

Sound — A Very Short Introduction

Mike Goldsmith

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Wow! This book is nice ... and cute. It is a bit bigger than one and a half iPhone mobile phones placed side to side, about as thick as one too, and only 140 pages, making this a nice travel book.

It is perhaps one of 100 books that have “A very short introduction” as part of their title. Others in the series include topics such as evolution, martyrdom, African religions and quantum theory. There are dozens more.

Mike Goldsmith is the former Head of the Acoustic Group at the United Kingdom's National Physical Laboratory and an author of many books for general readers. Two of his books have been short-listed for the Aventis prize (now the Royal Society prize) for science books. His most recent book is “Discord: The Story of Noise.”

I will go over the sections and chapters one by one, although I must keep my comments short; otherwise, the review will be longer than the book. Here we go.

List of illustrations: This consists of 23 illustrations covering just about everything — wave shapes, constructive interference, the ear, condenser microphone and active noise cancellation. The list goes on.

The sound spectrum: This is a list of things and their frequencies — from a volcano, to the highest recorded note sung by a human, to an acoustic microscope.

1. “Past Sounds”: When he says “past” he means “past.” Starting with 13.7 billion years ago (in those days, they only had coal-powered sound level meters) and the very first sounds on earth, he discusses sound through the ages, 40,000 years ago, 2500 years ago, and up to modern times. The modern times include Pierre Laplace (1800's) up to the present — including sound art and soundscapes. It is a great introduction to the field, albeit only nine pages.
2. “The Nature of Sound”: This chapter introduces pressure waves and their propagation, reflection, refraction and even sound power. Furthermore, it discusses wave forms, loudness, standing waves, filters and even decibels. Everything is in 26 pages.
3. “Sounds in Harmony”: The 16 pages discuss sound as music. It includes singing (and learning to sing), notes, being “in tune,” music making, scales, why they picked eight of the 12 notes to form an octave, sequences and instruments.
4. “Hearing Sound”: The physiology and psychology of sound discussed including parts of the ear (my favorite is the outer ear, a place to hold my glasses),

the transition of pressure waves from sound to brain to hearing, directionality, deafness and speech. All is in 17 pages.

5. “Electronic Sound”: What is this about? This is not about electric music, per se, but sound to electricity (and maybe back to sound): microphones, loudspeakers, instruments, Helmholtz resonators and storage devices (16 pages).
6. “Ultrasound and Infrasound”: In 13 pages, Goldsmith partly talks about bat hearing but also medical ultrasound and a bit about infrasound.
7. “Sound Underwater and Sound Underground”: This chapter discusses the first use of underwater sound where the military, mistakenly thinking that the sounds in the Chesapeake Bay during WW2 were enemy submarines, depth-charged and killed millions of “loud” fish. Further, a brief physiology of marine creature's ears is discussed along with techniques to hear and measure underwater noise. Goldsmith goes on to discuss sound propagation in water and how whales at one of the earth's pole can hear whales at the other one. (13 pages).
8. “Sound Out of Place”: This last 17-page chapter is about noise. It treats sources, noise issues between people, noise source identification and ways to quiet (noise cancellation, noise “attenuators,” distance, etc.). Finally, it has a brief discussion of quieting the home.
9. “References”: Separated by chapter and perhaps up to 15 useful references for each.

Further reading: This is also by chapter and includes several references, citing Bob Beyer and Dan Raichel among many others.

Index: This is a very comprehensive index. Well done.

The well-written book is full of clear illustrations and well-described tables and is a pleasure to read. Fortunately, there are no Bessel functions to get in the way.

I highly recommend this book. Perhaps this is the best general book discussing “acoustics” in a very elementary sense. Goldsmith is a good writer and the book has a comprehensive review, given the brevity of treatment and the small format. It is perfect for a short seminar or to help explain part of what we do to someone who knows how to read. It is a wonderful and delightful book. Buy it. Buy two!

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