Foreword

In 1873, James Clerk Maxwell published a rambling and difficult two-volume *Treatise on Electricity and Magnetism* that was destined to change the orthodox picture of physical reality. This treatise did for electromagnetism what Newton's *Principia* had done for classical mechanics. It not only provided the mathematical tools for the investigation and representation of the whole of electromagnetic theory, but it altered the very framework of both theoretical and experimental physics. Although the process had been going on throughout the nineteenth century, it was this work that finally displaced action-at-a-distance physics and substituted the physics of the field.

Like Newton's *Principia*, Maxwell's *Treatise* did not immediately convince the scientific community. The concepts in it were strange and the mathematics was clumsy and involved. Most of the experimental basis was drawn from the researches of Michael Faraday, whose results were undeniable, but whose ideas seemed bizarre to the orthodox physicist. The British had, more or less, become accustomed to Faraday's "vision," but continental physicists, while accepting the new facts that poured from his laboratory, rejected his conceptual structures. One of Maxwell's purposes in writing his treatise was to put Faraday's ideas into the language of mathematical physics precisely so that orthodox physicists would be persuaded of their importance.

Maxwell died in 1879, midway through preparing a second edition of the *Treatise*. At that time, he had convinced only a very few of his fellow countrymen and none of his continental colleagues. That task now fell to his disciples.

The story that Bruce Hunt tells in this volume is the story of the ways in which Maxwell's ideas were picked up in Great Britain, modified, organized, and reworked mathematically so that the *Treatise* as a whole and Maxwell's concepts were clarified and made palatable, indeed irresistible, to the physicists of the late nineteenth century. The men who accomplished this, G. F. FitzGerald, Oliver Heaviside, Oliver Lodge, and others, make up the group that Hunt calls the "Maxwellians." Their relations with one another and with Maxwell's works make for a fascinating study of the ways in which new and revolutionary scientific ideas move from the periphery of scientific thought to the very center. In the process, Professor Hunt also, by extensive use of manuscript sources, examines the genesis of some of the more important ideas that fed into and led to the scientific revolution of the twentieth century.

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