contributors, and deal with four juxtaposed topics: magnetic fields due to currents, microwave techniques, reactor-associated physics, and nuclear kinematics—a sort of miscellany of technical "hand-book" material. There are some interesting pieces in the remaining quarter—some sixty pages covering a dozen diverse topics—but it is too dispersed and scrappy to be effective.

Samuel Devons
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Gravitation and The Universe

By R. H. Dicke
82 pp. American Philosophical Society, Phila., Pa., 1970. $2.50

In the last decade, some incredibly ingenious experimental tests of Einstein's gravitational theory have been proposed or performed. They involve, for example, Mössbauer methods, radar, supercooled gyroscopes and gravity-wave detectors. Princeton's Robert Dicke has consistently been close to where the action was, and has even sponsored a rival relativistic theory. He is particularly associated with three superb experiments for which he likes to cite the earth and sun as part of his "apparatus" and the universe as his "laboratory." These are: an Eötvös type of experiment that establishes the proportionality of inertia and gravity for gold and aluminum to one part in 10^{11}, improving previous accuracy by a factor of 500; an optical measurement of the sun's oblateness, which, if due to a fast rotation of the core would account for about 10% of the "relativistic" advance of Mercury's perihelion and thus upset general relativity, and the search for, and discovery of, the thermal-radiation fall out from a "big-bang" origin of the universe. The book under review consists of three 1969 lectures to a general audience, and it tells in fascinating detail, with the help of some 40 illustrations, about these three experiments and their theoretical implications, and also some historical sidelights.

Wolfgang Rindler
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Integral Equation Methods

By C. D. Green
243 pp. Barnes & Noble, New York, 1970. $15.00

The subject of integral equations is usually part of a course in mathematical physics, and there are at least two excellent references available: the monographs by F. G. Tricomi and S. G. Mikhlin. It is then natural to ask whether this book by C. D. Green is in any way an improvement over the sources already available. Unfortunately my answer must be a negative one.

Although the author includes all the topics that one would want in a book on integral equations, the treatment is very often superficial, offering little real insight into why methods work when they do, and when they can be expected to fail. No general conclusions are drawn from the few numerical examples presented. Short and confusing discussions are given of several topics, such as stochastic processes, Monte Carlo methods and the steepest-descent method. The latter is covered in a page and a half, leaving the reader with no clue as to the subtleties involved. The only really new textbook material is a chapter on dual-integral equations. There is almost no discussion of purely numerical methods. This is unfortunate since such a chapter would represent a real contribution when digital computers are widely available.

One misses in this book the insight of a master, such as that which characterizes the work of Tricomi. The little additional material included would appear to me to be insufficient for a new work on the subject.

George Weiss
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Advances in Plasma Physics, Vol. 3

A. Simon, W. B. Thompson, eds.
249 pp. Interscience, New York, 1969. $14.95

"We feel a desperate need for some review volume that will present authoritative discussions of advances in the several branches of plasma physics and even perhaps form a channel of communication among plasma physicists with allegiance to CTR, space physics, astrophysics, direct conversion, ion engines, solid state, and so forth." Thus the editors, Albert Simon, University of Rochester, and William B. Thompson, University of California at San Diego, introduced Volume 1 of their *Advances in Plasma Physics*. These review volumes have been coming out quite rapidly in the last year or so, and Volume 3 differs considerably from the other two. The first two volumes covered a fairly wide range of subject matter, whereas this volume is restricted to theoretical papers on kinetic theory and plasma wave phenomena.

The longest paper, which is also the lead article in the volume, concerns kinetic theory of plasma waves in a magnetic field and is a published version of the course that the authors, David Baldwin, Ira Bernstein, and M. P. H. Weenink, have been giving for the past few

years at Yale. Its chief novelty is contained in the analysis of recent problems involving the solution of the Vlasov equation in finite geometries.

In a short second paper Bernstein presents an interesting treatment of electron distribution functions in weakly ionized plasmas.

Perhaps the most unique of the three articles in the volume is the last one in which E. G. Harris, of the University of Tennessee, shows the value of treating nonlinear phenomena in plasmas by the quantum mechanical method, even though he pushes all his calculations to the classical limit. In a way this would seem a curiously complicated way of treating classical plasma phenomena, but Harris demonstrates with considerable skill that much is to be gained by the quantum-mechanical viewpoint even in dealing with classical problems.

Sanborn C. Brown
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The Story of Quantum Mechanics

By Victor Guillemin
332 pp. Scribner's, New York, 1969. $8.95

This book is more than an account of quantum mechanics and its development. The author also discusses such varied subjects as Newtonian mechanics, electromagnetism, the solid state, and elementary particles, and he speculates about the existence of quarks, the nature of space and time, the meaning of causality, and whether Man has free will. The author paints with a wide brush, overlooking detail, in order to present the layman with a panoramic picture of modern physics, its origins, and its philosophical implications.

Victor Guillemin, a student of Arnold Sommerfeld in the early days of quantum mechanics, is well suited to his task. On the whole, he succeeds in bringing to the reader a feeling for the remarkable structure of quantum mechanics and the magnificent achievements of such men as Newton, Maxwell, Planck, Einstein, Rutherford, Bohr, Schrödinger, Heisenberg, and Dirac. But because Guillemin's subject is so big, it is inevitable that he treats some topics in so perfunctory a manner that he would have done better to omit them altogether. For example, he devotes only short paragraphs to the laser and the semiconductor, and only a single sentence to superconductivity.

The author stresses the idea of symmetries in physics, both exact and approximate. Without going into the mathematical details, he partially succeeds in conveying to the reader an idea of the connection between symmetries and conservation laws. In discussing the breaking of parity and charge-conjugation symmetries, he considers the possibility that the combined symmetry CP still holds. Unfortunately, he neglects to mention an experiment that is intepreted as a breakdown of CP invariance: the observation that the long-lived neutral K meson decays into two pions.

Guillemin's discussion of philosophy ranges from Socrates to William James. Much of what the author says is controversial, but his discussions are well presented and stimulating.

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Electrodynamics of Particles and Plasmas

By P. C. Clemmow, John P. Dougherty
457 pp. Addison-Wesley, Reading, Mass., 1969. $17.50

For many years the standard book on classical electrodynamics has been that of J. D. Jackson (Wiley, New York, 1962). Now two applied mathematicians, P. C. Clemmow, a lecturer in the department of applied mathematics and theoretical physics at Cambridge University, and J. P. Dougherty, a University lecturer at the same institution, have covered much of the same material but aimed rather more specifically towards plasma physics.

This new book, as did Jackson's, treats the mathematics of electrodynamics with almost no reference to experimental observation or laboratory approaches to these problems. Both books are aimed at the beginning graduate student and can be used as a text covering the theoretical background of electrodynamics. At the end of each chapter Clemmow and Dougherty have presented problems that will be useful to test students on their grasp of the material. My own preference is to develop problems that are suggested by the text material rather than by an extension of it. The authors clearly do not have this same point of view because many of the problems are derivations of formulas presented in the appropriate chapters. In addition to the usual material covered in a course on electrodynamics, such as Cerenkov radiation, gyro radiation, magneto-ionic theory and the Boltzmann equation, these authors go fairly deeply into microinstabilities, magnetohydrodynamics and advanced kinetic theory.

If this book is used as a text in plasma physics, the student will have to rely almost wholly upon the instructor to demonstrate the relevance of this material to the real world, because the approach is highly theoretical. Although reference is given to