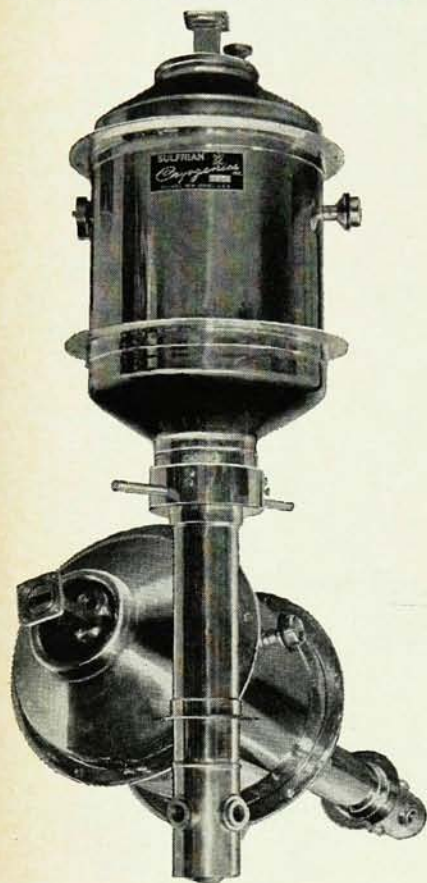


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new observations and current interpretations and gives little indication of the numerous puzzles and questions that these observations raise.

No question remains unanswered, though competing theories do share credit at times. Thus students may view astronomy as a collection of facts now known, rather than a collection of questions to be answered.

The book will remain a useful reference accessible to readers without a college math or science background. Numerous problems and a few recent references with each chapter aid the student. However, several more recent books—Krogdahl's "The Astronomical Universe" is a good example—merit higher grades as a modern college text for many schools.

Lasers and Applications. Symp. Proc. (Columbus, Ohio, 1962) W. S. C. Chang, ed. 267 pp. Ohio State Univ. Press, Columbus, 1963. \$7.00.

Reviewed by H. J. Hagger, Albiswerk Zürich, Switzerland.

The field of quantum electronics which the lasers belong to has advanced very rapidly, and new discoveries follow each other. So in this situation a symposium conducted in short sequence on such a very special subject seems necessary. A collection of papers of the Symposium on Lasers organized in Columbus, Ohio, November 7-8, 1962, is presented by W. S. C. Chang. Optical and semiconductor lasers are considered. The most recent and interesting materials, such as CaF_2 , and new pumping methods are described, e.g., double pumping, pumping by exploding wires, etc. Nonlinear properties, especially in connection with modulating and mixing optical frequencies, as well as parametric photo interaction between radiation and matter, are studied. In the application section, absorption in water vapor of laser radiation and satellite tracking systems are considered. Some experimental results on coherence of laser output and on the interference patterns of the ruby-laser end surface are given.

This book gives a good survey on the state of the art, and it may serve well as a collection of data and ideas and as a discussion of the most recent problems. It is intended for the man

working in lasers, and it fulfills this purpose very well. Thus it can be highly recommended in this respect, but one must look at it as a survey book on the state of the art which may be out-dated to some extent at the moment the next symposium is held or entirely new discoveries on this subject are made.

Waves and Oscillations. By R. A. Waldron. 135 pp. Van Nostrand, Princeton, N. J., 1964. Paper, \$1.75.

Reviewed by Richard V. Waterhouse, The American University.

This is the fourth of a series named Momentum Books, issued under the general editorship of E. U. Condon. These books, says the blurb, "were conceived with a purpose . . ." (no labours of love here, presumably!) "to serve the modern inquiring mind. Scientist, engineer, teacher, student, inquisitive layman . . . will find, etc. etc. Each Momentum book is a lucid and accurate analysis of an area of . . . physics".

In pursuit of this compendious goal, the author proceeds to pack a good collection of material into the pages at his disposal. In compiling such a book, there is a huge amount of material to choose from, and it seems reasonable for an author to follow his personal taste in the selection. Here electromagnetic waves, in and out of wave guides, receive the most attention, and this reflects the main professional interest of the author. There is a gesture in the direction of wave mechanics: the author devotes 2 pages to Schrödinger's equation and the uncertainty principle, but for the rest the waves treated are classical ones. Reflection, refraction, interference, and diffraction are discussed. Masers are mentioned, but only in a footnote.

The treatment is mostly at an undergraduate level, although the author occasionally drops a more recondite titbit to spur further investigation; for example, he mentions that the real and imaginary parts of the impedance of an electrical network, given as functions of frequency, are mutually dependent, being a pair of Hilbert transforms.

The use of language is generally adequate although in the introduction the author manages to contradict

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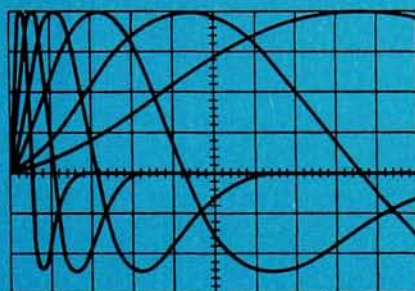
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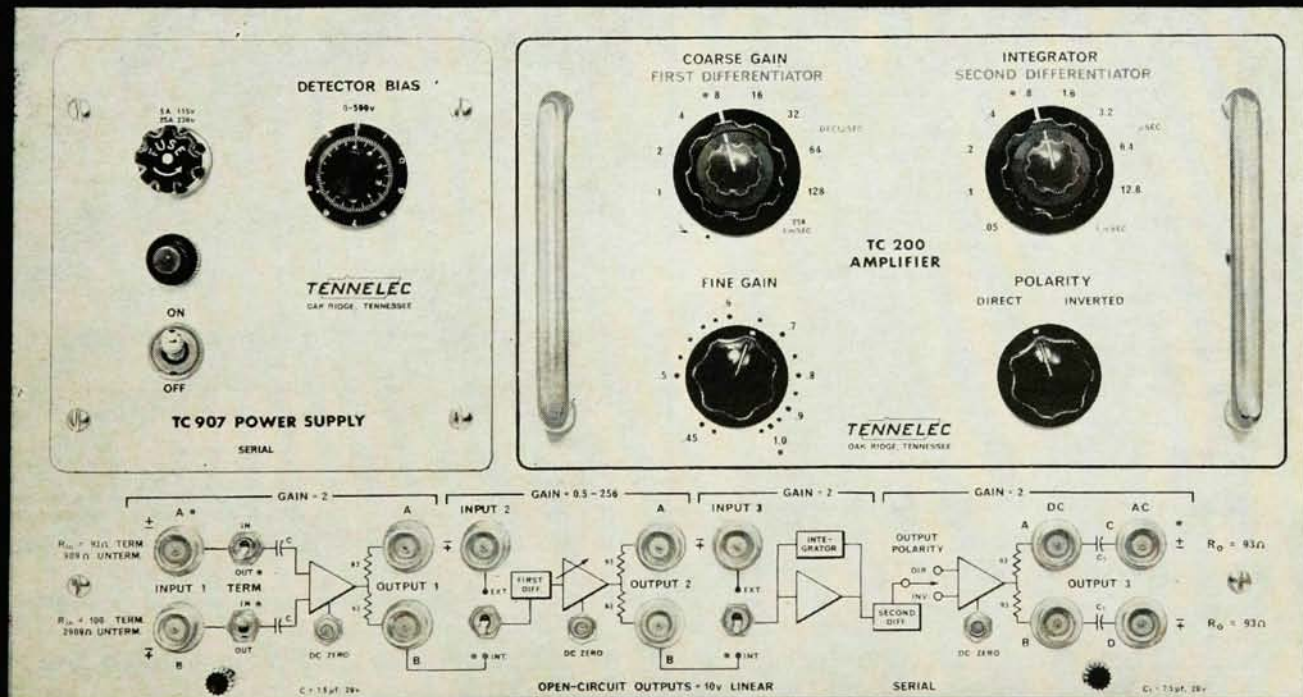
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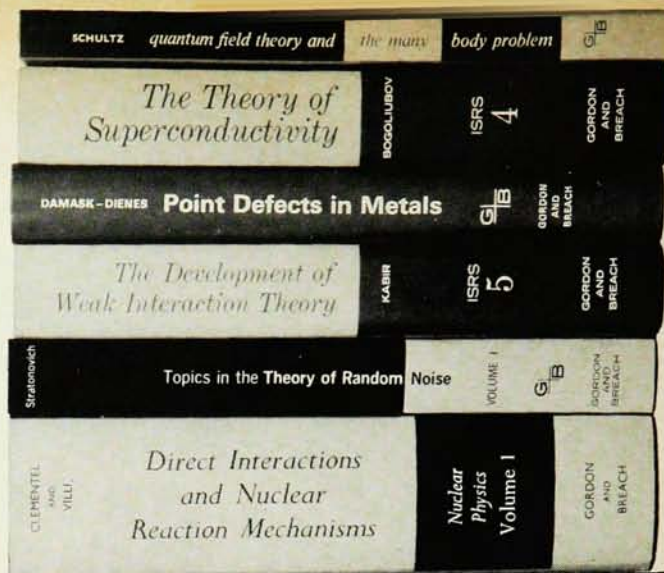
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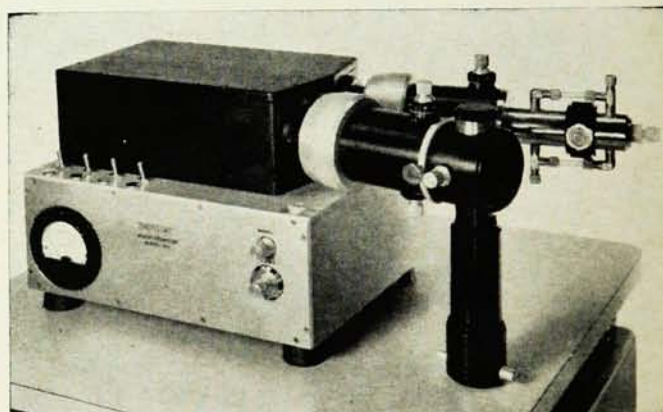
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himself on the matter of whether or not we can see surface waves on water. Likewise, his definition of a wave as "something that can be treated by wave mathematics" seems less satisfactory for his purpose than the common dictionary one of a wave as a motion periodic in space and time.

The book ends with an index, a list of symbols, and a short but far-flung bibliography. One might have to travel a long way to discover a copy of his first reference, *Waves and Ripples in Water, Air, and Aether*, London Society for Promoting Christian Knowledge, 1912. The text contains about a hundred line drawings which are very useful, and 4 plates which are fair. In general, I think the author and publisher have produced a worthwhile and inexpensive book.

Statistical Thermodynamics. By John F. Lee, Francis W. Sears, and Donald L. Turcotte. 374 pp. Addison-Wesley, Reading, Mass., 1963. \$10.75

Equilibrium Statistical Mechanics. By Frank C. Andrews. 206 pp. Wiley, New York, 1963. \$5.00

Reviewed by Joseph L. Katz, University of Copenhagen.

During the last four years several good introductory statistical mechanics textbooks have been published. To the growing list of worthwhile texts these two books must be added.

Statistical Thermodynamics is a well-written careful survey of the applications of statistical mechanics, but its discussion of the basic ideas is very brief, and its proofs are of the Lagrange-multiplier hand-waving type. In reality the reader is asked to accept the dubious foundations because of the excellent agreement with experiment. The agreement with experiment is very thoroughly documented, better than in almost any other text, as the reader works through chapters on the kinetic theory of gases, the Einstein and Debye crystals, fluids, chemical equilibria, and almost all the other easily solved problems in statistical mechanics. It even includes two well-written chapters on fluctuations and irreversible systems, covering Brownian motion, Johnson noise, the Onsager reciprocal relations, and related phenomena. In their preface the authors clearly indicate that

this book is intended as a text for engineering students. For engineering students, for organic and biochemistry majors, and for any other science students who wish to learn the applications, but not the foundations of statistical mechanics, thoroughly and with a minimum of effort, this book can be highly recommended.

Equilibrium Statistical Mechanics perfectly fills the void left by the above book. It is a thorough text which does a good job of covering the fundamentals. The book is brief (only 200 pages) and cheap, an added attraction with today's high textbook prices, but still manages to cover all the traditional topics: the ideal gas, both classical and quantum, metals, the photon gas, perfect crystals, and dense fluids. There is no hand waving here. The derivation of the canonical distribution, for example, is rigorously obtained in only one page, and without the use of Lagrange multipliers. Because of the large number of topics covered in such a brief volume, and to some extent, because of the author's almost completely successful attempt at rigor, large parts of this book are too difficult for the beginner. I strongly recommend this book, but only as a refresher text for someone who has already had an introductory course, or as the text in a course where the instructor will greatly expand the material in his own lectures.

Mass Spectrometry of Organic Ions. F. W. McLafferty, ed. 730 pp. Academic, New York, 1963. \$24.00

Reviewed by Stuart A. Rice, University of Chicago.

This compendium of articles on mass spectrometry comes close to achieving the aims set forth in the preface: the volume is, it is stated, intended to give comprehensive and up-to-date reviews of particular fields of mass spectrometry and to provide other scientists with references to the theory and applications.

The first few chapters give good surveys of the quasi-equilibrium theory of mass spectra and of ion molecule reactions. In suggesting these articles to graduate students, I have found the second subject to be much more clearly presented than the first.

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