

# **Sounds of Our Times: Two Hundred Years of Acoustics.**

Robert T. Beyer - ISBN 0-387-98435-6

reviewed by John O'Keefe for *Canadian Acoustics/Acoustique Canadienne*

The English philosopher C.S. Lewis once wrote:

*Most of all, perhaps, we need an intimate knowledge of the past. Not that the past has any magic about it, but because we cannot study the future, and yet need something to set against the present, to remind us that the basic assumptions have been quite different in different periods and that much which seems certain to the uneducated is merely temporary fashion.*

If this strikes any kind of resonance with you and if you have any interest in acoustics then Robert Beyer's *Sounds of Our Times* should be on your bookshelf. Beyer has produced a highly readable, well illustrated 444 page tome covering just about everything you'd want to know about the last two hundred years of acoustic research. And if you can't find what you're looking for in the book, you can consult one of the most exhaustive sets of references I've ever seen. Most of the 10 chapters have more than 100 references, Chapter 9 has 261. All this, Beyer tells us in the Introduction, came out of a four year long retirement project! I can't think of any other retirement that has proved so useful to one's profession.

*Sounds of Our Times* picks up where F.V. Hunt's *Origins in Acoustics* left off, around the beginning of the 19th century. Each of the ten chapters covers a loosely defined epoch. Chapters are divided into areas of interest that are easily followed from one age to the next. So, for example, if you're interested in Tartini tones (where two loud musical sounds of different pitches can create a third tone with a pitch equal to the difference between the two tones) you can easily follow the path of discovery from the eighteenth century to the present. In Chapter 1 we learn that Italian violinist Giuseppe Tartini was one of several people to "discover" the phenomenon. In Chapter 3 we learn that Herman von Helmholtz added the concept of summation tones and that he was alert to possible non-linear explanations both inside and outside the ear. His work applied a recently invented sound source; the siren. The siren was invented by Charles Cagniard de la Tour then quickly improved on by several scientists, including von Helmholtz. The story picks up again in the late 19th century when Ruckner and Edser use sirens, horns, tuning forks and the mirror of a Michelson interferometer to provide objective evidence of Tartini tones. In the 1990s we learn of the connection between Tartini tones and otoacoustic emissions, i.e. sound generated inside the cochlea. This information has recently been applied to the study non-linear distortions in hearing aids. Thus weaves the interdisciplinary tapestry that is the history of acoustics.

The book works well on several levels. It reads well from one end to the other. Chapter size chunks are easily bitten off. Historical threads are easily followed then expanded on through the references. The inventions of the 19th century provide very interesting reading. If you're fascinated with the new analytical possibilities presented by modern computers, think of what it must have been like the first time sound was made visible! Inventions like this, the telephone, and the phonograph are clearly reviewed in a single chapter. Tyndal and von Helmholtz have a chapter dedicated to their work; Rayleigh gets a chapter all to himself.

Seemingly everything is covered in this book. Interested in the origin of the decibel? Well you'll find it in Chapter 7. Echolocation by bats? Try Chapter 8. The latest developments in solitons, chaos and frequency doubling cavitation bubbles are found in the final chapter. The range of the author's scholarship is reflected in quotes from such disparate sources as the Bible, Victor Hugo, von Helmholtz and R. Murray Schafer in the preambles to each of the ten chapters.

Nothing in this world is perfect though. There are a number of typographical errors and these become tiring at times. The book suffers from a slightly inward looking American bias. *Canadian Acoustics/Acoustique Canadienne* readers will be interested to learn of the "onset of World War II ... in 1941". As a result of this bias, room acoustics is not particularly well covered; the majority of post-war room acoustics research having gone on outside the US. Harold Marshall has been re-christened Herbert.

These however are pedantic quibbles. Beyer readily admits when he's out of his depth. Indeed, his diffidence is engaging. It's a natural extension of his style, which could be best described as a cross between rigorous scientific presentation and a fireside chat. So do yourself a favour: pick up this book, pour yourself a drink and set yourself down for a good read.

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