

Preface

Since the middle of the twentieth century, concert performance developments have created raised, and to some extent, new demands on musicians and architects. Reasons for changes in performance conditions can be found on the one hand in the tendency for ever larger concert halls and on the other in the fact that listeners, educated by quality recordings are used to a high degree of precision and subtle tonal nuances. These circumstances lead to acoustic and performance technical problems for the interpreter unknown in previous generations. These tasks must largely be mastered by the musicians themselves, yet in some sense Tonmeister (sound recording engineers) and builders of concert halls can have an essential influence on the tonal results of a performance. Thus it is important for all participants to be knowledgeable of those acoustic processes which shape the tonal development beginning with the tonal perception of the performer down to the aural impression of the listener.

With this background, the first German edition of the book *Acoustics and Musical Performance* appeared in 1972, in which those aspects of musical instrument acoustics, and room acoustics, relevant to music in general were considered. An important element of this book was the consideration of the degree to which approaches to performance practice could be derived from those principals. The great demand for these themes made several new editions necessary, which in each case were revised to include current knowledge. Thus, this English edition of the book is based on the 5th German Edition of 2004. In addition to new experimental results in the physical, technical realm, many personal experiences by the author, as presenter and conductor of demonstration concerts with large orchestras, not only in Europe, but also in the USA and Japan, relating to questions of orchestral arrangements have added significant insights.

In order to make this complex subject matter accessible even for readers without special knowledge in the physical sciences, the principal chapters are introduced by brief explanations of the most important fundamental concepts of acoustics as well as a selection of some of the more important hearing principles essential for understanding. The detailed representation of directional characteristics in the fourth chapter was originally intended especially for audio engineers. Since then, the new area of room acoustical simulation auralization has been developed which

could not be anticipated in 1972. The sections concerned with room acoustics are deliberately limited to those aspects essential to musical performance. They are thus intended as an introduction for non-acousticians. On the other hand, it is likely more important for acousticians, when considering historic performance technical matters, to gain an insight relating to things which are routine for every musician.

Acoustic data which characterize tonal characteristics in sound radiation of musical instruments as well as room acoustics processes represent objective facts. In contrast, performance practical directions in many cases are only examples of subjective interpretations. They are intended merely to show the possibilities for utilizing acoustical facts for the realization of an artistic tonal perception. In this sense, the present volume occupies a position between the standard works of Fletcher/Rossing (*The Physics of Musical Instruments*) and Beranek (*Concert and Opera Halls – How They Sound*). They thus form a bridge between musical instrument acoustics and room acoustics, based on practical experience.

Scientific data obtained by the author are the result of continuing exchange between experimental investigations at the Physikalisch-Technische Bundesanstalt in Braunschweig and lectures in the framework of the audio engineering program (Tonmeister-Ausbildung) at the School of Music in Detmold (Music Academy). The author here again expresses gratitude to both institutions for decades of support. It is precisely the cooperation with generations of audio engineers that has significantly contributed to the fact that in recent years changes in attitude of conductors concerning the seating order of strings in the orchestra have been effected.

My personal thanks go to Professor Uwe Hansen of Indiana State University who has made enormous efforts to translate the voluminous text into English, while fine-tuning the formulation of numerous details in personal communications during several visits to Germany. Beyond that he has also taken it upon himself to interact with the publisher concerning production details. Special thanks also go to Springer-Verlag for the successful cooperation and the appealing final appearance of the volume.

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