SoundEffects
An Interdisciplinary Journal of Sound and Sound Experience

Reviewed by

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Cathy van Eck: Between Air and Electricity

Microphones and Loudspeakers as Musical Instruments
Bloomsbury, 2017

When I read a book for research I like to mark the pages with book darts, small metal clips that slip onto the page and indicate the sentence I was struck by. I was given an electronic copy of the book to review, but after reading the first chapter, I knew I had to get the book in hard copy, because there were so many striking sentences, thoughts and descriptions of pieces I had never heard of. After reading the second chapter I sent an email to the music librarian at Stony Brook University to purchase the book, as I knew of at least three students whose current papers or colloquia topics would benefit from reading this essential resource. After finishing the book, I asked my colleagues if our next computer music concert could be all pieces using feedback between microphones and loudspeakers because I was inspired by the idea of showcasing Microphones and Loudspeakers as Musical Instruments – the answer was an enthusiastic yes (and our audio engineer Nicholas Nelson exclaimed, 'I loved that book!').

I do not think I have ever page-pointed (yes, I am verbing a noun) a book as thoroughly as I did *Between Air and Electricity*. Each chapter has at least 10 metal markers, and the references section has almost 20 resources that I would like to follow up on. For me the book was a combination of amazingly thoughtful critiques of pieces and techniques with which I am intimately familiar, with new pieces and new ways of looking at (or listening to) equipment I have spent nearly 30 years working on/with.

The book is only five short chapters and 170 pages long, but van Eck gives more information on electronic music than tomes twice the size. It grew out of her doctoral thesis and is an excellent example of artistic research – where her own compositions were directly influenced by her research. The table of contents lists the pieces covered in each section and is an easy way to see the scope (both in time and in aesthetic practice) of her research.

The chapters follow the format of an introduction, then diving into pieces while looping back to pieces already discussed, before offering a short summary. Some of the summaries felt a bit forced, but in general the writing was excellent, and even complex ideas were presented very clearly. I found the organisation of the introduction a bit odd, because van Eck starts with a description of Chapter 3 and ends with a description of Chapter 1. I have my students read Simon Emmerson's *Living Electronic Music* going backwards, so I am comfortable with non-linear reading, but I kept thinking I had missed descriptions of the first two chapters (and have checked for the fifth time that Chapter 3 is indeed the first chapter referenced in the introduction).

The book 'takes the artistic use of the devices that take air pressure waves (sound waves) into electricity and back as its central focus point'. Van Eck organises the book into different categories of interaction between loudspeakers and microphones. A fairly short Chapter 1 searches for the true nature of microphones and loudspeakers using the metaphor of the curtain. Curiously, though she cites Brian

 issn 1904-500X

Kane in another chapter, she reinforces Pierre Schaeffer's term of acousmatic listening relating to Pythagoras lecturing behind a curtain and does not mention recent scholarship disputing the origin of the word.

I found Chapter 2 to be the most interesting in terms of creating an ontology for microphones and loudspeakers. Here van Eck defines four terms – Reproducing, Supporting, Generating and Interacting – and gives examples of each. The number of references in this chapter alone is astonishing, and she tracks ideas about sound and instrument further back in time than most books I have read. I had also never heard of Boehmer's theory that electronic sound production ushered in a *terza practtica*, and I am looking forward to having conversations about this with my musicologist friends. With *Reproducing*, van Eck creates one word that encompasses the idea that all music/sound can be recreated with a single system. *Supporting* refers to the constitutive approach of making sound louder, and where *Reproducing* is concerned with exact replication, supporting refers to transparently making sounds louder without changing their character. *Generating* in this sense refers to music which is created solely through the manipulation of electrical signals, the most extreme version of which is Goeyvaerts' idea of 'dead tones'. *Interacting* does not mean interactive computer music in the current sense, but interaction between performer and object discovering the resonance and resistance of the speaker and microphone, or more broadly between performer and instrument.

Chapter 3 deals with the acoustic feedback, the simplest and most direct way of creating sound using microphones and loudspeakers. In this chapter van Eck also covers the use of tuning forks in early experiments with sound as well as their use as approximate sin tone generators; the first RCA synthesizer used 12 electrified tuning forks as the source for oscillators. Chapter 4, which deals with 'movement, material, and space', is similar in density and ontological database wizardry to Chapter 2. Again van Eck categorises pieces in a way that is obvious only after reading the chapter and pairs well-known standard pieces from electronic music repertoire with more obscure works. I will never listen to electronic music the same way after having read this chapter and want to go back and listen to pieces I already know using this new critical listening skill.

Chapter 5 is just a little bit longer than Chapter 1 and takes us from Edison's experiments with a singer and record player on stage through to speculations about future materials for loudspeakers and microphones in 22 pages. I think Chapter 1 functions more as an introduction and Chapter 5 more as a conclusion, rather than equal chapters. Chapter 5 is somewhat conclusive, but I was not quite ready for the book to end! Perhaps labelling Chapter 1 as an Introduction and Chapter 5 as a Conclusion would make it clearer to the reader.

Anyone who is working in the area of sound art, interactive electronic composition or sound studies needs to read this book. It is an impressive addition to a field

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I thought had become saturated. Van Eck brings a mature approach to the study of electronically produced sound, and I see a myriad of future scholarship written using the concepts and ontologies she developed for this book. As a reviewer, I will be checking authors' bibliographies for this important citation, and I know that I will be referencing *Between Air and Electricity* in my own writings.

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