

Series Preface

November, 2011

The preface that follows is the one that we published in volume 1 of the Springer Handbook of Auditory Research (SHAR) back in 1992. Thus, 2012 marks the 20th year of SHAR. As anyone reading the original preface, or the many users of the series will note, we have far exceeded our original expectation of eight volumes. Indeed, with books published to date, and those in the pipeline, we are now set for more than 50 volumes in SHAR, and we are still open to new and exciting ideas for additional books.

We are very proud that there seems to be consensus, at least among our friends and colleagues, that SHAR has become an important and influential part of the auditory literature. While we have worked hard to develop and maintain the quality and value of SHAR, the real value of the books is very much attributable to the numerous authors who have given their time to write outstanding chapters and our many coeditors who have provided the intellectual leadership to the individual volumes. We have worked with a remarkable and wonderful group of people, many of whom have become great personal friends of both of us. We also continue to work with a spectacular group of editors at Springer - our current editor is Ann Avouris. Indeed, several of our past editors have moved on in the publishing world to become senior executives. To our delight, this includes the current president of Springer US, Dr. William Curtis.

But the truth is that the series would and could not be possible without the support of our families, and we want to take this opportunity to dedicate all of the SHAR books, past and future, to them. Our wives, Catherine Fay and Helen Popper, and our children, Michelle Popper Levit, Melissa Popper Levinsohn, Christian Fay, and Amanda Fay, have been immensely patient as we developed and worked on this series. We thank them and state, without doubt, that this series could not have happened without them.

1992

The Springer Handbook of Auditory Research presents a series of comprehensive and synthetic reviews of the fundamental topics in modern auditory research. The volumes are aimed at all individuals with interests in hearing research including advanced graduate students, post-doctoral researchers, and clinical investigators. The volumes are intended to introduce new investigators to important aspects of hearing science and to help established investigators to better understand the fundamental theories and data in fields of hearing that they may not normally follow closely.

Each volume presents a particular topic comprehensively, and each serves as a synthetic overview and guide to the literature. As such, the chapters present neither exhaustive data reviews nor original research that has not yet appeared in peer-reviewed journals. The volumes focus on topics that have developed a solid data and conceptual foundation rather than on those for which a literature is only beginning to develop. New research areas will be covered on a timely basis in the series as they begin to mature.

Each volume in the series consists of a few substantial chapters on a particular topic. In some cases, the topics will be ones of traditional interest for which there is a substantial body of data and theory, such as auditory neuroanatomy (Vol. 1) and neurophysiology (Vol. 2). Other volumes in the series deal with topics that have begun to mature more recently, such as development, plasticity, and computational models of neural processing. In many cases, the series editors are joined by a coeditor having special expertise in the topic of the volume.

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Volume Preface

Tinnitus is a prevalent hearing disease in humans and affects 15% of the population, particularly the hearing impaired, veterans, and even young people who grow up with mp3 players and iPods. The mechanisms underlying tinnitus remain controversial. At present, there is no cure for tinnitus and treatment options are limited. Recognizing the significance of tinnitus to hearing, as well its being a window into the basic science of understanding of the hearing process, the present volume provides a broad overview of the topic. The volume focuses on neural mechanisms of tinnitus and its behavioral consequences. The book is divided into two parts to address systematically the current issues in tinnitus research.

After an opening chapter by Eggermont and Zeng that gives a historical perspective on tinnitus and its study, the first part of the book covers animal research that has led to increases in our understanding of the disease and its underlying mechanisms. In [Chapter 2](#), Heffner and Heffner evaluate the behavioral tests for animals currently employed in understanding tinnitus. In [Chapter 3](#), Knipper, Müller, and Zimmermann discuss etiologies of tinnitus in the context of molecular changes in the peripheral auditory system, in subcortical areas, and in the auditory cortex. This is followed by [Chapter 4](#) by Nouvian, Eybalin, and Puel, who argue that the auditory nerve is a potential tinnitus generator through recruitment of *N*-methyl-D-aspartate receptors at the first auditory synapse. In [Chapter 5](#), Dehmel, Koehler, and Shore discuss the role of the dorsal cochlear nucleus as an interaction node between auditory and somatosensory neural activity in inducing tinnitus. In [Chapter 6](#), Robertson and Mulders address the role of the inferior colliculus in tinnitus. The last chapter of this section, [Chapter 7](#), is a discussion by Eggermont of the role of the auditory cortex in sound perception in general and tinnitus in particular.

The second part of the book covers research and potential therapies in humans. In [Chapter 8](#), Melcher describes the study of tinnitus in humans by means of brain imaging to measure human brain function and structure. In [Chapter 9](#), Moore dissects the psychophysics of tinnitus, particularly that of pitch, loudness, and masking, including residual inhibition. In [Chapter 10](#), Noreña emphasizes the view that tinnitus results from central changes due to sensory deprivation, which result in

increased spontaneous activity and/or synchrony in auditory centers. Finally, in [Chapter 11](#), Langguth, Ridder, Kleinjung, and Elgoyhen review the effects of transcranial magnetic stimulation, direct electrical brain stimulation, and pharmacological intervention in tinnitus patients.

As with all SHAR volumes, there are chapters in earlier volumes that relate to, and often provide background for, chapters in the current volume. The first SHAR volume, *The Auditory Pathway* (edited by Webster, Popper, and Fay, 1992) and *Integrative Functions in the Mammalian Auditory Pathway* (Vol. 15, edited by Oertel, Fay, and Popper, 2002) provide a background of auditory neuroanatomy and physiology that can help readers understand tinnitus origins and manifestations in various stages of the auditory pathway. Similarly, many of the chapters in *The Auditory Cortex* (Vol. 43, edited by Poeppel, Overath, Fay, and Popper, 2012) provide an extensive discussion of human brain imaging and function. Finally, *Auditory Protheses: New Horizons* (Vol. 39, edited by Zeng, Popper, and Fay, 2011) shows that different sites and modes of stimulation can be explored to treat tinnitus. Specific discussions on tinnitus and related topics in SHAR include a chapter by Penner and Jastreboff in *Clinical Aspects of Hearing* (Vol. 7, edited by Van De Water, Popper, and Fay, 1996), by Bower and Brososki in *Auditory Trauma, Protection, and Repair* (Vol. 31, edited by Schacht, Popper, and Fay, 2007), and chapters by Grantham and by Kaltenbach and Manz in *Noise-Induced Hearing Loss: Scientific Advances* (Vol. 40, edited by Le Prell, Henderson, Fay, and Popper, 2011).

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