I met Miss Payne, I considered her intelligence to be vastly superior to my own, and I still do. (Even after her degree, we called her "Miss Payne," but Shapley was always "Doctor Shapley.") However, the reader should be warned that because of this jealousy the autobiography is far from a balanced account of the Harvard Observatory, such as that given earlier by Bailey in 1931, *The History and Work of Harvard Observatory 1839 to 1927*. As a result, many pertinent names are absent from this section. These include Emma T. R. Williams (Vyssotsky), the first woman to follow after Miss Payne for the second Radcliffe PhD in astronomy, in 1930. Though much is written about Miss Annie J. Cannon, the only mention of Margaret Walton Mayall, her devoted assistant, close friend and companion for many years, is in the caption of a group photograph. Whereas Payne-Gaposchkin resents the fact that Harry Plaskett would talk no science with her, but only social chit-chat, she in turn ignores the years of service to Harvard and the Milky Way of the illustrious Bart Bok, and mentions him only as a family man. Katherine Haramundanis has tried to round out the picture of people at the observatory, but her material is not covered in the index, which is based solely on the autobiographical section.

Nevertheless the reader will find this a stimulating account of the brilliant mind and extraordinary life of an astronomer who was herself responsible for much of the development in 20th century astronomy.

The Physical Principles of Computed Tomography

William R. Hendee
192 pp. Little Brown, Boston, 1983. $32.50

The introduction of the first clinical x-ray computed tomography machine in 1971 heralded a new era of radiological imaging. The subjects required to understand computed tomography include basic radiation physics, computer science, and imaging science. Past attempts at including the "basics" of these diverse fields in one book on clinical imaging, and at aiming the book at a broad audience including physicians, physicists, engineers and technologists, have failed. Invariably, what one group views as "basics" is considered "advanced material" by another. William Hendee has tried to write a book on the principles of computed tomography aimed at this same diverse audience. He has succeeded in producing a useful introductory text for physicians and technologists but that is of limited use to engineers and physicsts.

Brevity is both the strength of the text, as a survey for physicians and technologists, and its weakness, as a study guide for scientists trying to master new imaging modalities. Hendee can barely cover the vocabulary of computed tomography in the book's 192 pages. His chapters on the history of the new technique, physical characteristics of scanners, reconstruction of the tomographic image and performance evaluation and dose in computed tomography, although easy to read, are too short to serve as texts. Even with the bibliographies (mostly citations before 1981) appended, the material is incomplete for a serious student. However, the restriction in space also affects the book's usefulness to physicians; for example, dose evaluation is given only one page. Effects of various parameters on radiation dose, including table incrementation and slice width, are not discussed in any detail, although they are critically important to physicians prescribing computed tomography studies.

The best chapters of the text are those on x-ray attenuation coefficients of tissues, data acquisition and computers, and data display and recording (all of which, though brief, are fairly complete). The applications chapters on the use of computed tomography in radiation treatment planning and on the quantitative interpretation of data, both of which had more up-to-date bibliographies, also were comprehensive.

Lastly, emission computed tomography, ultrasonic computed tomography and nuclear magnetic resonance imaging, are discussed in sketchy chapters with little physics. They would be better studied elsewhere.

Overall, the text is a useful survey book for physicians and technicians. Physicists and engineers hoping to find a source book with direction to good bibliographies should look elsewhere—perhaps to the book most often cited by Hendee, *Radiology of the Skull and Brain: Technical Aspects of CT*, edited by T. H. Newton and D. G. Potts (Mosby, St. Louis, 1981).

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A Symmetry Primer for Scientists

Joe Rosen
131 pp. Wiley-Interscience, New York, 1983. $26.95

A Symmetry Primer for Scientists consists of two distinct parts. The first third of the book is devoted to an exposition of the basic elements of group theory. In the last two thirds, Rosen gives his perspective on the meaning of symmetry in physical theory. In spite of being designated a "primer," the book is not easily digested because many of the arguments in the latter portion of the book are quite formal. While the required physics background is slight, the demands of abstraction placed on the reader are great. Regrettably, the returns are not commensurate with the effort required.

The treatment of group theory is fairly conventional and rather clearly presented. The concepts of isomorphism, homomorphism, conjugacy classes, and cosets are explained effectively. Unfortunately, this strong feature of the book is not exploited, for many of the concepts so well presented in the first two chapters never reappear in the final four.

Unlike the treatment of group theory, the discussion of symmetry is very idiosyncratic. The presentation is not restricted to quantum systems whose states give representations of the existing symmetries. Instead the author deals with "states" in a more general way, including simultaneously quantum states and macroscopic states. This generalization leads to a very formal development and the invention of an extensive vocabulary that must be mastered: "Laws of nature . . .we called 'causal relations in systems' when the 'systems' are processes in physical systems, with the 'cause subsystem' being the initial state of the physical system and the 'effect subsystem' its final state." Because such passages abound and useful physical examples are few, the book cannot be recommended as a text.

The style of the book is overly colloquial, sounding much as if it were a transcript of a lecture, and there is a condescending quality which reaches its apex when, on page 157, we are presented the information: "(Isaac Newton, English philosopher and mathematician, 1642–1727)." Newton was, of course, a natural philosopher. The distinction is important, for this book contains too much philosophy and not enough natural philosophy.

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Vibrations and Waves

W. Gough, J. P. G. Richards, R. P. Williams
278 pp. Wiley, New York, 1983.
$64.95

Vibrations and waves play a central role in many areas of current physics and its applications, from elementary particle theory to the design of integrated circuits. A good course in this area can consolidate a student's knowledge of classical physics and lay the groundwork for a thorough understanding of quantum mechanics. This concise, well-written text provides the material needed for such a course, which could be taught to physics sophmores as well as applied math majors. The book could also be used as a supplementary text for courses in acoustics or optics.

The expected topics are covered, and in the expected order: Early chapters on oscillations—free, damped, driven and coupled—lead to a longer and nicely unified discussion of waves and their properties. Fourier analysis occupies more than its usual share of a book at this level, and the discussions of convolutions, Dirac delta functions, and the uncertainty principle are welcome additions. Although *Vibrations and Waves* is quite complete in its coverage, its brevity is a hindrance in some respects. A single page treats the polarization of light, a paragraph gives