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**W. F. DONKIN**

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SERIES. ACOUSTICS,  
THEORETICAL, PART I**



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# ACOUSTICS

*DONKIN*

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Acoustics  
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Clarendon Press Series

# ACOUSTICS

*THEORETICAL*

PART I

BY

W. F. DONKIN, M.A., F.R.S., F.R.A.S.

LATE SAVILIAN PROFESSOR OF ASTRONOMY, OXFORD

*SECOND EDITION.*

Oxford

AT THE CLARENDON PRESS

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## ADVERTISEMENT.

As this is the only portion of a treatise on Acoustics, intended to comprise the practical as well as the theoretical parts of the subject, which will proceed from the pen of its Author, a few words are required to explain the circumstances under which it now appears.

The Author, the late Professor Donkin, has passed away prematurely from the work. It was a work he was peculiarly qualified to undertake, being a mathematician of great attainments and rare taste, and taking an especial interest in the investigation and application of the higher theorems of analysis which are necessary for these subjects. He was, moreover, an accomplished musician, and had a profound theoretical knowledge of the Science of Music.

He began this work early in the year 1867; but he was continually interrupted by severe illness, and was much hindered by the difficulty, and in many instances the impossibility, of obtaining accurate experimental results at the places wherein his delicate health compelled him to spend the winter months of that and the following years. He took, however, so great an interest in the subject, that he continued working at it to within two or three days of his death.

The part now published contains an inquiry into the Vibrations of Strings and Rods, together with an explanation of the more elementary theorems of the subject, and is, in the opinion of its Author, complete in itself; his wish was that it should be published as soon as possible; and he was pleased at knowing that the last pages of it were passing through the Press immediately before the time of his death. It is the first portion of the theoretical part.

It was intended that the second portion should contain the investigation into the Vibrations of Stretched Membranes and Plates; into the Motion of the Molecules of an Elastic Body; and into the Mathematical Theory of Sound. Professor Donkin did not live long enough to complete any part of this section of the work.

The third portion was intended to contain the practical part of the subject; and the theory and practice of Music would have been most fully considered. It is exceedingly to be regretted that the Professor did not live to complete this portion; for the combination of the qualities necessary for it is seldom met with, and he possessed them in a remarkable degree. Not even a sketch or an outline is found amongst his papers. He had formed the plan in his own mind and often talked of it with pleasure. It can now never be written as he would have written it.

BARTHOLOMEW PRICE.

11, ST. GILES', OXFORD,  
*Feb. 16, 1870.*

#### PREFACE TO THE SECOND EDITION.

Little alteration has been made in preparing the second edition. A few slight errors (chiefly misprints) have been corrected; and I have added an article (68 *a*), with diagrams, on Compound Harmonic Curves. In all other respects the work remains exactly as it left its Author's hands.

A. E. DONKIN.

RUGBY,  
*July 6, 1884.*

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