

The Sound Book
A philosophical toolbox
(Project, submitted in 2002)

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What are sounds? Some experimental psychologists will be tempted to say that sounds are impressions in the mind. Acousticians will assure you that sounds are vibrations in the air. Then comes the musician who declares sounds ethereal, abstract elements - those entities that are represented by notes on a musical score. How can we reconcile these divergent viewpoints? Are there different things we call “sound”? Or maybe sounds are objects with an ambiguous nature? For the psychologist, the acoustician and the musician all listen to sounds, produce them, record them. Can it be that sounds are so many different things? These are philosophical questions. Philosophical questions often arise when there is a tension between different ways of describing reality. And they often are methodological questions related to the foundations of a particular discipline – in our case, acoustics, auditory psychology, or music. The aim of this book is to provide a philosophical toolbox for those interested in sounds and their intellectual complexity – composers, performers, psychologists, neuroscientists, acousticians, sound producers, musical critics, and listeners:

- We shall present competing theories of sound and sound audition, and conceptual tools for defending or criticizing them.
- We shall rely on the most recent advances in the cognitive sciences. We shall provide intriguing auditory examples.
- Some chapters will include an appendix that deepens the scientific, technical and musical aspects.

Authors and their suitability

The Sound Book endeavor originates from a research project by Roberto Casati and Jérôme Dokic, both researchers in philosophy and the cognitive sciences at the Institut Nicod in Paris (<http://www.institutnicod.org>). The project has led to the publication of several articles and a book, *La philosophie du son* (The Philosophy of Sound), that appeared in French and has been discussed in France among musicians and psychologists.

- Roberto Casati has a long standing interest in the nature of perceptual objects and is the co-author of two MIT books (*Holes* and *Parts and Places*) with Achille Varzi; his *The Discovery of the Shadow* is forthcoming with Knopf.
- Jérôme Dokic is concerned with issues in the philosophy of mind and language and has written a treatise on epistemology, to appear at CSLI, Stanford.
- Nicolas Bullot, a PhD student of Collège de France in cognitive psychology and philosophy (<http://www.objectcognition.net/>) with a working interest in electro-acoustic music, joined in to create a society for the study of the relationship between art and cognition (<http://www.artcognition.org/>). He runs the ArtCognition.org Studios.
- A former student of the musician Salvatore Sciarrino, Maurizio Giri is a professional musician from Rome, and specializes in computer music (<http://www.virtual-sound.com>).

The Sound Book

The book will be divided into short chapters, each presenting a different philosophical aspect of sounds, audition, sound cognition, musical cognition, composition, musical production, and the interactions among these. Each chapter will be accompanied by musical samples (electro-acoustics) and ecological sounds recorded and edited by the ArtCognition.org Studios and by Maurizio Giri. The samples will be made available through a dedicated website (or/and on a companion CD or CD-Rom.) The following is a provisional plan of the book.

1. Sounds and Space, Events and Objects

What is the nature of sounds? At the onset we shall somewhat surprise the reader by claiming that sounds are not sound waves, but events located where a sounding object is. Sound waves are means for delivering sound information, but identifying sounds with sound waves misses some crucial phenomenological features of audition. In particular, the very important feature of sounds' location can be properly accounted for only if sounds are conceived of as located events. We shall give many examples that show how sounds conceived of as events can fit in acoustics and theories of auditory perception alike.

2. Sound, Time and Memory

The aim of this chapter is to investigate the temporal content of auditory experience. It takes time to perceive a melody, or even to hear an isolated sound (for the concept of a purely instantaneous sound does seem to be an abstraction). This is connected with the fact that sounds have no spatial parts, and that the melody does not exist as a whole at each moment at which it is experienced. A crucial philosophical issue, though, is whether there can be atomic acts of apprehension that cover successions of events. This issue has been much discussed in the phenomenological tradition, and especially by Husserl, who put forward a theory of what he called perceptual “retentions” and “protentions”. Husserl tackled the question of what it means to hear a melody as being present, while its first notes have already passed out of existence, and its future notes are still forthcoming. We would like to link Husserl's insights with the contemporary debate about whether perceptual (especially auditory) content is tensed or tenseless, and with the position Jerrold Levinson calls “concatenationism”, namely the view that musical understanding arises entirely from the “impressiveness” of a composition's individual parts and from the “cogency of succession” between adjacent parts.

3. Audition and Other Sense Modalities

But now, how do we know that there is anything like auditory perception in the first place, as opposed to, say, vision or touch? Common sense distinguishes between five (give or take a few) senses, but are these scientifically useful categories? The question originated in a celebrated letter from the lawyer Molyneux to the philosopher John Locke in the 17th century and has received renewed attention in recent years. Think of it in these terms: Do bats hear obstacles? Do they see obstacles instead with their ears? Or

do they use a hitherto unspecified sensory modality? One's answer to these questions indicates one's conception of the sensory modalities. And the answer is very disputed indeed, as there is no clear-cut criterion for demarcating the senses. We shall offer a guide into the variety of oftentime ingenious attempts at classifying sensory modalities. One particularly intriguing issues concerns cross-sensorial analogies. Do sounds have boundaries in the same sense in which physical objects have? Visual transparency is the exception, whereas auditory transparency is the norm - but are these instances of the same case of transparency?

4. Auditory Objects and Attention

Attention is generally assumed to be a crucial condition for efficient perception. If you are currently reading our text (attending to it), you cannot co-temporaneously attend to the myriad of other events that are stimulating your sensory systems (noises in the background for example). Psychological research suggests that attended events or objects benefit from various cognitive advantages, for instance they are more easily retrieved in memory. Now, what is the nature of auditory attention? We shall suggest that a proper theory of auditory attention should take into account the distinction between located physical objects that emit sounds on the one hand, and sounds as autonomous objects on the other hand. Attending to the former is not the same as attending to the latter. When you shut your eyes, you can attend to various sounds and noises in various directions, but you can also attend to various qualitative aspects of a complex sounds, as when you try to follow a melody in a counterpoint. A proper theory of the varieties of auditory attention should illustrate the complex relationship between the ontology and the epistemology of sounds.

5. Sound Images and Imagery

Some sounds “speak for themselves”. Others represent *other* sounds. The sound from my loudspeakers now is *both* a sound that I can hear *and* a representation of the Köln concert by Keith Jarrett - of a particular event, with a definite location in time, many years back in the past. Some will talk of reproduction, but *representation* is a much more appropriate concept here. (Of course, the line between representational and non-representational sounds is sometimes very thin and easy to trespass, as happens in many cases of abstract electronic music.) We shall introduce here the notion of *sound images* and discuss how sound images are similar to and at the same time different from visual pictures. We shall then discuss visual and auditory imagery and question the assumption that mental images are “imagistic” or pictorial.

6. The Transparency of Media

If sounds are not sound waves, what are sound waves after all? We shall argue that they are *perceptual media*. The notion of a perceptual medium has received little attention in the psychological and philosophical literature. We almost never experience perceptual media as such, unless some of the conditions for ordinary perception are broken (for instance, when we observe heated air over a road in the sun). We shall explore the phenomenology of media perception, and introduce the notion of the cognitive

transparency of the medium. We shall also explore and illustrate cases where the listener can gain information through the loss of transparency of the medium.

- An appendix to the last two chapters will cover sound recording techniques and philosophical issues of fidelity and truthfulness.

7. Intermission: A Purely Auditory World

At this point, we shall indulge in a little piece of philosophical science fiction. Can there be a purely auditory world? This was the subject of Peter Strawson's thought experiment in his book *Individuals*. Strawson's original motivation in imagining a purely auditory world was to justify the conceptual relationship between the objectivity of sounds and the fact that they are experienced as located in space. We shall review some of the historical forerunners of Strawson's fantasy and re-assess its philosophical significance. We shall insist on something that Strawson himself has somewhat neglected, namely the possibility of causal relations between sounds. Can there be causality in a purely auditory world, given the fact that such causality may be indiscernible from mere successions of events? We shall discuss Donald Davidson's view that causality is a relation between events (rather than facts), explore putative causal phenomena between sounds, and illustrate them in the companion CD.

8. Situated Perception and Sound

There is a growing interest in situated cognition. Research has shown the explanatory advantages of the interactions between the observer and the environment in an account of the nature of perceptual representations. Cognition needs an anchoring that lessens the burden of having to make all aspects of the environment explicit. We shall present the major arguments for this point of view as related to auditory perception and our ability to refer directly and pre-conceptually to individual sounds.

9. Listening and Recognizing

Speech perception is an intriguing example of how our auditory system can categorize the world, from the lesser aspects of phoneme segmentation to the recognition of the identity of the speaker, from accessing the semantic content of the auditory signal to the subtle aspects of listening to a song. We shall introduce a number of examples at these different levels that indicate the philosophical complexities of recognition. We shall also assess the analogy with visual object recognition.

10. Is Music a Language, and What is a Musical Sound?

Music is often compared to a language, and in this chapter we are set to find out if there is any substance to this analogy. We shall examine and reject in turn two theses: music is like a language (1) insofar as it has expressive power or (2) insofar as it has a syntax. Music is not a language because its putative syntax and semantics are not co-ordinated in the way the syntax of, say, English, is co-ordinated to its semantics. However, a weaker sense of the analogy between music and language will be explored, according to

which the ability to produce music and the ability to produce language both access the same or very similar computational resources.

We shall also examine whether musical production and understanding could recruit a broad spectrum of cognitive faculties (as it is the case with the ability to appreciate artistic artifacts) and whether reference to this spectrum explains why we should not consider music and language as disjoint from each other. We shall argue against the thesis that there exists intrinsically musical properties in the world and show the implications of this point of view for musical history and aesthetics. In the course of our analysis, we shall propose an evaluation of the attitude of composers towards musicality and the nature of sound.