

BOOKS

A Physicist's Guide To the Best Musical Venues

Concert and Opera Halls: How They Sound

▶ Leo Beranek
AIP, Woodbury, N.Y., 1996.
643 pp. \$49.95 hc
ISBN 1-56396-530-5

Reviewed by Dana Houglund

Concert and Opera Halls: How They Sound is the much anticipated follow-up to Leo Beranek's classic *Music Acoustics & Architecture* (Wiley), published in 1962. Thirty-six halls constructed since 1962 are discussed in the current work. An additional 40 halls covered earlier are revisited. Fifteen more that were included in *Music Acoustics & Architecture* have been omitted, either because they have been torn down or because they are no longer as widely used. Generally, the narratives on the various halls follow the pattern set in the earlier work, except that they reflect measurement techniques and analysis tools, such as bass ratio, lateral fraction and early decay time, that have evolved in the 30-plus years since the original publication. The technical details that follow each hall's narrative have also been expanded to reflect important descriptive factors and ratios whose importance has been demonstrated in the intervening years.

Beranek has designed the book to be accessible to a broad spectrum of readers, from avid concert patrons to musicians to practicing acousticians. Much of the narrative for the 76 halls is addressed to the reader interested in music and music performance. The wealth of information included in the extensive compiled tables, the five appendices and some of the discussion chapters, however, will be an invaluable resource to any student or practicing professional in either music or acoustics.

It is apparent that Beranek, though an internationally recognized acoustician, is first and foremost a lover of

great music. The book conveys a clear appreciation of the ability of different halls with different characteristic sounds to highlight musical subtleties that might previously have been overlooked. Although the narratives describing the various halls could be criticized for being too forgiving, Beranek shows an appreciation of the fact that a hall that may not meet today's textbook ideal can still provide a venue for the enjoyment of great music.

One of the stated goals of the author in this as well as the earlier work is the development of an objective rating scheme to allow rank ordering of the various halls that correlates to subjective perception. The first four chapters of *Concert and Opera Halls* establish a common vocabulary, summarize the parallel paths of music and acoustics from a historical perspective and discuss the psychoacoustic qualities that are currently regarded as being the predominant factors in determining acoustical preferences. Nonetheless, just prior to the narrative descriptions of the 76 halls that make up the body of the book, Beranek also presents a subjective ranking of the concert halls, according to acoustical quality, based on interviews with a limited group of skilled listeners—including music critics, conductors and musicians.

In the chapters following the hall narratives, Beranek discusses the physical and architectural factors that determine a hall's acoustical performance. This discussion expands and updates the discussion in the 1962 edition and is designed to provide the basis of the objective rating method. That method is based on the work of Yoichi Ando in *Concert Hall Acoustics* (Springer, 1985), with relative weighting factors proposed by Beranek. Regrettably, very little supporting information is provided on the selection of the weighting factors.

The goal of rank ordering the halls is ultimately a victim of political correctness. The vast majority of halls considered in this book were not included in the rank ordering by name but were listed only as a composite average of objective parameters, apparently to protect the sensibilities of the less worthy. The result places the whole rank ordering exercise in question.

The importance placed on various

subjective and objective parameters is an area of ongoing research and active discussion within the acoustical community. Major changes have occurred in our understanding of the psychoacoustic and physical acoustic factors in the design of concert halls since *Music Acoustics & Architecture* was published. Regardless of changes that may develop in the coming years, what will make the book an invaluable reference for years to come is the extensive compilation of objective data drawn from a variety of researchers and presented in easily comparable formats.

The Peenemünde Wind Tunnels: A Memoir

▶ Peter P. Wegener
Yale U. P., New Haven, Conn., 1996. 187 pp. \$30.00 hc
ISBN 0-300-06367-9

The Peenemünde Wind Tunnels is an account of Peter Wegener's experiences during the latter half of and shortly after the Second World War. He had been an anti-aircraft gunner in the German Air Force in the campaigns against France and Russia, before the battle for Stalingrad. He then worked on experimental research and development of supersonic flow in support of the design of the V2 rocket and the never-deployed Wasserfall anti-aircraft missile. He believes that his move from the Russian front to the Peenemünde R&D facility—a transfer possibly brought about by an influential uncle—probably saved his life.

Wegener is a gas dynamicist of note. He has written a personal but objective account, evidently based, as far as possible, on official documents as well as on his own diary. The book is illustrated with technical and historical photographs and presents detailed notes and background information on relevant topics, as well as a chronology of events.

The wind tunnels had been built at Peenemünde, in eastern Germany, as early as 1939. They were moved, after the air raid of August 1943 that left them and the Aerodynamics Institute that housed them unharmed, to Ko-

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