively sound spaces in which no noises are bothersome or worthy of condemnation. However, some sounds that attach local people to their neighbourhood or home fulfil a function that may seem pointless to the outside observer. This is why it is so important to acknowledge the special role and attachment that local people associate with sounds. This research has enabled us to gain an understanding of the way in which individuals manage to define sounds in their familiar territory and take a certain pleasure in identifying with them. It has also shown how this identification depends on the person(s) controlling, creating or developing the territory. Furthermore this knowledge can be mapped. Now that city councils are processing data and knowledge on behalf of national or European bodies—generally projecting national problems at a local level—it seemed important to rise above the current EU incentives and regulations on acoustic mapping and backtrack a little. We would rather see cities as places in which original sound information is produced and local know-how is given shape. On this basis we may inform our approach to acoustic development. As a complement to the mapping of acoustic measurements, we are consequently trying to chart the sound life of the city to open the way for a debate between all those involved in urban development.

Exploring the sounding city

The map is open. It can be connected in all its dimensions (…) We can draw it on a wall, conceive it as a work of art, build it as a political action or as a form of meditation. (Deleuze and Guattari, *Rhizome.*)[5]

Why should an organisation responsible for managing a city go out of its way to base its sound rationale on a description of local particularities? Simply because there can be no universal model for explaining noises. Neighbourhoods with similar streets have different sound atmospheres. The type of social life that unfolds there and the requirements of local people vary so much that it is difficult to identify constant characteristics. To convince Lyon city council of the merits of an observatory of the

sound environment we studied three neighbourhoods near Place des Terreaux, in the first *arrondissement*: Rue Romarin, Rue Major Martin and Rue du Garet, and their immediate vicinity. In all three neighbourhoods our acoustic measurements revealed identical levels of sound intensity. But for local people all three streets had quite different atmospheres.

Changes in the way we use the city also raise questions about our sense of comfort. How can we treat the notion of comfort without taking into account local social and acoustic factors. Look for example at car traffic in cities. Car engines with their continuous, low-frequency, medium-intensity background noise tend to muffle sharper, human sounds, not to mention silence. But what is rightly perceived as negative noise may temporarily be seen as a positive factor if it partly conceals neighbourhood noise. It should now be clear why it is worth developing a tool to present qualitative sound dimensions and not just make do with quantitative maps.

It was at this point that we developed our sound bite (chorography) database ChAOS,[6] as the continuation of our initial work for the sound environment observatory in Lyon.[7] The database is still up and running now. One day it will help to reconstitute the history of our contemporary sound environment.

This action[8] started in 1992 when we undertook a programme to develop the qualitative representation of urban sound phenomena for operational purposes. In 1997 the Spatial Information Systems (SIS) team at Laboratoire d'Ingénierie des Systèmes d'Information (LISI), led by Robert Laurini, offered to take part in the programme and explore the possibilities of a geographical information system (GIS) giving us the benefit of the skills of its researchers, in particular Sylvie Servigne and Bruno Tellez. Collaboration started between CRESSON and LISI to explore three openings for a GIS: to organise the cartographic representation of the sound environment including qualitative data; to model the databases required for this representation, providing users with an instrument that would help them think about the local design of sound environment; and to define ways of representing data with maps, captions, graphical semiology, etc.

What was special about ChAOS was that its database was designed to distinguish the way local people perceive sounds from the reactions of informed observers (acousticians, sociologists, architects and planners) carrying out field surveys. We thought that when there was a clear discrepancy between the two perceptions this meant that some changes in the environment must be required. We started from the assumption that sounds are never "motionless", but constantly varying, and that our perception of sound is time-based. Just listening to the soundtrack of our daily life is enough to understand the phenomenon of sound qualification of passing time. But, at least until now, noise maps have always been static. That is why our GIS includes a temporal representation of sound signals, on the one hand, and road traffic, on the other, after counting. Users can thus get a grasp of the times at which a street or neighbourhood wakes up or goes to sleep. Furthermore he or she can monitor the density of sound signals by type. Coupled with an account of people's actual lives, these time charts are very expressive in graphic terms. Lastly scope for making sound recordings is another original feature of our sound-bite tool. The soundtrack plays back a record of the area under study. It is also a medium for the neighbourhood's sound memory, and in particular even the smallest activities going on there. It can thus serve as a starting point for imagining ways of reshaping the sound environment, proposing or correcting a particular acoustic space.

This GIS provides new ways of exploring and organising auditory journeys for its users. The map displayed on the computer screen as exploration progresses, keeps track of the route taken. It is for instance possible to access a particularly remarkable sound situation after opening the menu to see how a bend in the street or the form of an alley can affect the quality of local life. The user will hear the sound of steps on a staircase or in a garden, gaining access to a fragment of narrative depicting daily life in that particular place.

Lastly the database enables users to explore various topics. They take the form of ready-made maps that can be called up, with a map of different categories of remarkable acoustic spaces, a map of dominant background sounds, a map of the various forms of social interaction identified, and a map of the locality's ordinary sound heritage. To this we might add a map summarising the built-up form of the streets, the type of ground surface, the slope of the thoroughfares, the presence of plants and wildlife and the time-based maps already mentioned. There is also a menu of acoustic measurements developed in partnership with the Building Science and Technology Centre (CSTB) in Grenoble and a set of files relating stories by local people. The whole system can be connected to the Greater Lyon GIS.

Olivier Balaÿ is a practising architect, has a doctorate in town planning, is a teacher at several schools of architecture and a researcher at CRESSON (Centre de recherche sur l'Espace Sonore et l'environnement urbain) UMR CNRS 1563, Grenoble School of Architecture.

Harry Forster is a British-born freelance translator who has been living in Grenoble, France, for over 20 years. His work ranges from current affairs to microelectronics, through food, travel and town planning.

Footnotes

1 C Müller *Géographi graeci minores* Vol. 2 Paris, Firmin Didot 1861, p. 212, 213. What is a chorograph? According to Ptolemy (90-168 AD), chorographs differ from geographers in that the latter consider the Earth to achieve an overall view whereas chorographs describe or delineate on a map particular regions or districts and describe all their particularities. Christian Jacob *Ecritures du monde* in Cartes et figures de la terre, Centre Georges Pompidou, CCI Paris 1980, p. 107 and 108.

2 RAPIN Jean-Marie SIGAUR, Système d'information géographique et acoustique urbaine, CSTB, UJF, Grenoble 1999.

3 BALAŸ Olivier, *L'espace sonore de la ville au XIXème siècle,* (ed.) A la Croisée, Grenoble 2003.

4 AUGOYARD Jean-François, TORGUE Henri (with the team at CRESSON), *A l'écoute de l'environnement, Répertoire des effets sonores*, Marseille, Parenthèses, 1995, 174 p.

5 DELEUZE (G.) and GUATTARI (F.), *Rhizome* (ed.) De Minuit, Paris 1975.

6 BALAŸ Olivier, *SIG ChAOS, La représentation de l'environnement sonore à l'aide d'un système d'information géographique* (collaboration CRESSON-LISI-Laboratoire d'Ingénierie des systèmes d'information), 2 volumes and a CD-Rom, Contrat de Plan Etat / Région Rhône-Alpes / Agence des Villes, Lyon-Grenoble, October 1999. ChAOS = Chorogaphies pour l'Aménagement Sonore

7 BALAŸ Olivier, *Lyon prépare son observatoire de l'environnement sonore.* Quarterly review "Annales des ponts et chaussées" N° 88 *Observatoires locaux*, December 1998, p. 61 and following.

8 Cf. ARLAUD Blaise, BALAŸ Olivier, *A geographical information system of the qualitative sound environment* in SFA, I. INCE, INRETS, Proceedings Inter-Noise 2000, Nice, France, Paris, 2000, Published in abstracts and in CD Rom, August 2000.