will try hard to resist. Cahn and Goldhaber can hardly be faulted for what they have chosen to include: Every paper is historically significant. Anyone who has worked in the field could offer dozens of additional candidates, but given the constraints of keeping the volume to a manageable length, it is hard to imagine what could have been cut to make room for them. In any event, each chapter provides an extensive bibliography that covers the most significant omissions.

Hadron spectroscopy is represented in nine papers. Although this may seem like a large fraction of the total, it does not begin to portray the extent to which this topic dominated particle physics in the 1960s. At the other extreme, four papers can only hint at the full richness of the neutral kaon system and the crucial role it has played at several junctures in the history of the field, though the accompanying text makes up for some of the omissions.

Any short history is necessarily sanitized history. Thus in this volume there is no split A_2, no high-y anomaly or any of the other blind alleys, irrelevancies and embarrassments that haunt the history of an experimental discipline. It might have been nice to include just one of these, if only as a lesson in humility.

In summary, this could be a useful book for many categories of readers. There is something here for the student new to the field, the veteran old enough to have read most of the papers when they originally appeared and the historian looking for a starting point for more comprehensive research.

ROBERT H. MARCH
University of Wisconsin

Physics of Medical Imaging

Edited by S. W. Webb
Adam Hilger, Bristol, UK (AIP, New York), 1988. 633 pp. $176.00 hc ISBN 0-85274-361-0; $53.00 pb ISBN 0-85274-349-1

With the rapid development of spatially resolved detectors and the availability of expanding graphical computing power, imaging research is attracting increasing attention within the physics community. The dedication of a recent issue of PHYSICS TODAY to the subject of imaging (September 1989) is indicative of physicists' new interest in imaging. Medical imaging is a rapidly developing subspecialty that is attracting a growing number of physicists interested in applying fundamental physics to medical problems.

At this time the up-to-date and comprehensive textbook on the physics of medical imaging, edited by Steve Webb, is welcome as a primary research resource and particularly as a teaching aid. His book discusses established technologies such as projection radiography, computer tomography, nuclear medicine, ultrasound and magnetic resonance, and it outlines more tentative possibilities such as infrared, impedance tomography and diaphanography. The various technologies are discussed within the conceptual framework of their historical development and their relationship to the theory of image formation and perception.

The 15 contributors to *Physics of Medical Imaging* are all members of the joint department of physics of the Institute of Cancer Research and the Royal Marsden Hospital, Sutton, UK. This fact is the source of the book's strength and weakness. The authors' close involvement in clinical activities ensures that the book realistically reflects the range of issues that concern physicists who have chosen to do research that impacts medical practice. That the authors are all from a single institution gives the book a rather parochial bias with a strong focus on cancer. In particular, the lack of attention to dynamic cardiovascular imaging and the rather shallow treatment of magnetic resonance imaging and spectroscopy reflect the institutional priorities of the authors more than developments in the field.

Nonetheless, Steve Webb has produced a first-class book. Because *Physics of Medical Imaging* is up-to-date in a rapidly changing field, it is the text of choice for teaching graduate research students in this new and exciting subspecialty of physics.

R. Mark Henkelman
University of Toronto

The Rise of the Wave Theory of Light: Optical Theory and Experiment in the Early Nineteenth Century

Jed Z. Buchwald
U. Chicago P., Chicago, 1989. 474 pp. $75.00 hc ISBN 0-226-07884-1; $24.95 pb ISBN 0-226-07886-8

Jed Buchwald's expressed goal is "to alter the historical terms" in which "the rise of the wave theory of light" in early 19th-century optics has been cast for over a century. He has succeeded in his intention, and—notwithstanding some serious shortcomings—the new account is an important addition to the historical literature.

For some time now historians of science have concurred that "scientific revolutions" do not consist of the straightforward vanquishing of a reigning theory by an empirically superior one. The available data often lend support to two competing views, as was the case examined in this book. The tendency among historians has been to search for social factors that contributed to the acceptance of one view or the other, but Buchwald's approach is to unravel the conceptual intricacies of both the particle and the wave theories of light. While stressing the importance of experiments and experimental technique for the development of the new optical theory, he argues convincingly that the "victory" of wave over particle theory owes much to the conceptual resources of the wave theory. These resources facilitated the more effective use of new mathematical techniques for analyzing optical phenomena.

The book is divided into three parts. The first discusses the shift from geometrical to algebraic techniques in optical analysis. While the new mathematical apparatus had the benefit of increasing the accuracy of analysis, more importantly, it allowed a certain vagueness in the understanding of the nature of a beam of light. This vagueness was to mask the profound differences between the particle and the wave concepts of light until the mid-1830s.

Particle theorists, or "emissionists," believed that a beam of light comprises many rays, which are in turn composed of streams of particles. In this scheme the various phenomena of light—reflection, refraction and so on—are understood in terms of Newtonian forces acting among these particles. The new mathematics enabled Jean-Baptiste Biot to develop a variant of this theory, in which the primary unit of analysis was the ray itself. Thus, while the "selectionists," as Thomas Young was to call Biot and his followers, still believed the ray to be physically real and ultimately composed of particles, the physical structure of the ray was not essential to optical analysis. What both selectionists and wave theorists failed to understand for some time was that the rays of the wave theory had a different ontological status altogether, in that they are mathematical