

sented. This is followed by Copson's solution, comparatively simple and of much wider application, and the chapter ends with an elementary discussion of the dual integral equations that arise from the Beltrami method.

The last subject is taken up more actively in chapter 4. Indeed this chapter, with the next one on dual series equations, really forms the kernel of the book, and one has the impression that the physical problems were introduced to illustrate the use of the dual equations rather than the opposite. The very full discussion of these techniques in chapters 4 and 5 is rounded off by chapter 6, on triple equations. And the book ends with several applications of the mathematical methods thus developed to various problems of electrostatics.

Mixed boundary problems have tended to be ignored in standard textbooks of applied mathematics, possibly because one has to explain so much before even starting to expound them. One notable exception is the short discussion of the subject in the same author's earlier book on Fourier transforms. The book under review therefore merits a particular welcome in that it fills a real gap in the literature. Moreover the large range of mathematical techniques presented will make it useful quite apart from the specific class of problems to which it is directed. As in his previous textbooks the author has combined his characteristic forthright style with mathematical virtuosity and with a wide knowledge of the interesting problems of physics.

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Statistics of the stars

INTRODUCTION TO STELLAR STATISTICS. By Rudolf Kurth. 175 pp. Pergamon Press, Oxford, 1967. \$8.00

by George Weiss

There are two potential audiences for which this book might have been intended: astronomers interested in the applications of statistics to celestial phenomena, or statisticians wishing to acquire a feeling for the uses of statistics in astronomy. Both of these audiences are very likely to be disap-



pointed in Rudolph Kurth's monograph.

There is a single, long chapter on probability and statistics. Compression of all of the important facts into one chapter must inevitably lead to the exclusion of many important ideas, as indeed is the result here. The reader can only conclude that the theory of statistics is limited to the classic parameters related to the normal distribution. There is no hint of distribution-free tests, sequential analysis or any work more recent than the early 1930's. Furthermore there are no examples anywhere in the book discussed in sufficient detail to allow the reader to see what issues are to be settled in real estimation problems, what sort of data there are to describe the issues, and what are other possible techniques for describing the data. Like the author, I have doubts as to the validity of recent work by Neyman and his collaborators, but the ideas that they introduce are not entirely implausible and deserve some discussion.

If one approaches the monograph from the point of view of the statistician interested in astronomy, one is also likely to be fairly uninformed after reading it. The author writes in a telegraphic style that does not allow anyone not acquainted with astronomy to acquire a clear picture of the problems that are of real interest. Again, the lack of real data is a very serious defect in the exposition. I was also disappointed that there is no mention of the role of stochastic processes in astronomy, particularly of the work of Chandrasekhar, Ambarzumian and Münch. Surely, these constitute a real contribution to theoretical astronomy and deserve mention in a monograph on stellar statistics.

The subject matter treated here is potentially a fascinating field in itself. Unfortunately, the author has not suc-

ceeded in conveying the interest or excitement of the field to the reader.

* * *

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Landau's general physics

GENERAL PHYSICS: MECHANICS AND MOLECULAR PHYSICS. By L. D. Landau, A. I. Akhiezer, E. M. Lifshitz. 372 pp. Trans. from Russian. Pergamon Press, Oxford, 1967. \$8.00

by H. H. Barschall

The Course of Theoretical Physics by Lev Landau and Eugene Lifshitz is generally regarded as an outstanding series of texts on the graduate level. Less well known is Landau's *General Physics*. In 1937 he prepared a manuscript for an introductory text but did not publish it. Notes were published, however, in 1948, based on lectures in general physics that Landau gave in the applied physics department at Moscow University.

The volume under review is based on the 1937 manuscript and the 1948 notes, and was prepared by A. I. Akhiezer and Lifshitz. Although the book was published before Landau's death, it was written after his tragic automobile accident so that he could not contribute to its preparation himself.

The subtitle of this volume is *Mechanics and Molecular Physics*. The book begins with a discussion of the basic concepts of mechanics, such as velocity, acceleration, and force. These concepts are treated clearly and simply without the confusing attempts at rigor that one finds in some of the widely used introductory texts. The

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entire subject of mechanics takes up only 100 pages. The rest of the book deals with thermodynamics, kinetic theory, chemical and solid-state physics. The emphasis on the various subjects reflects Landau's own interests. For example, liquid helium is mentioned in four different places, including a six-page discussion of superfluidity.

Landau's *General Physics* would hardly be suitable as a text for an introductory course in this country. Many of the topics are not usually considered elementary. The approach is purely theoretical. There are no numerical examples or problems. Nevertheless Landau's *General Physics* should be useful for the instructor, and, as a supplementary reference, for the student, along with Feynman's *Lectures on Physics*. Unfortunately only the first part of Landau's *General Physics* is available, and there is no indication whether the rest of the course will be published later.

* * *

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All about magnetic fields

MAGNETISM AND THE COSMOS. (NATO Advanced Study Institute, Newcastle Upon Tyne, 1965) W. R. Hindmarsh, F. J. Lowes, P. H. Roberts, S. K. Runcorn, eds. 436 pp. American Elsevier, New York, 1967. \$27.50

by S. Fred Singer

The magnetism of the earth was demonstrated over 300 years ago by William Gilbert, Queen Elizabeth's physician, in his treatise, *De Magnete*. The discovery of the magnetic field of the sun took place about 50 years ago and since then, magnetic fields have been found in other stars, in other planets of the solar system (Jupiter and possibly Saturn), and have been deduced to exist or have been measured in interplanetary space in the galaxy. This volume is divided into five sections: geomagnetism (12 papers); stellar magnetism (6 papers); solar magnetism (6 papers); planetary magnetism (12 papers) and solar-system magnetic fields (3 papers). Galactic magnetic fields are not specifically discussed.

The volume is the result of a NATO

Advanced Study Institute and has many aspects of a symposium report. The papers, although individually excellent, sometimes have little coherence. The section on geomagnetism starts with a classical review paper by Sidney Chapman on solar-terrestrial relations, involving the earth's magnetic field, and continues with papers dealing with straightforward geomagnetic measurements, radiocarbon effects, rock magnetism, electrical conductivity of the mantle, and magneto-hydrodynamic theory.

Perhaps this serves as a demonstration that geophysics is a subject requiring broad scientific knowledge and the cooperation of many disciplines: physics of all kinds, chemistry, geology, astronomy and even biology.

There is considerable variation in the contributions. Some of them are frankly described as "Introductory Lectures for the Non-Specialist," for example, a brief description of the Zeeman effect or an extremely compact formulation of the magnetohydrodynamics of plasmas. There are some fine review chapters, particularly by Chapman on geomagnetism, and the inevitable list of detailed papers that give some specialized research results.

On the whole, the contributions make up a well balanced presentation, indicating the wide scope of magnetic phenomena in the universe. Credit must be given to the organizers for the manner in which these contributions have been assembled. The only conspicuous gap, as I noted, is in the matter of intergalactic-field structure and related cosmic-ray effects. The interplanetary magnetic field is only very lightly treated in a couple of contributions. The volume can be strongly recommended to anyone who wishes to learn about the great variety of locales in which magnetic phenomena exist. Geophysicists, astrophysicists, laboratory physicists, geologists, plasma theorists and fluid dynamicists can find a common meeting ground here and will find much of value in this volume.

It is interesting to note that this NATO symposium had good representation from many countries, including a Soviet contribution by the director of the Crimean Observatory.

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NEW BOOKS

ATOMS & MOLECULES

The Physics of Electronic and Atomic Collisions. Conf. proc. (Leningrad, July 1967). Lewis M. Branscomb, ed. 200 pp. Joint Institute for Laboratory Astrophysics, Boulder, Colo., 1967. Paper \$7.00

SOLIDS

The Physics of Large Deformation of Crystalline Solids. By James F. Bell. 253 pp. Springer-Verlag, New York, 1968. \$12.00

An Introduction to the Theory of Superconductivity. By Charles G. Kuper. 301 pp. Clarendon Press Oxford, 1968. \$9.60

Superconductivity in Science and Technology. Conf. proc. (U. of Chicago, 1966). Morrel H. Cohen, ed. 163 pp. U. of Chicago Press, Chicago, 1968. \$5.95

Semiconductors and Semimetals, Vol. 4: Physics of III-V Compounds. R. K. Willardson, Albert C. Beer, eds. 511 pp. Academic Press, New York, 1968. \$22.00

Microplasticity. Charles J. McMahon Jr., ed. 427 pp. Interscience, New York, 1968. \$20.00

High Temperature Materials: The Controlling Physical Processes. A. J. Kennedy, ed. 102 pp. Oliver & Boyd, Edinburgh, 1968. £2. 7s. 6d.

Chemistry and Physics of Carbon, Vol. 3: A Series of Advances. Philip L. Walker Jr., ed. 449 pp. Edward Arnold, London (Marcel Dekker, New York), 1968. \$22.75

MATHEMATICS & MATHEMATICAL PHYSICS

Electric and Magnetic Forces. By R. R. Birss. 165 pp. American Elsevier, New York, 1968. \$6.00

Problems and Solutions in Ordinary Differential Equations. By Fred Bauer, John A. Nohel. 267 pp. W. A. Benjamin, New York, 1968. Cloth \$7.95, paper \$3.95

Probabilistic Methods in Applied Mathematics, Vol. 1. A. T. Bharucha-Reid, ed. 291 pp. Academic Press, New York, 1968. \$15.00

INSTRUMENTATION & TECHNIQUES

Simple and Complex Vibratory Systems. By Eugen Skudrzyk. 514 pp. Pennsylvania State U. Press, University Park, 1968. \$24.50

Vacuum System Design. By N. T. M. Dennis, T. A. Heppell. 223 pp. Chapman and Hall, London (Barnes & Noble, New York), 1968. \$8.00

Experimental Methods in Magnetism, Part 1: Generation and Computation of Magnetic Fields; Part 2: Measurement of Magnetic Quantities. By H. Zijlstra. 532 pp. North-Holland, Amsterdam (Interscience, New York), 1967. \$26.50 per set