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Nineteenth-Century Physics

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Nineteenth-Century Physics*

P. M. HARMAN

Department of History, University of Lancaster

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Preface

The period circa 1800–1900 corresponds to a distinctive phase in the conceptual development of physics, bounded by the increasing dominance, from the late eighteenth century on, of quantification and the search for mathematical laws, together with the emergence of a unified physics based on the programme of mechanical explanation, and by the development in the early twentieth century of the quantum and relativity theories. I have aimed to provide a study of the development of physics in the nineteenth century in a form accessible to the reader without a specialised knowledge of physics and mathematics. The argument of the book is structured around the major conceptual problems of nineteenth-century physics: the emergence of energy physics and thermodynamics, the theory of the luminiferous and electromagnetic ether and the concept of the physical field, molecular physics and statistical thermodynamics, and the dominance of the programme of mechanical explanation. The book begins with an account of the transformation in the scope of the science of physics in the first half of the nineteenth century.

I am grateful to John Heilbron for reading a portion of the manuscript and to Crosbie Smith for reading the whole manuscript of this book, and for their helpful comments. I am also grateful to the Syndics of the Cambridge University Library for their kind permission to reproduce documents in their keeping, and to the Council of the Royal Society for the award of a grant for research undertaken in the preparation of this book.