inal contributions to virtually every branch of classical physics. Although Rayleigh had placed his "finger on the open wound in theoretical physics," as Walther H. Nernst remarked after the Solvay conference of 1911, he remained to the end of his life content to work within the classical tradition, preferring to let the younger men explore the new leads of quantum mechanics, relativity and atomic models.

It is clear from this biography that Rayleigh possessed a deep sense of the importance of the mystery of nature and man's existence. His capacity for suspending judgment was unusual. He was easily impressed but very difficult to convince.

Historians of science and physicists alike will be grateful to Howard for making available this splendid edition of an important biography and source book.

ERWIN HIEBERT
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Advanced Electricity And Magnetism
By W. J. Duffin
300 pp. McGraw-Hill, New York, 1969. $9.00

There are times when it seems that what this world needs least is another book on electricity and magnetism, yet there always seems to be a new presentation, arrangement or approach that makes the new book a worthwhile addition. This new book by W. J. Duffin of the University of Hull, England, differs from so many others covering the same general field because it is truly aimed at the student who has already received a good grounding in electricity and magnetism, and is now in his second course.

The arrangement is also something of a departure from the customary text. The first chapter deals with steady electric fields and the second with steady magnetic fields. The third chapter discusses slowly varying currents, so that by chapter four it is possible to introduce Maxwell's equations. Thus the first unit or part of the book is completed, which Duffin calls "Basic Electromagnetism." It is really a neat and well done presentation in less than one hundred pages.

There are four more parts to the book, each consisting of two chapters. They are, in order: "Potential Problems," "Electromagnetic Waves in Matter," "Hardware," and "Field Theory." With what might be considered typical British frankness, Duffin calls linear-network problems and waveguides, cavities and aerials exactly what they are, "hardware." The section on field theory is one usually not found in such texts and it is well handled. It would appear that a course in electricity and magnetism can do with a discussion of this type and at this level.

This is much more than an introduction to electricity and magnetism, yet it is not suitable for graduate students, which the author makes perfectly clear when he calls it "an advanced book for undergraduates." But it is hard to place it in an undergraduate curriculum in an American college. Most courses in electricity and magnetism, after the initial physics sequence, are full year courses and justifiably so. It would be an excellent book for a one-semester four-hour per week course that followed a really strong four-semester introductory course in physics.

There are many good problems at the ends of the chapters, and the answers in the back are in many instances brief discussions of the important points in the solutions. This is typical of the quality of writing in the book throughout. There is also a good table of symbols in the front of the book and several fine appendixes touching on such topics as vectors and matrices.

JAMES B. KELLEY
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Adelphi University

Cohérence Optique: Classique et Quantique
By J. F. Vinson
114 pp. Dunod, Paris, 1969
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The concept of coherence in optics has been discussed by physicists for a very long time but mostly from a classical point of view. In the usual classical treatments of interference phenomena, one treats either the case of complete coherence or total incoherence.

In the first case, the complete dependance upon phases is implied, but in the latter case complete independence of phases is assumed. In both cases, we discuss the superposition of

waves with or without phase dependence. The quantum-statistical description of coherence had not been widely applied to various optical problems until about twelve years ago when the Twiss caused one to consider the concept on a broader and more fundamental basis.

The author has performed a very great service to the physics community by bridging the classical concepts of coherence of electromagnetic radiation with the quantum mechanical and statistical treatments. His words are few but well chosen. A student with a background in statistical mechanics and second quantization should have no difficulty in following the text. The format is such that one can go in a relatively short time from a basic knowledge of classical coherence to a fairly sophisticated understanding of the quantum-mechanical treatment. The major drawback for the US audience is that the book is written in French.

HAROLD MENDLOWITZ
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Statistical Theory Of Signal Detection

By Carl W. Helstrom
(2nd edition) 467 pp. Pergamon, New York, 1968. $12.00

Almost any physical measurement is bound to include some kind of random error or unwanted information. Usually the unwanted information is in the form of random fluctuations or "noise." The detection and resolution of signals in this random noise, and the estimation of signal parameters, are what this book is all about.

The author, Carl W. Helstrom, professor of applied electrophysics at the University of California, San Diego, is well known to engineers involved in signal processing: His present book is revised and enlarged from the 1960 edition.

Much of it has been rewritten (including an updated bibliography), although the approach taken in the first edition was retained. However, the treatment of several topics has been modernized, simplified and made more efficient. In particular, the likelihood ratio, now prominently appearing in recent literature, has been used throughout the book instead of the repeated use of sampling theory.

New topics have also been included such as: digital communications, and the sequential, nonparametric and adaptive forms of detection. The treatment of the ambiguity function and the detection of stochastic signals have been expanded and brought up to date.

One need not be a radar specialist or a communications theorist to find this book extremely useful. Directed at the mathematical-minded engineer, the book consists of an elementary and heuristic treatment of those aspects of noise theory that are most useful in a study of the detection of electrical signals.

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Solid State Physics

By J. S. Blakemore
391 pp. Saunders, Philadelphia, 1969. $13.50

There is certainly no shortage today of books on solid-state physics of all levels of sophistication, detail of treatment and degree of pedagogical wisdom. Unfortunately, few, if any of them can be used as the only text for a particular undergraduate, not to speak of a graduate, course.

The newest of these is the present slender volume that is aimed at a one-semester senior course. Its main characteristic is the avoidance of mathematics and the resulting need for qualitative arguments and deductions. This is not always an easy task and the results are sometimes disappointing.

The author, who is professor at Florida Atlantic University, wisely did not attempt to cover the whole of the basic solid-state physics but chose several topics such as lattice dynamics, electrons in metals and so on, and treated them in some detail. The level of the various chapters is not even; some are done very well and others leave something to be desired. Particularly gratifying is the brief discussion of the Kronig–Penney model, which some authors consider unimportant. The sections dealing with thermal conduction, lattice dynamics and semiconductors are particluarly well done.

This is also one of the rare books in which the recent Tosi and Fumi ionic radii are used instead of the dubious