

# Soundscapes and the temporality of Auditory Experience

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## Abstract

Until very recently in the history of philosophy (non-musical) sounds have been almost absent from serious philosophical consideration and although auditory perception was often taken into account when the main subject was music, it has rarely been considered for its perceptual specificity, more often than not, superseded by the visual modality of perception. Rather surprisingly, it was in a famous descriptive metaphysics essay by P. F. Strawson, *Individuals*, that an auditory world was conceived as a thought experiment, considering it a possible model for establishing a conceptual scheme of a spatio-temporal world. Strawson argued, though, that an exclusively auditory world would only provide a temporal framework, since sounds wouldn't have, according to him, intrinsic spatial characteristics (what we usually ascribed to sounds as spatial would have been the result of multimodal perceptual interaction). Notwithstanding, there is now an intellectual consensus in philosophical sound studies that accords spatial features to sounds, namely their locations. This of course and the information it provides concerning sound sources make auditory perception a valuable cognitive resource for the spatial representation of the perceiver's environment. Nevertheless, it cannot be denied that sounds also have temporal features and that we can only perceive them in time. Actually, there is even a theory (O'Callaghan 2007) that conceives them ontologically as particular events, in which a surrounding medium is disturbed or set into motion by the action of interacting bodies. But even if we do not agree with the event-theory of sounds, it seems reasonable to accept they have temporal durations. In fact, sounds are not only perceived in time but they even add to the perception of time itself. As far as we can postulate, in a Kantian fashion, an inner sense, we can think of sounds and aural properties as qualitatively enriching our experience of objects, events and our own self-awareness. Consequently, we may build a temporal representation of events and the places where they occur, with the help of sound durations, the temporal relations between sounds – succession, simultaneity, order, etc. – and our own experience of those sounds.

If the spatial aspect of auditory perception enables the perceiver with cognitive tools to build a descriptive and operational map of places and situations, then the temporal features – working together with other audible qualities which, we claim, enhance this possibility – provide qualitative elements for the weaving of acoustic narratives, inhabited with meaningful experiences that emotionally connect (or disconnect) the perceiver with (from) its environment.

What I aim to do in this presentation is then to highlight the temporal features of acoustic experience through the phenomenological description and critical analysis of auditory perception, in order to show how soundscapes are interweaved with temporal elements that necessarily pervade the personal experience of places.

**Keywords:**

## 1. Philosophical awareness about an 'auditory world'

It is, nowadays, common place to assert that modern western civilization thought patterns have been dominated by visual perception and concepts. In fact, one cannot find many examples in the history of philosophy where other perceptive modalities are paid similar attention. In what concerns us here, i. e., sounds and auditory experience, apart from some individual cases in early modern philosophy – Locke, Berkeley or Condillac, and yet, still dominated by a visual ideological frame –, it was not until very recently that philosophers have begun to seriously consider the aural modality of perception and the ontological specificities of sounds. It is now an emerging sub-area of philosophy, encompassing metaphysics, epistemology, aesthetics and philosophy of mind, and a growing number of books and articles have been published in the past few years. But it would not be fair to ignore an unexpected yet major contribution to the philosophical consideration of sounds, which can be found in a 1959 book, also responsible for the rebirth of metaphysics in the analytical tradition, *Individuals: an essay in descriptive metaphysics* by British philosopher P. F. Strawson.

The reason for invoking this book at the beginning of this presentation is connected with the controversial yet pregnant thought experiment, presented in chapter 2, where Strawson entertains the hypothesis of a purely auditory world, and the consequences of its analysis for the characterisation of sounds. In his project of a 'descriptive metaphysics', in the context of an ordinary language philosophy, Strawson was focused on clarifying our conceptual scheme of the world. For that purpose, he was looking for a category of entities that would be objective and independent from references to other entities, so that they could ground a spatio-temporal framework where descriptive relations would be coherent and thus enable us to structure our conceptual scheme and effectively perceive our environment. In chapter 1, he found that category of referentially basic entities in material bodies. But, in the second chapter, he tested his hypothesis with an alternative category of objective entities: sounds. He chose sounds because he wanted to speculate over the possibility of building a conceptual scheme – different from ours – with reference to objective entities that were not material bodies and thus non-spatial<sup>1</sup> (according to Strawson, auditory experience is in itself non-spatial)<sup>2</sup>. The triumph or misfortune of this thought experiment is of no concern here,

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1. The relevance of discussing basic non-spatial entities derives from Strawson's analysis of the Kantian claim that the notion of there being objective particulars should involve the notion of space (Strawson 1959, p. 62).

2. Delving deeper in his thought experiment, he was forced to postulate something he called a continuous 'master-sound', which would then provide a frame of reference, analogous to space, in order to allow the distinction and re-identification of particular sounds (Strawson 1959, p. 76).

yet, this characterisation of sounds and the controversial assumption that auditory perception is essentially temporal and non-spatial encouraged me to seriously rethink the nature of sounds and sonic experience.

## 2. Scepticism about spatial audition

Most contemporary philosophical discussions on auditory perception – at least since (Casati & Dokic 1994) – put a strong focus on its spatial features, namely the location of sounds. Likewise, our empirical everyday interaction with sounds makes us naturally think of them in spatial terms. In fact, our ability to effectively detect and perceive the sounds of our spatial environment, in order to properly act and survive, seems to be one of the main evolutionary reasons for having audition as part of our perceptual system. So, we cannot avoid being at least baffled with Strawson’s assumption of the non-spatiality of auditory experience. Strawson does not ignore that in our current experience we say that sounds “come from the right or the left, from above or below” or that they seem “to come nearer and recede” (Strawson 1959, p. 65), but his argument is that what we commonly ascribe to sounds as spatial features results from multimodal perceptual interaction (mainly with visual, tactile and kinaesthetic perceptions)<sup>3</sup> and that such expressions have no intrinsically auditory significance.

This scepticism about spatial audition has been shared by other aspatial accounts of auditory experiences (O’Shaughnessy 1957) and by some proximal theories that locate sounds at or near the ears of the subject, despite the distant location of sound sources (Nudds & O’Callaghan 2009, pp. 69–83 and pp. 117–125). To be fair, some of these theories do not deny that auditory experience may convey spatial information, insofar as it can represent spatial features or have spatial content, namely concerning the causes of sounds. According to these theories one should subtly distinguish between the location of sounds and the location of sound sources, as well as between the spatial content of auditory perception and

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3. The fact that humans are equipped with two directional aural receptors, ears, is also responsible for the spatial information perceived in auditory experience, namely via interaural time and level differences. Also see (Bregman 1990, pp. 79–83) and (Warren 2008, pp. 35–63).

the spatial properties of sounds themselves<sup>4</sup>. Furthermore, these differences between the various theories also result from different perspectives concerning the nature of sound, its ontological or metaphysical status.

### 3. What, then, are sounds?

On this topic, Strawson starts by saying, in a very traditional fashion, that sounds are “the proper objects of hearing” and then characterises them stating that they “*of course*<sup>5</sup> have temporal relations to each other, and may vary in character in certain ways: in loudness, pitch and timbre.” However – as I have pointed out – he insists that “they have no intrinsic spatial characteristics” (Strawson 1959, p. 65). We can infer, from his argument in the thought experiment, that he considers sounds as objective, public entities, mind-independent particulars that can be distinguished and re-identified. But saying that sounds are the public objects of auditory perception only spares us from the conclusion that they could be subjective mental states (or properties of hearers)<sup>6</sup>, although it does not tell us much about their metaphysical nature. What ontological category do they belong to? They are particulars, not universals. But: Are they properties? Are they powers or dispositions? Are they abstract particulars or tropes?

The recent philosophical publications on the ontology of sounds have given different answers to these questions – from the traditional and scientifically consistent ‘wave view’ to the ‘property view’ – but this is not the place to survey them all<sup>7</sup>. Nonetheless, there is a type of answer that is particularly sound and that stresses the main aspect of auditory experience that concerns me in this presentation: temporality. As we have emphasised above in our quotation of Strawson’s characterisation of sounds, it seems obvious that they, at least, have

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4. Of course, this distinction does not exempt aspatial and proximal theories from showing how sounds with no intrinsic spatial characteristics can convey information about the spatial location of sound sources.

5. Italics mine.

6. Actually, this is a rather traditional view about sounds that is warranted by the phenomenon of aural hallucinations.

7. For a brief review of these various positions concerning the ontological status of sounds, see (Nudds & O’Callaghan, pp. 4-8), (O’Callaghan 2007, pp. 13-28 and pp. 57-71) and (Casati & Dokic 2012).

temporal relations to each other. And although it is debatable if sounds have locations or if they are intrinsically or only extrinsically spatial, almost everyone would agree that, not only they have temporal relations between each other, but sounds themselves occur in time and have durations<sup>8</sup>. An approximate answer to the ontological question - “what are sounds?” - that takes temporality as an essential feature of these entities - is then that they are events (Casati & Dokic 1994, pp. 36-48) (O’Callaghan 2007, pp. 57-71).

## 4. Sounds as events

The ‘event view’ informs us that: either sounds are events happening to material objects that resonate (the Located Event Theory defended by Roberto Casati and Jérôme Dokic) or they are events that involve both the causal source and the disturbed surrounding medium (the Relational Event Theory defended by Casey O’Callaghan). One of the main consequences of this ‘event view’, in both versions, is that sounds are intrinsically temporal entities<sup>9</sup>, “they take time and involve change” (Nudds & O’Callaghan 2009, p. 36), they “are either instantaneous events or temporally extended processes” (Casati & Dokic 2012). The “wave view” of sounds also recognises that they are temporally extended occurrences and that they are somewhat persisting particulars, but, as O’Callaghan critically observes, at best “it mistakes the lifetime of a train or bundle of sound waves in an environment for the duration of a sound” and is thus unable to correctly grasp the temporal characteristics of sounds. To be clear, the propagation of sound waves is, according to the Relational Event Theory, a consequence of ‘medium-disturbing events’ which sounds ontologically are, and the collisions or vibrations of material objects are the respective causes - precisely the events that indeed are sounds,

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8. Although Jonathan Cohen argues against the exceptional and distinctive temporal features of sounds that would allegedly distinguish them from other sensible qualities, namely colours, he still concedes “of course, that sounds occur in time, that they have temporal durations, and perhaps bear many other interesting relations to time” (Cohen 2010, p. 304). So, in this chapter on “Sounds and temporality” he does not deny the intrinsically temporal characteristics of time, but simply states that they are not that distinct from temporal features of colours, for instance.

9. Saying that sounds are events implies that they are, of course, spatio-temporal occurrences. Nonetheless, for what concerns me here, I shall only emphasise their temporal features, which singularise them from other metaphysical entities, be it properties, dispositions or abstract particulars.

in the Located Event Theory. In this last version, sound waves propagating in a medium are the necessary condition for auditory perception of sounds but not to their existence (in the 'property view', sounds could occur in a vacuum but also according to (Casati & Dokic 2012)).

Whether we accept the 'event view' of sounds or not, it seems consensual that sounds involve temporal features, since they occur in time, they have instantaneous or extended durations, they start and cease (and sometimes last), they qualitatively change or survive qualitative change and, to sum up, our auditory experience of sounds is significantly a temporal one. I will go further and claim that the experience of sounds shows us something about time itself, insofar as it assists us in perceiving time and in building our own temporal experience. Notwithstanding, before considering this somewhat more ambitious claim, I will analyse the ways in which auditory perception comprises time.

## 5. Temporal processing in auditory perception

Besides the obvious temporal relations involved in the perception of various and successive sounds, which imply the elementary experience of previous and subsequent sounds, and consequently, an order of succession between them, there is also a temporal dimension in the perception of each individual sound. In fact, even the human detection of sound is dependent upon duration, since everything shorter than 40 ms will be virtually inaudible and, for durations of less than 200 ms, the sound intensity necessary for detection must increase as duration decreases (Moore 2013, p. 64). Moreover, temporal processing in auditory experience is highly complex, involving temporal resolution (or acuity), which refers to the ability to detect change – gaps or modulations – in stimuli over time, but also temporal integration (or summation) – the ability of the auditory perceptual system to add information over time in order to enhance the detection and discrimination of various future stimuli (Moore 2013, pp. 169-202).

Furthermore, any of the traditional perceptual properties of sound – pitch, loudness and timbre – requires, in one way or another, some temporal dimension to be able to produce the psychoacoustic sensation in the perceiver. Pitch is the qualitative and subjective perception of frequency, which is a physical property of the pressure waves that occur when sounds

are produced. So pitch tells the perceiver the number of cycles of motion per unit of time that the particles constituting the disturbed *medium* (air, water, etc) undergo<sup>10</sup>. Even if this is the result of an infra-level perceptual process, it is undeniable that time has a part in the perception of pitch by the hearer of a sound. Loudness is the perceptual quality that gives the perceiver an account of the intensity or magnitude of a sound. This means that it informs the hearer about the sound energy transmitted per unit time through a unit area, but while this measure of sound intensity depends on the sound pressure exerted by the atmosphere, the subjective magnitude of the sound also depends on its frequency, waveform and duration (Truax 1999), which, in some sense, still gives time a role in loudness perception. Finally, timbre, usually known as the quality or even, metaphorically, the colour of a sound, is determined by the behaviour in time of the spectrum of a sound or its frequency content (the presence and distribution of 'the fundamental' frequency, partials and transients, their phase relations, their growth and decay in time) (Truax 1999). Given the rich variety of traits that influence timbre perception<sup>11</sup>, it helps singularising sounds and reveals itself to be very useful in the recognition of sound sources in the environment of the perceiver. The relevance of time in the perception of each of these different qualities makes it, not only an important feature, but a constitutive element in auditory experience.

## 6. Time perception in auditory experience

But if the perception of sounds necessarily needs time to occur, auditory experience is a very effective way to make us aware of time itself. Since, we do not own a specific sense fitted for the perception of time, it is commonly accepted that we become aware of time and experience it through the perception of other things, particularly events and changes in states of

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10. I am, somehow, still keeping in mind the Relational Event Theory of O'Callaghan in this characterisation of pitch, even though my claim concerning the temporal condition of pitch perception is valid for other definitions, in general. For details on how he dealt with the objection that pitch seems a perceptual quality about sound waves, see (O'Callaghan 2007, pp. 76-86). For details concerning pitch perception, also see (Warren 2008, pp. 64-106).

11. After Pierre Schaffer's *Traité des Objets Musicaux* and his theory of 'reduced listening', timbre as a perceptual category for the identification and description of 'sound objects' has been criticised, namely by Michel Chion, for its lack of homogeneity, its causalist nature and its dependence not only on spectral analysis but also on dynamical variations and context. See (Chion 2010, pp. 184-5).

affairs, but, also in the perception of the relations of non-simultaneity, movement, variation and order among objects. Sounds are thus exceptionally fitted for the experience of time, not only because of their temporal nature, insofar as they can be conceived as events, but also due to their perceptual properties – as we have noticed above – and how the perception of these qualities aesthetically and emotionally affect the perceiver. Through the perception of duration, timbre, spectral and harmonic variation and even loudness and pitch properties of sounds, the listener is affected in a particular way that is, by all means, cognitively significant – it informs about sound sources, distance (via interaural time and loudness levels) and other space characteristics, like amplitude, indoors or outdoors situation (via resonance, reverberation or echoes, acoustic phenomena where duration and repetition is crucial) – but also aesthetically and emotionally meaningful, in a way that transforms time experience inasmuch as it tinges and singularises particular moments or periods. Just think of how our time awareness changes during the experience of music, rhythms, poetry declamation or speech recitation on radio, for instance.

Certainly, music and speech perception are particularly interesting cases of auditory experience with a perceptually distinct character of unity, integration and intelligibility, which notably suits them for temporal experience. Husserl's well known analysis of time consciousness during the auditory experience of a melody showed us that, even though we only perceive the tone moment-by-moment, we have a capacity for retaining the continually passing moments in a way that enables us to put them all together and thus unify them in a whole melody (Husserl 1991, pp. 40-42). This is made possible because of a tripartite composition of consciousness, according to Husserl, made of 'primal impressions' (the live, actual experiences that occupy the momentary now), 'retentions' (a sort of 'adumbrations', 'primary memories', not quite yet ordinary memories of previous tone-phases) and 'protentions' (future-oriented counterparts of retentions), at any given moment (Dainton 2010), that make the listener aware of the time flow yet suspending him in a continuous unified auditory stream of musical tone. Rather curiously – but significantly enough – Husserl used the example of an auditory experience that does not involve the perception of music but the perception of a mundane sonic event – the approaching of a stagecoach (Husserl 1991, pp. 289 *et seq.*)<sup>12</sup> – in order to expound how we become conscious of temporal experience, giving thus an aperçu on how the perception of an aural event assists us in perceiving time itself.

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12. Husserl describes it in the following fashion: "The perception of the sound in the perception's ever new now is not a mere having of the sound, even of the sound in the now-phase. On the contrary, we find in each now, in addition to the actual physical content, an adumbration; or better: we find a unique sound-adumbration that terminates in the actually sensed sound-now. If we focus reflectively on what is presently given in the actually present now with respect to the sound of the postilion's horn, or the rumbling of the coach, and if we reflect on

Notwithstanding, the most striking aspect of temporal experience through the perception of sounds is not the fact that we become aware of the passage of time between a past, a present and a future but that it assumes a concrete and meaningful phenomenological character that has little to do with an abstract chronological time. The experience of sounds – of music, speech but also any natural or urban sounds – changes the awareness of time, expanding or compressing it<sup>13</sup>, associating it with feelings, ideas and, of course, memories – in fact, the temporal experience of sounds, as we could notice in Husserl’s account, is not just a matter of perception but of memory as well – rendering it psychologically rich and meaningful. Furthermore, the enriched and hued experience of instants, moments, events, and periods by sound contributes to our own self-awareness and identity inasmuch as it assists us in building a temporal representation – a complex of narratives, a history – of our living experience. This might be conscious but also subliminal, since aural phenomena often permeate our experience in ways that we are not particularly aware of until we make some sort of reflexive exercise upon past events or until another similar auditory experience triggers feelings, thoughts or personal memories that were accompanied by sonic events<sup>14</sup>.

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it just as it is given, then we note the trail of memory that extends the now-point of the sound or of the rumbling. This reflection makes it evident that the immanent thing could not be given in its unity at all if the perceptual consciousness did not also encompass, along with the point of actually present sensation, the continuity of fading phases that pertain to the sensations belonging to earlier nows. The past would be nothing for the consciousness belonging to the now if it were not represented in the now; and the now would not be now - that is, for the perceiving consciousness pertaining to the moment in question - if it did not stand before me in that consciousness as the limit of a past being. The past must be represented in this now as past, and this is accomplished through the continuity of adumbrations that in one direction terminates in the sensation-point and in the other direction and in the other direction becomes blurred and indeterminate.” (Husserl 1991, p. 290)

13. In his acousmatic experiences, Pierre Schaeffer detected some distortions in the perception of sound duration, which he labeled ‘anamorphoses temporelles’ [temporal anamorphosis] and developed in his *Traité des Objets Musicaux* (Schaeffer 1966, pp. 216-243).

14. In a recent publication dedicated to the role of audio technology in memory processes and cultural practices, Carolyn Birdsall focus “sound souvenirs” in relation to the traumatic events experienced by *earwitnesses* of World War II, to whom involuntary remembering and embodied memories are, still nowadays, triggered by the listening of particular sounds. See (Bijsterveld & van Dick 2009, pp. 169-181).

## 7. Soundscapes as dynamic and diegetic environments

The notion of 'soundscape' was, as it is now well-known, introduced by Robert Murray Schafer in 1969 and the terminology associated with acoustic ecology and the characterisation of soundscapes has, to a great deal, been stabilised in his 1977 book *The Tuning of the World*. Schafer based this notion in an analogy with landscape and defined it roughly as "any acoustic field of study" (a musical composition, a radio program or an acoustic environment) (Schafer 1993, p. 7), which means that any sound environment with an emphasis on the way it is perceived by an individual or society (Truax 1999) may be understood as being a soundscape. Landscape as a word appeared itself originally in reference to a framed image of land scenery in seventeenth century Dutch and Flemish painting (*landschap*) and progressively became a rather vague and comprehensive notion of a visual panorama of a spatial environment, a unified and harmonious image (be it graphic, mental or social) that exhibits, embodies or expresses the character of a place and grasps a certain impression of wholeness and identity. A soundscape can be understood – as it certainly is sometimes –, in a simplistic way, as a metaphorical variation of that notion to the auditory realm, making it an aural representation of a specific sound environment. Nevertheless, the difference here cannot be just one of modality, a mere transfer from the visual to the aural. Because of the temporal nature of sounds, if it is an image, it is necessarily a dynamical and diegetic one, which already introduces a rather important difference in relation to a landscape, traditionally a rather static and descriptive image of the environment. I do not mean to say that a landscape has to be a purely static representation or entirely devoid of temporal indices and symptoms, but that its visual character makes an emphasis on a spatial dimension that is grounded in simultaneous and situational, rather than successive or causal, relations between the various components of the landscape. A soundscape develops in time; it describes events and tells a story or rather multiple stories that occur in a given environment.

It is clear that the spatial information conveyed by sounds, the spatial content of auditory perception, enables the perceiver with cognitive tools that are apt to build a descriptive and operational map of places and situations and thus also give a stable and structural representation of the environment. Likewise, the systematic relationships between individuals and the sonic environment is what sustains a scientific enterprise like acoustic ecology and even the idea of a soundscape design – the improvement or even the creation and modelling of such environment – implies a supposed or expected relative stability. Even Schafer's basic features of a soundscape – 'keynote sounds', 'signals' and 'soundmarks' – delve in this struc-

tural logic in order to provide objective tools for the representation of the aural landscape's identity. But none of these factors necessarily turn a soundscape into an immotile image of an environment.

What distinguishes the notion of the soundscape – which “consists of events heard not objects seen” (Schafer 1993, p. 8) – is, certainly, its temporal dimension, the fact that it is made of elements that occur in time, that start and cease, either instantaneous events or temporally extended processes, that suffer constant, even if mild, variations but may also somewhat persist through change. All these features and the way they may affect the perceiver qualify the sonic environment, giving it a particular set of hued perceptual and cognitive but also aesthetic and emotional attributes.

Naturally, a soundscape is not an abstract entity, it is a complex set of spatio-temporal acoustic relations that generally combines geophonic, biophonic and antropophonic (to borrow Gage and Krause's terminology)<sup>15</sup> elements that an individual can experience at different times and for different durations. It can be an episodic acquaintance – a one-time or iterative experience – or an extended endurance of the environment because of the person working or residing there or simply due to it being her birthplace or place where she has grown. Whatever the case, these different experiences are accompanied by aural events with varying degrees of vividness and affection that more or less impregnate them consciously or subliminally with audible memories. These souvenirs, which may be nostalgic ‘sound romances’ (the church bells of the native village, the steam train whistle traversing homeland prairies) but also traumatic ‘sound phobias’ (wartime bombings or ambulance sirens), may emotionally connect – or disconnect – the subject of those experiences with – from – the respective environment and, certainly, are relevant features in the interweaving of personal acoustic narratives and the building up of identity.

As a final note, we should recall that, due to the nature of sound – what it is – and the psychoacoustic phenomenology of human auditory perception, each sound tells a story. Because of its temporal essence, when we hear a sound we always become aware of something that just happened, an event in the immediate past that produced the auditory effects we are experiencing at the moment, something that resonates in our body and will leave a deeper or lighter memorable trace – depending on multiple external acoustic and contextual factors but also subjective dispositions – that will endure in ourselves and become part of our own personal history. But we should also be aware that “a sound” is somewhat a perceptual fiction, inasmuch as our system of auditory perception is constantly working (with auditory

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15. See (Krause 2008, p. 73).

grouping, stream segregation, sequential and spectral integration that can be very complex and detailed in an auditory scene analysis)<sup>16</sup> to decompose the extremely rich and entangled acoustic phenomena we are submersed in, for the sake of producing cognitive forms of individuation that enable us to effectively engage with the environment. The fact that some constitute meaningful experiences, charged with an aesthetical and/or emotional character is, of course, unpredictable, but this is what will make them a relevant part of our own narratives and will tie the affective knots that may bind us – or not – to a given soundscape and the place that it expresses. It is, therefore, important that we do not neglect the auditory realm of our lives, since a deeper understanding of the implications of sound experience may help us create, improve or model a more convenient acoustic surrounding but also teach us skills to properly enjoy and interact with it.

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16. For a summary of these complex processes, see (Bregman 1990, chapter 8, particularly pp. 641-697).

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